Final Environmental Impact Statement
Steller Sea Lion Protection Measures for Groundfish Fisheries in the Bering Sea and Aleutian Islands Management Area

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Abstract: This environmental impact statement provides decision-makers and the public with an evaluation of the environmental, social, and economic effects of alternatives to the Steller sea lion protection measures for the Bering Sea and Aleutian Islands Management Area groundfish fisheries, in particular the Atka mackerel, Pacific cod, and pollock fisheries in the Aleutian Islands. The western distinct population segment (WDPS) of Steller sea lions is listed as endangered under the Endangered Species Act, and the population in portions of the Aleutian Islands is declining. Atka mackerel, Pacific cod, and pollock are principal prey species for Steller sea lions in the Aleutian Islands. This proposed action would implement Steller sea lion protection measures for the Aleutian Islands Atka mackerel, Pacific cod, and pollock fisheries to mitigate the potential fishery impacts on the WDPS of Steller sea lions. This document addresses the requirements of the National Environmental Policy Act.

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Table of Contents

8.0 ECONOMIC ANALYSIS 8-1
8.1 Introduction 8-1
8.1.1 What is a Regulatory Impact Review? 8-3
8.1.2 Statutory Authority 8-4
8.1.3 Purpose and Need 8-5
8.1.4 Alternatives 8-5
8.2 Background 8-8
8.2.1 Trawl catcher/processors 8-9
8.2.2 Non-trawl catcher/processors 8-24
8.2.3 Trawl catcher vessels 8-29
8.2.4 Non-trawl catcher vessels 8-34
8.2.5 State of Alaska Aleutian Islands Pacific cod GHL fishery 8-37
8.2.6 Atka mackerel fishing in the Bering Sea 8-42
8.2.7 CDQ groups 8-44
8.2.8 Aleut Corporation 8-47
8.2.9 Subsistence 8-49
8.2.10 Benefits from Steller sea lion stock health 8-52
8.2.11 Public Finance 8-55
8.2.12 Community economic impacts 8-61
8.2.13 Product markets 8-65
8.2.14 “Revenue-at-risk” methodology 8-67
8.2.15 Gross revenue estimates 8-71
8.2.16 Aleutian Islands/Bering Sea Pacific cod split 8-75
8.2.17 Incidental catches 8-77
8.3 Trawl catcher/processors 8-78
8.3.1 Catches 8-78
8.3.2 Gross revenues 8-80
8.3.3 Fleet redeployment and impacts on other fisheries 8-83
8.3.4 Alternative 1 summary 8-93
8.3.5 Alternative 4 8-94
8.4 Non-trawl catcher/processors (Alternatives 1 and 4) 8-95
8.4.1 Catches 8-95
8.4.2 Gross revenues 8-96
8.4.3 Fleet Redeployment and Impacts on Other Fisheries 8-97
8.4.4 Alternative 1 Summary 8-102
8.4.5 Alternative 4 8-103
8.5 Trawl catcher vessels (Alternatives 1 and 4) 8-104
8.5.1 Catches 8-104
8.5.2 Gross revenues 8-104
8.5.3 Fleet redeployment and impacts on other fisheries 8-106
8.5.4 Alternative 1 summary 8-112
8.5.5 Alternative 4 8-113
8.6 Non-trawl catcher vessels (Alternatives 1 and 4) 8-113
8.6.1 Alternative 1 8-113
8.6.2 Alternative 4 8-115
8.7 Pollock (Alternatives 1 through 4 and their options) 8-115
8.7.1 Introduction 8-115

8.7.2 TAC based analysis 8-118
8.7.3 Spatial/temporal analysis 8-121
8.7.4 Incidental catch of Groundfish and PSC 8-126
8.7.5 Rollover implications 8-129
8.7.6 Fleet and community impacts 8-129
8.7.7 Summary 8-133
8.8 Atka mackerel analysis (Alternatives 2 and 3) 8-136
8.8.1 Introduction 8-136
8.8.2 Critical habitat area closures 8-138
8.8.3 TAC and critical habitat limits 8-140
8.8.4 Maximum retainable amount changes, seasons, and rollovers 8-157
8.8.5 Redeployment 8-159
8.8.6 Incidental catch and PSC 8-160
8.8.7 Fleet and community impacts 8-161
8.8.8 Summary 8-163
8.8.9 Appendix: Critical habitat closure tables 8-166
8.9 Pacific cod trawl catcher/processor analysis (Alternatives 2, 3, and their options) 8-169
8.9.1 Introduction 8-169
8.9.2 Pacific cod harvest limits 8-172
8.9.3 Critical habitat closures 8-176
8.9.4 Seasons and other measures 8-186
8.9.5 Redeployment 8-188
8.9.6 Incidental catch and PSC 8-189
8.9.7 Fleet and community impacts 8-190
8.9.8 Summary 8-191
8.9.9 Appendix: Critical habitat closure tables 8-193
8.10 Pacific Cod Non-trawl Catcher/Processors (Alternatives 2, 3, and their options) 8-198
8.10.1 Introduction 8-198
8.10.2 Pacific cod harvest limits 8-200
8.10.3 Critical habitat closures 8-203
8.10.4 Seasons and other measures 8-208
8.10.5 Redeployment 8-209
8.10.6 Incidental catch and PSC 8-209
8.10.7 Sector and community impacts 8-211
8.10.8 Summary 8-212
8.10.9 Appendix: Critical habitat closure tables 8-215
8.11 Pacific Cod Trawl Catcher Vessels (Alternatives 2, 3, and their options) 8-220
8.11.1 Introduction 8-220
8.11.2 Pacific cod harvest limits 8-221
8.11.3 Critical habitat closures 8-224
8.11.4 Seasons and ESA reinitiation triggers 8-231
8.11.5 Redeployment 8-231
8.11.6 Incidental catch and PSC 8-231
8.11.7 Fleet and community impacts 8-231
8.11.8 Summary 8-233
8.11.9 Appendix: Critical habitat closure tables 8-236
8.12 Pacific Cod Non-trawl Catcher Vessels (Alternatives 2, 3, and their options) 8-244
8.13 Alternatives 5 (Preferred alternative) and 6 8-245
8.13.1 Alternative 5 (Preferred alternative) 8-245
8.13.2 Alternative 6 8-252
8.14 Benefits from Steller sea lion stock health 8-255

8.15 Impacts on other ecosystem resources 8-255
8.16 Community economic impacts 8-257
8.17 Consumers 8-270
8.18 Additional impacts 8-272
8.18.1 Safety 8-272
8.18.2 Enforcement 8-275
8.18.3 In-season management 8-280
8.18.4 Science 8-280
8.18.5 Federal mandates and grants 8-282
8.18.6 U.S. balance of trade 8-283
8.19 Cumulative Effects 8-283
8.20 Summary 8-287
8.21 Comments by the SSC 8-300
8.22 References 8-307
8.23 Preparers and Persons Consulted 8-313
8.24 Index 8-316
9.0 SMALL ENTITY ANALYSIS 9-1
9.1 Introduction 9-1
9.2 The purpose of an IRFA 9-2
9.3 What is required in an IRFA? 9-2
9.4 What is a small entity? 9-3
9.5 Why the action is being considered 9-4
9.6 The objectives of, and the legal basis for, the proposed rule 9-5
9.7 Number and description of small entities directly regulated by the proposed action 9-6
9.8 Recordkeeping and reporting requirements 9-7
9.9 Federal rules that may duplicate, overlap, or conflict with proposed action 9-8
9.10 Description of significant alternatives and their effects on small entities 9-8
9.11 References 9-10
9.12 Preparers 9-11
9.13 Persons Consulted 9-11
9.14 Index 9-12
10.0 COMMUNITY IMPACTS 10-1
10.1 Introduction and Methodology 10-1
10.1.1 Introduction 10-1
10.1.2 Methodology and Document Organization 10-2
10.2 Quantitative Indicators of Community Engagement 10-11
10.2.1 Trawl Catcher Vessels 10-11
10.2.2 Non-trawl Catcher Vessels 10-13
10.2.3 Trawl Catcher/Processors 10-15
10.2.4 Non-trawl Catcher/Processors 10-16
10.2.5 Shore-Based Processors 10-16
10.2.6 Support Services 10-20
10.2.7 Community Engagement in the AI Pollock Fishery 10-23
10.3 Community Profiles and the Local Context of Potential Impacts of Proposed Management Changes 10-24
10.3.1 Adak 10-26
10.3.2 Atka 10-35
10.3.3 Unalaska 10-40
10.3.4 Seattle-Tacoma CMSA 10-48
10.3.5 Other Aleutian Island Subarea Communities 10-54

10.3.6 CDQ Communities 10-55
10.3.7 Other Communities 10-56
10.4 Community-Level Impacts of the Proposed Action Alternatives 10-56
10.4.1 Community Engagement, Dependence, and Vulnerability 10-56
10.4.2 Fishery Engagement Summary: Adak, Atka, Unalaska, and the Seattle-Tacoma CMSA 10-57
10.4.3 Fishery Dependency and Vulnerability to Adverse Community-Level Impacts of the Proposed Action Alternatives 10-63
10.4.4 Risks to Fishing Community Sustained Participation 10-95
10.4.5 Potential Community-Level Beneficial Impacts 10-95
10.5 Cumulative Impacts 10-106
10.5.1 Adak and Unalaska 10-106
10.5.2 Atka and Potential Cumulative Small/Rural Community and Cultural Context Issues 10-111
10.6 Summary 10-114
10.7 References 10-117
10.8 Preparers and Persons Consulted 10-123
10.8.1 Preparers and Contributors 10-123
10.8.2 Persons Consulted 10-123
10.9 Community Impacts Attachments 10-125
10.9.1 Attachment A: Community Detailed Fishery Engagement Tables 10-125
10.9.2 Attachment B: Community Engagement Ranking Exercise 10-144
10.9.3 Attachment C: Indirect Impacts on Subsistence Activities other than Direct Use of Steller Sea Lions, Atka mackerel, Pacific Cod, and/or Pollock 10-147
10.9.4 Attachment D: Overview of Research on Contemporary Fishery Management Actions and Sociocultural Impacts 10-151
10.10 Index 10-154
11.0 RESEARCH NEEDS 11-1
11.1 Groundfish Fisheries 11-2
11.1.1 Fisheries Surveys 11-2
11.1.2 Fisheries Interaction with Steller Sea Lions 11-6
11.2 Steller Sea Lion Research 11-12
11.3 Lack of Commercial Fishing Leading to Less Data and More Need for Research? 11-12
11.4 References 11-13
11.5 Preparers and Persons Consulted 11-15
11.6 Index 11-16
12.0 DISTRIBUTION LIST 12-1
13.0 COMMENT ANALYSIS REPORT 13-1
13.1 Introduction 13-1
13.1.1 The Role of Public Comment 13-1
13.1.2 What is the Response to Public Comments? 13-2
13.1.3 Analysis of Public Comments 13-2
13.1.4 Quality Control and Review 13-3
13.2 Chapter 1 Comments 13-3
13.2.1 NEPA Compliance 13-3
13.2.2 ESA and NEPA Compliance 13-11
13.2.3 ESA Compliance 13-12
13.2.4 Magnuson-Stevens Act Compliance 13-14
13.3 Chapter 2 Comments 13-19
13.3.1 More information needed 13-19
13.3.2 Range of Alternatives 13-23

13.3.3 Preferred Alternative 13-29
13.4 Chapter 3 Comments 13-31
13.5 Chapter 5 Comments 13-35
13.5.1 Forage Ratios 13-35
13.5.2 Foraging 13-36
13.5.3 Harvest of prey 13-38
13.5.4 Natality 13-44
13.5.5 Nutritional stress 13-45
13.5.6 Other factors affecting Steller sea lions 13-49
13.5.7 Overlap between fisheries and Steller sea lions 13-53
13.5.8 Population Effects Analysis 13-55
13.5.9 Population Trends 13-60
13.5.10 Prey 13-63
13.5.11 Recovery 13-70
13.5.12 Uncertainty/lack of information 13-71
13.6 Chapter 7 Comments 13-77
13.7 Chapter 8 Comments 13-80
13.7.1 Redeployment 13-80
13.7.2 Revenue and revenue-at-risk estimates 13-85
13.7.3 Remaining issues 13-90
13.8 Chapter 10 Comments 13-94
13.9 Chapter 11 Comments 13-97
13.10 References 13-99
13.11 Preparers 13-103

List of Figures

Figure 8-1 Retained trawl Atka mackerel catches in the Bering Sea subarea, 2003–2012 8-43
Figure 8-2 Discarded trawl Atka mackerel catches in the Bering Sea subarea, 2003–2012 8-44
Figure 8-3 Typical information in the choice question in the AFSC Steller sea lion 2007 valuation survey 8-53
Figure 8-4 Cumulative percentage trawl catcher vessel Pacific cod harvests in the Aleutian Islands, prior to June 10 8-111
Figure 8-5 Residual Atka Mackerel Wholesale Gross Revenues, by Alternative, Baseline Years 2004 through 2010 8-139
Figure 8-6 Residual Atka Mackerel Wholesale Gross Revenues as a Percentage of Baseline Revenues, by Alternative, Baseline Years 2004 through 2010 8-140
Figure 8-7 Area 543 actual TACs, TACs at a hypothetical TAC equal to 65 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 8-143
Figure 8-8 Area 543 actual TACs, TACs at a hypothetical TAC equal to 50 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 8-144
Figure 8-9 Area 543 actual TACs, TACs at a hypothetical TAC equal to 40 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 8-145
Figure 8-10 Alternative 2 Area 542 TAC analysis 8-149
Figure 8-11 Atka mackerel Revenue streams modified to reflect Area 543 ABC-percentage based TACs under Alternative 2 8-156
Figure 8-12 Revenue streams modified to reflect ABC-percentage based TACs and potential revenue increases under Alternative 2 8-157
Figure 8-13 Hypothetical trawl catcher/processor residual revenues from 2004 through 2010 for each of the Pacific cod alternatives 8-178
Figure 8-14 Hypothetical trawl catcher/processor residual revenues from 2004 through 2010 for each of the Pacific cod alternatives, expressed as a percentage of baseline revenues 8-179
Figure 8-15 Hypothetical trawl catcher/processor gross revenues, by alternative, taking account of the catcher/processor only area-sector limits 8-182
Figure 8-16 Hypothetical non-trawl gear catcher/processor residual revenues in the Baseline Years for each of the Pacific cod alternatives 8-204
Figure 8-17 Hypothetic non-trawl gear catcher/processor residual revenues in the baseline years for each of the Pacific cod alternatives. Expressed as a percentage of baseline revenues 8-205
Figure 8-18 Gross revenues for Alternatives 2 and 3, taking account of the area-sector limits 8-207
Figure 8-19 Pacific cod trawl catches in the vicinity of Atka North Cape, 2004-2010 8-226
Figure 8-20 Hypothetical processor wholesale gross revenues from trawl catcher vessel Pacific cod production for the baseline years for the Pacific cod alternatives 8-227
Figure 8-21 Hypothetic processor wholesale gross revenues from trawl catcher vessel Pacific cod production for the baseline years for the Pacific cod alternatives, expressed as a percentage of baseline revenues 8-228
Figure 8-22 Gross revenues by alternative, taking account of the area-sector limits 8-230

Figure 10-1 North Pacific fishery management areas, Aleutian Islands subarea and districts, and selected Alaska communities 10-8
Figure 10-2 Adak 2010 population structure 10-27
Figure 10-3 Adak 2010 racial structure 10-28
Figure 10-4 Atka 2010 population structure 10-35
Figure 10-5 Atka 2010 racial structure 10-36
Figure 10-6 Unalaska 2010 population structure 10-41
Figure 10-7 Unalaska 2010 racial structure 10-42
Figure 10-8 Seattle-Tacoma CMSA 2010 population structure 10-49
Figure 10-9 Seattle-Tacoma CMSA 2010 racial structure 10-50
Figure 10-10 Aleut Corporation Shareholders in Alaska, by Region of Residence, 2012 10-94
Figure 10-11 Aleut Corporation Shareholders, by State of Residence, 2012 10-94
Figure 10-12 State Waters Aleutian Islands GHL Pacific Cod Fishery 2012 Longitudinal Boundaries and Selected Communities 10-109

List of Tables

Table 8-1 Numbers of trawl catcher/processors with retained Atka mackerel and Pacific cod from retained targeted or incidental catches in the Federal or State of Alaska parallel fisheries in the Aleutian Islands, 2004–2012 8-11
Table 8-2 Numbers of trawl catcher/processors receiving Atka mackerel deliveries from catcher vessels, and the numbers of catcher vessels delivering Atka mackerel to catcher/processors, 2004–2012 8-11
Table 8-3 Numbers of trawl catcher/processors receiving Pacific cod deliveries from catcher vessels, and the numbers of catcher vessels delivering Pacific cod to catcher/processors, 2004–2012 8-12
Table 8-4 Share of Amendment 80 quota share, by firm, 2012 8-13
Table 8-5 Annual allocation of Atka mackerel (measured in metric tons) among Amendment 80 Cooperatives and the open access fishery, 2008–2013 8-13
Table 8-6 Average weights of retained Pacific cod in the BSAI, by year and management area and by gear type, measured in kilograms 8-16
Table 8-7 Trawl catcher/processor retained Atka mackerel catch in the Aleutian Islands (Areas 541, 542, and 543) 8-17
Table 8-8 Trawl catcher/processor retained Pacific cod catch in the Aleutian Islands (Areas 541, 542, and 543) 8-17
Table 8-9 Incidental catch of other groundfish species in the trawl catcher/processor Atka mackerel and Pacific target fisheries in the Aleutian Islands 8-18
Table 8-10 PSC in the trawl catcher/processor Atka mackerel and Pacific target fisheries in the Aleutian Islands 8-18
Table 8-11 Trawl catcher/processor Atka mackerel first wholesale gross revenues, 2004–2011 8-19
Table 8-12 Trawl catcher/processor Pacific cod first wholesale gross revenues, 2004–2011 8-19
Table 8-13 Trawl catcher/processor first wholesale gross revenues from incidental catches other than Atka mackerel or Pacific cod, 2004–2011 8-20
Table 8-14 Aggregate trawl catcher/processor first wholesale gross revenues, 2004–2011 8-20
Table 8-15 Summary of aggregate trawl catcher/processor first wholesale gross revenues by source, 2004–2011 8-20

Table 8-16 Proportion of trawl catcher/processor gross revenues earned from fishing for Atka mackerel and Pacific cod in the Aleutian Islands, 2004–2011 8-22
Table 8-17 Estimated crew sizes for trawl and non-trawl catcher/processors and catcher vessels operating in the Aleutian Islands Atka mackerel and Pacific cod fisheries 8-23
Table 8-18 Estimated aggregate revenues and costs for the seven Amendment 80 trawl catcher/processors targeting Atka mackerel consistently in recent years 8-24
Table 8-19 Numbers of non-trawl catcher/processor vessels with retained Pacific cod catches in the Aleutian Islands, 2004–2012 8-25
Table 8-20 Estimated non-trawl catcher/processor retained catches of Aleutian Islands Pacific cod, 2004–2012 8-27
Table 8-21 Incidental catch of other groundfish species and PSC in the non-trawl catcher/processor Pacific target fisheries in the Aleutian Islands 8-28
Table 8-22 Estimated non-trawl catcher/processor first wholesale gross revenues from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 8-28
Table 8-23 Proportion of fixed-gear catcher/processor revenues earned from fishing for Pacific cod in the Aleutian Islands, 2004–2011 8-29
Table 8-24 Numbers of trawl catcher vessels targeting Pacific cod and making shoreside deliveries 8-30
Table 8-25 Trawl catcher vessel Pacific cod production in the Aleutian Islands 8-31
Table 8-26 Incidental catch of other groundfish species and PSC in the trawl catcher vessel Pacific target fisheries in the Aleutian Islands 8-32
Table 8-27 Estimated trawl catcher vessel ex-vessel gross revenues from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 8-32
Table 8-28 Estimated wholesale gross revenues to processors and catcher/processors acting as motherships from trawl catcher vessel retained catches from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 8-33
Table 8-29 Proportion of trawl catcher vessel ex-vessel gross revenues earned from fishing for Pacific cod in the Aleutian Islands, 2004–2011 8-33
Table 8-30 Numbers of jig catcher vessels targeting Aleutian Islands Pacific cod 8-34
Table 8-31 Numbers of longline catcher vessels targeting Aleutian Islands Pacific cod 8-35
Table 8-32 Numbers of pot catcher vessels targeting Aleutian Islands Pacific cod 8-35
Table 8-33 Aleutian Islands State-waters Pacific cod fishery guideline harvest level and harvest apportionment (2006–2012) 8-40
Table 8-34 Aleutian Islands State-waters Pacific cod fishery economic performance, season length and dates (2006–2012) 8-41
Table 8-35 Summary information on harvests by gear type in the Pacific cod GHL fishery in the Aleutian Islands (millions of whole pounds) 8-42
Table 8-36 Percentages of CDQ Aleutian Islands Atka mackerel allocations harvested by year 8-45
Table 8-37 Proportional allotments of Amendment 80 species CDQ allocations among CDQ Groups 8-46
Table 8-38 CDQ Pacific cod harvests in the Aleutian Islands 8-46
Table 8-39 Aleut Corporation and Aleut Enterprise LLC income flows, 2008–2012. 8-48
Table 8-40 Adak, State fisheries business tax revenues 8-57
Table 8-41 Atka, State fisheries business tax revenues 8-57
Table 8-42 Unalaska, State fisheries business tax revenues 8-57
Table 8-43 Combined Fisheries Business Tax and Resource Landing Tax Revenue 8-58

Table 8-44 Adak revenue and tax sources and annual expenditures projected for fiscal year 2013 8-59
Table 8-45 Atka revenue and tax sources and annual expenditures for fiscal year 2012 8-60
Table 8-46 Unalaska revenue and tax sources and annual expenditures for fiscal year 2008 to 2010 8-60
Table 8-47 Estimated annual-equivalent years of groundfish fishing on vessels active in 2010 in fisheries regulated by the interim final rule during the following year 8-64
Table 8-48 Estimated annual-equivalent years of activity by Amendment 80 vessels from 2008 through 2011 8-65
Table 8-49 Location of estimated aggregate trawl catcher/processor Atka mackerel harvest in the Aleutian Islands under Alternative 1, from 2004 through 2010 8-79
Table 8-50 Location of estimated aggregate trawl catcher/processor Pacific cod harvests in the Aleutian Islands under Alternative 1, from 2004 through 2010 8-80
Table 8-51 Estimated aggregate trawl catcher/processor Atka mackerel first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010 8-81
Table 8-52 Estimated aggregate changes in trawl catcher/processor Pacific cod first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010 8-82
Table 8-53 Estimated aggregate Atka mackerel and Pacific cod trawl catcher/processor first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010 8-82
Table 8-54 Estimated prohibited species catch rates per ton of trawl catcher/processor groundfish harvest in the Bering Sea Pacific cod, rock sole, and yellowfin sole fisheries (averages for 2008–2011) 8-87
Table 8-55 Location of estimated aggregate non-trawl catcher/processor Pacific cod harvests in the Aleutian Islands, Alternative 1, from 2004 through 2010 8-95
Table 8-56 Estimated aggregate non-trawl catcher/processor Pacific cod first wholesale gross revenues in the Aleutian Islands, Alternative 1, from 2004 through 2010 8-96
Table 8-57 Comparison of average Pacific cod B-season weekly harvest rates in the Bering Sea and the Aleutian Islands for vessels active in the Aleutian Islands 8-99
Table 8-58 Estimated PSC catch rates per metric ton of non-trawl catcher/processor groundfish harvest, and rates of prohibited species catch (averages for 2004 through 2011) 8-100
Table 8-59 Location of estimated aggregate trawl catcher vessel Pacific cod harvests in the Aleutian Islands, Alternative 1, from 2004 through 2010 8-104
Table 8-60 Estimated aggregate total Pacific cod trawl catcher vessel fishery ex-vessel gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010 8-105
Table 8-61 Estimated aggregate total wholesale gross revenues to processors of harvests by trawl catcher vessels in the Aleutian Islands, for Alternative 1, from 2004 through 2010 8-106
Table 8-62 Estimated prohibited species catch rates per ton of catcher vessel groundfish harvest (averages for 2004 through 2012) 8-108
Table 8-63 Closure dates for the GOA Trawl Pacific cod A-season fishery compared to Aleutian Islands fishing periods 8-110

Table 8-64 Comparison of pollock elements of the alternatives 8-117
Table 8-65 Estimated Aleut Corporation directed fishing allowances, seasonal allocations, and sector splits, based on 1991 through 2014 ABCs 8-119
Table 8-66 Fishing activity in areas proposed for opening under Alternatives 2 through 4, from observer data collected from 1991 to 1998 8-123
Table 8-67 Average catch of groundfish species in the pollock directed fishery in the BSAI from 2005-2010 8-126
Table 8-68 Potential Incidental Catch Allowance, Amendment 80, and BSAI trawl limited access allocations of Pacific ocean perch if the entire Aleutian Islands pollock allocation is harvested 8-127
Table 8-69 Average Aleutian Islands pollock directed fishery PSC rates from 1993 through 1998 and Aleutian Islands (AI) and Bering Sea (BS) pollock directed fishery PSC rates 2005 through 2010 8-128
Table 8-70 Comparison of pollock alternatives 8-134
Table 8-71 Comparison of Alternatives for Atka mackerel 8-137
Table 8-72 Area 543 Atka mackerel ABCs, TACs, catches, and TACs under options to Alternative 2 (1994 through 2014) 8-142
Table 8-73 Harvest limits in addition to Area 543 critical habitat closure limits associated with the ABC-percentage based TAC options 8-146
Table 8-74 Estimates of revenues associated with production shortfalls in Area 543 associated with ABC-percentage based TACs 8-146
Table 8-75 Potential additional production in Area 543 if the Amendment 80 fleet can redeploy into open areas from closed areas 8-147
Table 8-76 Estimates of potential revenue increases (over estimates based solely on critical habitat closures) of in Area 543 associated with ABC-percentage based TACs 8-147
Table 8-77 Area 542 Atka mackerel TACs under options to Alternative 2 (metric tons) 8-148
Table 8-78 Potential additional production in area 542 if the Amendment 80 fleet can redeploy into open areas from closed areas 8-150
Table 8-79 Estimates of potential revenue increases (over estimates based solely on critical habitat closures) of in Area 542 associated with ABC-percentage based TACs 8-150
Table 8-80 Impact of Alternatives 1 and 2 critical habitat harvest limits in Area 542 8-151
Table 8-81 Potential for increased production from within Area 541 critical habitat if 50 percent of the Area 541 TAC may be taken within critical habitat 8-152
Table 8-82 Potential for increased production of Atka mackerel from within Area 543 critical habitat if 60 percent of the Area 543 TAC may be taken within critical habitat 8-153
Table 8-83 Potential for increased Atka mackerel production from within Area 542 critical habitat if 60 percent of the Area 542 TAC may be taken within critical habitat 8-154
Table 8-84 Average rate of incidental catch and PSC in Atka mackerel targets between 2004 and 2012 8-161
Table 8-85 Comparison of Atka mackerel alternatives 8-164
Table 8-86 Location of estimated Atka mackerel harvests with respect to Alternative 2 area closures 8-166
Table 8-87 Estimated Alternative 2 Atka mackerel wholesale gross revenues from open and closed areas 8-166
Table 8-88 Location of estimated Atka mackerel harvests with respect to Alternative 3 area closures 8-167

Table 8-89 Estimated Alternative 3 Atka mackerel wholesale gross revenues from open and closed areas 8-167
Table 8-90 Location of estimated Atka mackerel harvests with respect to Alternative 3, Option to close Area 543 critical habitat and portions of Buldir 8-167
Table 8-91 Estimated Alternative 3, Option to close Area 543 critical habitat and portions of Buldir, Atka mackerel wholesale gross revenues for open and closed areas 8-168
Table 8-92 Location of estimated Atka mackerel harvests with respect to Alternative 3, Option to close Area 543 west of 174.5° E Long 8-168
Table 8-93 Estimated Alternative 3, Option to close Area 543 west of 174.5° E Long, Atka mackerel wholesale gross revenues for open and closed areas 8-169
Table 8-94 Comparison of alternatives for Pacific cod trawl gear. 8-171
Table 8-95 Area allocation of Pacific cod limits under Alternatives 2 and 3 8-174
Table 8-96 Estimated trawl catcher/processor sector limits under Alternatives 2 and 3, 2004 through 2014 8-176
Table 8-97 Constraints imposed on potential Area 543 trawl catcher/processor residual catches by area-sector limits 8-181
Table 8-98 Estimates of revenues associated with production shortfalls in Area 543 associated with trawl catcher/processor area-sector limits 8-181
Table 8-99 Potential expansion of open area fishing within the limits imposed on open area catches (residual catches) by area-sector limits (metric tons) 8-184
Table 8-100 Estimates of potential trawl catcher/processor wholesale gross revenue increases (over estimates based solely on critical habitat closures and net of possible area-year shortfalls) associated with area-sector limits 8-185
Table 8-101 Potential wholesale gross revenue loss to trawl catcher/processor sector of inability to act as motherships in Area 543 under Alternative 2, Option 1 8-186
Table 8-102 Aleutian Islands average rate of incidental catch and PSC in Pacific cod targets by trawl gear from 2004 through 2012 8-189
Table 8-103 Comparison of Pacific cod trawl catcher/processor alternatives 8-192
Table 8-104 Location of catcher/processor Pacific cod harvests with respect to Alternative 1 area closures 8-193
Table 8-105 Estimated Alternative 1 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas 8-194
Table 8-106 Location of catcher/processor Pacific cod harvests with respect to Alternative 2 area closures 8-194
Table 8-107 Estimated Alternative 2 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas 8-195
Table 8-108 Location of catcher/processor Pacific cod harvests with respect to Alternative 2 protective option area closures 8-195
Table 8-109 Estimated Alternative 2 protective option trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas 8-196
Table 8-110 Location of catcher/processor Pacific cod harvests with respect to Alternative 3 area closures 8-196
Table 8-111 Estimated Alternative 3 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas 8-197
Table 8-112 Location of catcher/processor Pacific cod harvests with respect to Alternative 4 area closures 8-197
Table 8-113 Estimated Alternative 4 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas 8-198
Table 8-114 Comparison of alternatives for Pacific cod non-trawl gear 8-199

Table 8-115 Estimated non-trawl catcher/processor sector allocations under Alternatives 2 and 3, 2004 through 2014 8-202
Table 8-116 Impact of area limits on potential non-trawl catcher/processor Pacific cod harvests during the baseline years 2004 through 2010, showing years in wich those harvests would be limited, and years in which there was potential for increased harvests. 8-206
Table 8-117 Shortfalls in open area gross revenues, or potential to exceed those gross revenues, associated with area-sector limits 8-207
Table 8-118 Average rate of incidental catch and PSC in Pacific cod targets by non-trawl gear between 2004 and 2013 8-210
Table 8-119 Comparison of Pacific cod non-trawl catcher/processor alternatives 8-213
Table 8-120 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 1 area closures 8-215
Table 8-121 Estimated Alternative 1 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas 8-216
Table 8-122 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 2 area closures 8-216
Table 8-123 Estimated Alternative 2 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas 8-217
Table 8-124 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 2 protective option area closures 8-217
Table 8-125 Estimated Alternative 2 protective option non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas 8-218
Table 8-126 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 3 area closures 8-218
Table 8-127 Estimated Alternative 3 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas 8-219
Table 8-128 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 4 area closures 8-219
Table 8-129 Estimated Alternative 4 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas 8-220
Table 8-130 Estimates of Constraints on Catcher Vessels if Catcher/Processors Harvest the Full Amounts Available to Them Under their Area-Sector Limits 8-223
Table 8-131 Potential restriction, or opportunity for expansion, of open area fishing by trawl catcher vessels within the limits imposed on potential Area 543 and Areas 541-542 open area catches (residual catches) by area area-sector limits (metric tons) 8-229
Table 8-132 Shortfalls in open area processor wholesale gross revenues associated with trawl catcher vessel Pacific cod production, or potential to exceed those gross revenues, associated with area-sector limits 8-230
Table 8-133 Comparison of Pacific Cod trawl catcher vessel alternatives 8-234
Table 8-134 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 1 area closures 8-236
Table 8-135 Estimated Alternative 1 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas 8-237
Table 8-136 Estimated Alternative 1 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas 8-237
Table 8-137 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 2 area closures 8-238
Table 8-138 Estimated Alternative 2 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas 8-238

Table 8-139 Estimated Alternative 2 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas....8-239
Table 8-140 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 2 protective option area closures....8-239
Table 8-141 Estimated Alternative 2 protective option trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas....8-240
Table 8-142 Estimated Alternative 2 protective option Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas....8-240
Table 8-143 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 3 area closures....8-241
Table 8-144 Estimated Alternative 3 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas....8-241
Table 8-145 Estimated Alternative 3 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas....8-242
Table 8-146 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 4 area closures....8-242
Table 8-147 Estimated Alternative 4 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas....8-243
Table 8-148 Estimated Alternative 4 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas....8-243
Table 8-149 Alternative 5 Summary Table (Preferred Alternative Recommended by the Council, October 2013)....8-247
Table 8-150 Pollock A-season Catch Limits under Alternative 5 in mt....8-248
Table 8-151 Alternative 5 TAC limit compared to residual catch under Alternative 5....8-250
Table 8-152 Potential for Alternative 5 Area 543 catch limit to constrain Area 543 catches....8-251
Table 8-153 Alternative 6 revenue losses in targeted Atka mackerel and Pacific cod fisheries in millions of 2012 dollars....8-253
Table 8-154 Estimated Cost to Trawl Vessels by increasing Polling rate in the Aleutian Islands based on 2010 data....8-278
Table 8-155 Estimated residual trawl catcher/processor Atka mackerel wholesale gross revenues by alternative and option, with and without closure limits, during the baseline years....8-288
Table 8-156 Estimated residual trawl catcher/processor Pacific cod gross revenues by alternative and option, with and without closure limits....8-289
Table 8-157 Estimated residual Atka mackerel and Pacific cod gross revenues for trawl catcher/processors by alternative and option during the baseline years....8-290
Table 8-158 Estimated residual non-trawl catcher/processor wholesale gross revenues by alternative and option, with and without closure limits, during the baseline years....8-292
Table 8-159 Estimated residual wholesale gross revenues to processors from catcher vessel catches by alternative and option, with and without closure limits, during the baseline years....8-293
Table 10-1 Trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011....10-12
Table 10-3 Trawl catcher vessels with Pacific cod catches in Aleutian Islands Area 542, by community of ownership, 2007 and 2009....10-13
Table 10-4 Trawl catcher vessels with Pacific cod catches in Aleutian Islands Area 542, by community of ownership, 2007 and 2009....10-13

Table 10-5 Non-trawl catcher vessels with Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011 10-14
Table 10-6 Non-trawl catcher vessels with Pacific cod catches in Aleutian Islands Areas 541 and 542, by community of ownership, 2008..... 10-15
Table 10-7 Non-trawl catcher vessels with Pacific cod catches in Aleutian Islands Areas 541 and 542, by community of ownership, 2008..... 10-15
Table 10-8 Trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011..... 10-17
Table 10-9 Non-trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011..... 10-17
Table 10-10 Shore-based processors receiving landings of Atka mackerel and/or Pacific cod catches from the Aleutian Islands, by community of operation, annual averages 2004–2010 and 2011..... 10-18
Table 10-11 Shore-based processors receiving landings of Pacific cod catches from Aleutian Islands Area 541, by community of operation, 2008 10-19
Table 10-12 Shore-based processors receiving landings of Pacific cod catches from Aleutian Islands Area 541, by community of operation, annual averages 2008..... 10-19
Table 10-13 Catcher vessel (all gear types) port calls in Adak and Unalaska immediately before and/or after targeted Pacific cod trips in the AI subarea and all of Alaska, annual averages 2004–2010 and 2011 10-22
Table 10-14 Catcher/processor (all gear types) port calls in Adak and Unalaska immediately before and/or after targeted Atka mackerel or Pacific cod trips in the AI subarea and all of Alaska, annual averages 2004–2010 and 2011..... 10-22
Table 10-15 Number of catcher vessels, catcher/processors, and shore-based processors authorized by the Aleut Corporation and participating in the AI pollock fishery, by year, 2004–2012..... 10-24
Table 10-16 Adak 2010 housing information..... 10-28
Table 10-17 Adak top five occupations and employers 10-29
Table 10-18 Amount of catcher vessel Pacific cod harvested in the Central and Western Aleutian Islands and delivered to Adak Fisheries, LLC, 2002–2008. 10-31
Table 10-19 Atka 2010 housing information 10-36
Table 10-20 Atka top five occupations and employers 10-37
Table 10-21 Unalaska 2010 housing information 10-42
Table 10-22 Unalaska top five occupations and employers 10-43
Table 10-23 Seattle-Tacoma CMSA 2010 housing information..... 10-50
Table 10-24 Washington state top five occupations and top Puget Sound employers..... 10-51
Table 10-25 Graphic representation of annual average engagement in potentially affected AI Atka mackerel, Pacific cod, and pollock fisheries, and relevant subsistence engagement, by community, 2004–2010 10-58
Table 10-26 CDQ Communities, Total Population, and Proportion of Alaska Native Residents, 2010 10-88
Table 10-27 CDQ Community Poverty Rate, by CDQ Entity, 1990–2009 10-90
Table 10-28 Aleut Corporation Shareholders in Aleutian/Pribilof Region, by Community of Residence, 2012..... 10-93
Table 10-29 Estimated Community Harvest of Steller Sea Lions, Atka and Adak, 1992–2008..... 10-98
Table 10-30 Atka Population 2000 and 2010, by Age, Range, and Sex 10-100

Table 10-31 Estimated Community Harvest of Steller Sea Lions, Nikolski, Unalaska, Akutan, St. George, and St. Paul, 1992–2008 10-101
Table 10-32 Trawl catcher vessels with Pacific cod catches in State of Alaska Aleutian Islands GHL fishery, by community of ownership, annual averages 2006–2010 and 2011 10-110
Table 10-33 Non-trawl catcher vessels with Pacific cod catches in State of Alaska Aleutian Islands GHL fishery, by community of ownership, annual averages 2006–2010 and 2011 10-110
Table 10-34 Atka Decennial Census Population, 1880–2010 10-113
Table 10-35 Trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 10-126
Table 10-36 Non-trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 10-131
Table 10-37 Trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 10-137
Table 10-38 Non-trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 10-138
Table 10-39 Shore-based processors receiving landings of Atka mackerel and/or Pacific cod catches from the Aleutian Islands, by community of operation, 2004–2011 10-140
Table 10-40 Catcher/processor and catcher vessel port calls in Adak and Unalaska immediately before and/or after targeted Atka mackerel or Pacific cod trips in the AI subarea and all of Alaska, 2004–2011 10-143
Table 10-41 Description of variables used in the community engagement ranking 10-144
Table 10-42 Principal components analysis results 10-145
Table 10-43 Rotated factor loadings (pattern matrix) and unique variances from the principal components analysis 10-145
Table 10-44 Community engagement index scores and rankings 10-146
Table 11-1 2012 survey catches (kg) of fisheries management species and other species from the AFSC Bottom Trawl Survey in the Aleutian Islands outside and within Steller sea lion (SSL) critical habitat (CH) 11-3
Table 11-2 Past (1990–2012) average, maximum, and minimum annual catches (kg) and 2012 survey catches of Pacific cod, Atka mackerel, and Pacific ocean perch from the AFSC Bottom Trawl survey inside and outside Steller sea lion (SSL) critical habitat (CH) in the Aleutian Islands management area 11-4
Table 11-3 2012 survey catches (kg) from the Bogoslof Area echo integration-trawl survey. All catches are from Steller sea lion critical habitat. 11-5
Table 11-4 Catch in number by species for the 2012 NMFS longline survey in the Aleutian Islands 11-5
Table 11-5 Anticipated survey catches for Atka mackerel tag recovery studies (mt) inside and outside Critical Habitat (CH) for a given cruise and year (fall or winter/spring) 11-8
Table 11-6 Anticipated survey catches during opportunistic prey field studies (mt) 11-8
Table 11-7 Anticipated survey catches of Atka mackerel in relation to Allowable Biological Catch (ABC) and AFSC groundfish trawl survey biomass 11-9
Table 11-8 Steller sea lion and fisheries interaction studies funded by NPRB 11-12

ACRONYMS AND ABBREVIATIONS

A80	Amendment 80
ABC	acceptable biological catch
ACDC	Adak Community Development Corporation
ACL	annual catch limit
ACMP	Alaska Coastal Zone Management Program
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADP	Annual Deployment Plan
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
AI	Aleutian Islands
AI FEP	Aleutian Islands Fishery Ecosystem Plan
AIHCA	Aleutian Islands Habitat Conservation Area
AKFIN	Alaska Fisheries Information Network
AKR	Alaska Region
AKRO	Alaska Regional Office
AMEF	Alaska Marine Ecosystem Forum
ANCSA	Alaska Native Claims Settlement Act
AP	Advisory Panel
APA	Administrative Procedure Act
APDES	Alaska Pollutant Discharge Elimination System
APICDA	Aleutian Pribilof Island Community Development Association
BA	biological assessment
BBC	Birds of Conservation Concern
BBEDC	Bristol Bay Economic Development Corporation
BFAL	black-footed albatross
BKC	blue king crab
BO	biological opinion
BOEM	Bureau of Ocean Energy Management
BOF	Board of Fisheries
BRAC	Base Realignment and Closure
BS	Bering Sea
BSAI	Bering Sea and Aleutian Islands
BSAI Groundfish FMP	Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area
BSC	Bering Slope Current
BSIERP	Bering Sea Integrated Ecosystem Research Program
CAI	Central Aleutian Islands
CAS	Catch Accounting System
CBD	Center for Biological Diversity
CBSFA	Central Bering Sea Fishermen's Association
CCL	combined catch limit
CDPs	Community Development Plans
CDQ	Community Development Quota
CEQ	Council on Environmental Quality
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
CH	critical habitat

CIA	catch in area
CIE	Center for Independent Experts
CIRA	Cooperative Institute for Research in the Atmosphere
cm	centimeter
CMSA	Consolidated Metropolitan Statistical Area
CO^2	carbon dioxide
Council	North Pacific Fishery Management Council
COAR	Commercial Operators Annual Report
COE	Corps of Engineers
CP	catcher/processor
C/P	catcher/processor
CPUE	catch per unit effort
CQE	Community Quota Entity
CRP	Comprehensive Rationalization Program
CSP	catch sharing plan
CSSA	Chinook Salmon Savings Area
CSWG	Circumpolar Seabird Working Group
CV	catcher vessel
CVOA	catcher vessel operational area
CVRF	Coastal Villages Region Fund
CWA	Clean Water Act
DAH	domestic annual harvest
DAP	domestic annual processing
DAS	Days-at-sea
DCED	Alaska Division of Community and Regional Economic Development
DCRA	Division of Community and Regional Affairs
DCPL	daily cumulative production logbook
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DEC	Department of Environmental Conservation
DEIS	Draft Environmental Impact Statement
DFA	direct fishing allowance
DFL	daily fishing logbook
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DOR	Alaska Department of Revenue
DOS	Department of State
DOT	Department of Transportation
DPS	Distinct Population Segment
EA	environmental assessment
EA/RIR	Environmental Assessment/Regulatory Impact Review
EAI	Eastern Aleutian Islands
EBS	Eastern Bering Sea
EPDS	eastern distinct population segment
EDR	economic data report
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EFP	experimental fishing permit / exempted fishing permit

EIR	economic impact review
EIS	environmental impact statement
EIT	echo integration trawl
EM	electronic monitoring
ENPR	eastern North Pacific resident
ENSO	El Niño/Southern Oscillation
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPOCS	Equatorial Pacific Ocean Climate Studies
ESA	Endangered Species Act
F	fishing mortality rate
FEAST	Forage/Euphausiid Abundance in Space and Time
FEP	Fishery Ecosystem Plan
FERC	Federal Energy Regulatory Commission
FFP	Federal fisheries permit
FIS	Fisheries Information System
FIT	Fishery Interaction Team
FLCC	Freezer Longline Conservation Cooperative
FLL	freezer longline
FMA	fishery management area
FMC	Fishery Management Council
FMP	fishery management plan
FMP biop	fishery management plan-level biological opinion
FMU	fishery management unit
FO	frequency of occurrence
FOCI	Fisheries Oceanography Coordinated Investigations
FOIA	Freedom of Information Act
FPP	Federal processor permit
FR	Federal Register
FRAM	Fleet Replacement and Modernization
FRFA	final regulatory flexibility analysis
FSEIS	final supplemental environmental impact statement
FSV	Fishery Survey Vessel
ft	feet
FVOG	Fishing Vessel Obligation Guarantee Program
FY	fiscal year
FYDP	Five Year Development Plan
GARP	Global Atmospheric Research Program
GCC	Global Climate Change
GCDIS	Global Change Data and Information System
GCM	Global Circulation Model
GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEO	Group on Earth Observation
GHL	guideline harvest level
GIS	geographic information system
GLOBEC	Global Ocean Ecosystem Dynamics Studies
GMS	Geostationary Meteorological Satellite
GNP	Gross National Product
GOA	Gulf of Alaska

GOA Groundfish FMP	Fishery Management Plan for Groundfish of the Gulf of Alaska
GOALS	Global Ocean-Atmosphere-Land System (Program)
GOCIP	GEWEX Continental-Scale International Project
GOES	Geostationary Operational Environmental Satellite
GOOS	Global Ocean Observing System
GPS	Global Positioning System
GRS	groundfish retention standard
GSA	General Services Administration
GSAT	Global Satellite Data Acquisition Team
GSN	Global Seismic Network
GTS	Global Telecommunications System
HAPC	habitat area of particular concern
HAZMAT	Hazardous Materials Response and Assessment Division
HCD	Habitat Conservation division
HFC	hydrofluorocarbon
HLA	harvest limit area
HMS	Highly Migratory Species
HSFCA	High Seas Fishing Compliance Act
HTML	Hyper-Text Markup Language
IAI	Inter-American Institute for Global Change Research IARCC Interagency Arctic Research Coordination Committee
IBA	Important Bird Area
IBQ	individual bycatch quota
ICA	incidental catch allowance
ICES	International Council for the Exploration of the Seas
ICON	Integrated Coral Observation Network
ICSU	International Council of Scientific Unions
ICP	United Nations Informal Consultative Process on Oceans and the Law of the Sea
IFQ	individual fishing quota
IFR	interim final rule
IOC	International Oceanographic Commission
IOOS	Integrated Ocean Observing System
IPCC	Intergovernmental Panel on Climate Change
IPHC	International Pacific Halibut Commission
IQ	individual quota
IQA	Information Quality Act
IRFA	Initial Regulatory Flexibility Analysis
IRIU	improved retention & improved utilization
IT	Information Technology
ITS	incidental take statement
ITAC	initial total allowable catch
ITQ	individual transferable quota
ITS	Incidental Take Statement
IUCN	World Conservation Union
IWC	International Whaling Commission
IW	integrated weight longlines
IWPS	integrated weight longlines and paired streamer lines
JAM	jeopardize the continued existence of Steller sea lions or adversely modify their designated critical habitat
JEA	Joint Enforcement Agreement

kg	kilogram
km	kilometer
km^2	square kilometer
LAAL	Laysan albatross
LAMP	Local Area Management Plan
LAPP	Limited Access Privilege Program
LEI	long-term effects indices
LLP	License Limitation Program
LNG	liquefied natural gas
LOA	length overall
LORAN	LOng RAnge Navigation
LOS	Law of the Sea
m	meters
M	natural mortality rate
MFMT	Maximum Fishery Mortality Threshold
MLOA	maximum length overall
mm	millimeter
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MPA(s)	marine protected area(s)
MRA	maximum retainable amount
MSA	Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)
MSC	Marine Stewardship Council
MSE	management strategy evaluation
MSST	minimum stock size threshold
MSY	maximum sustainable yield
mt	metric tons
mtDNA	mitochondrial DNA
NA(na)	not applicable/data not available
NAICS	North American Industrial Classification System
NEPA	National Environmental Policy Act
ng/g	nanograms per gram
NGDC	National Geophysical Data Center
NGO	Non-Governmental Organizations
nm	nautical mile
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NMSA	National Marine Sanctuaries Act
NMSP	National Marine Sanctuaries Program
NOAA	National Oceanic & Atmospheric Administration
NOC	National Ocean Council
NODC	National Oceanographic Data Center
NOS	National Ocean Service
NPAFC	North Pacific Anadromous Fisheries Commission
NPDES	National Pollutant Discharge Elimination System
NPFF	North Pacific Fisheries Foundation
NPFMC	North Pacific Fishery Management Council
NPI	North Pacific Index
NPOA-Seabirds	National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries

NPPSD	North Pacific Pelagic Seabird Database
NPRB	North Pacific Research Board
NRC	National Research Council
NSEDC	Norton Sound Economic Development Corporation
NSP	National Seabird Program
OA	Ocean Acidification
OAR	Office of Oceanic and Atmospheric Research
OCRM	Office of Coastal Resource Management
OCS	outer continental shelf
OCSEAP	Outer Continental Shelf Environmental Assessment Program
OFL	overfishing level
OLE	Office of Law Enforcement
OSCURS	ocean surface current simulations
OY	optimum yield
PBR	potential biological removal
PCB	polychlorinated biphenyl
PCE	Personal Consumption Expenditures
PCEPI	Personal Consumption Expenditures: Chain-type Price Index
PDF	probability density factor
PFO	percent frequency of occurrence
POP	Pacific ocean perch
POP	platform of opportunity
Pollock	walleye pollock
PPA	preliminary preferred alternative
PPI	Product Price Index
PQS	processor quota share
PRA	Paperwork Reduction Act of 1995
PRD	NMFS Alaska Region Protective Resources Division
PS	prohibited species
PSC	prohibited species catch
PSEIS	Programmatic Supplemental Environmental Impact Statement
PSQ	prohibited species quota
QS	quota share
R&R	recordkeeping & recording
RAM	Restricted Access Management
REFM	Resource Ecology and Fisheries Management
RFA	Regulatory Flexibility Act
RIR	regulatory impact review
RPA	reasonable and prudent alternative
RPM	reasonable and prudent measure
SAFE	Stock Assessment and Fishery Evaluation Document
SAR	stock assessment report (Chapters 3-7) or search and rescue (Chapter 8-10)
SBA	Small Business Administration
SBREFA	Small Business Regulatory Enforcement Fairness Act
SBX	Sea-based X-band
SEBSCC	southeast Bering Sea carrying capacity
Secretary	Secretary of Commerce
SEIS	supplemental environmental impact statement
SEM	Socio-Economic Monitoring
SFD	NMFS Alaska Region Sustainable Fisheries Division
SIR	supplementary information report

SLIP	Steller Sea Lion Interactive Predator-Prey
SPR	spawning per recruit
SSC	Scientific and Statistical Committee
SSL	Steller sea lion
SSLMC	Steller Sea Lion Mitigation Committee
STAL	short-tailed albatross
STWG	Seabird Technical Working Group
t/m^3	tons per cubic meter
TAC	total allowable catch
TMDL	Total Maximum Daily Load
U.S.	United States
U.S.C.	United States Code
USCG	United States Coast Guard
USCOP	United States Commission on Ocean Policy
USDOC	United States Department of Commerce
USDOI	United States Department of the Interior
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
VMP	Vessel Moratorium Program
VMS	Vessel Monitoring System
WACDA	Western Alaska Community Development Association
WAI	Western Aleutian Islands
WDPS	western distinct population segment
WPR	weekly production report
WQS	water quality standards
WTA	willingness to accept
WTP	willingness to pay
YDFDA	Yukon Delta Fisheries Development Association

8.0 ECONOMIC ANALYSIS

8.1 Introduction

This economic analysis examines proposed changes to groundfish management required to insure that groundfish fisheries in the Bering Sea and Aleutian Islands Management Area (BSAI) are not likely to jeopardize the continued existence of Steller sea lions, or to adversely modify or destroy their critical habitat. This economic analysis was prepared to meet the requirements of Presidential Executive Order (EO) 12866,[1] is a part of the socio-economic analysis included in this Environmental Impact Statement (EIS)[2], and may provide part of the record for subsequent regulatory action. This document will be used as the basis for a Regulatory Impact Review meeting the requirements of EO 12866 when NMFS prepares a proposed rule to take an action analyzed in this EIS.

Steller sea lions may be inadvertently taken in fishing gear, may be disturbed by fishing activities, and may compete with groundfish fisheries for important prey species. Atka mackerel, Pacific cod, and pollock are important Steller sea lion prey species that also are harvested in the groundfish fisheries. The North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) have taken measures that temporally and spatially disperse Atka mackerel, Pacific cod, and pollock harvests to reduce potential impacts from the groundfish fisheries on Steller sea lions and on their designated critical habitat. Spatial protection measures include closures of areas to groundfish fishing near Steller sea lion haulouts and rookeries, and in foraging areas, to reduce potential interactions with Steller sea lions and fishing vessels and to reduce potential impacts on prey resources in locations important to Steller sea lions. Temporal dispersion of pollock, Pacific cod, and Atka mackerel harvests is

[1] National Marine Fisheries Service (2007) provides current NMFS guidance for preparation of an economic analysis consisted with Executive Order 12866; Queirolo (2013) provides a more accessible overview.

[2] This EIS contains an economic analysis (Chapter 8) and a small entity analysis (Chapter 9). These analyses, along with the community impacts analysis containing Environmental Justice analysis required under EO 12898 (Chapter 10), are presented as separate chapters in this EIS rather than as a single combined "socioeconomics" chapter as is often found in other EISs. This presentation format is designed for ease of access and review, given the nature of the economic and social resources potentially affected by the proposed action alternatives, and in reflection of the emphasis placed on a detailed community impacts analysis appropriate to the scope and issues identified in both the litigation and scoping processes. Because Chapters 8 and 9 have been drafted to meet the requirements of EO 12866 and the Regulatory Flexibility Act, this arrangement of chapters also lends itself to efficient preparation of an RIR and IRFA to accompany a proposed rule.

accomplished through seasonal apportionments of the annual total allowable catch (TAC) for these species.[3]

In 2010, NMFS completed an Endangered Species Act (ESA) section 7 consultation on the effects of the Alaska groundfish fisheries on ESA-listed species, including the western distinct population segment (WDPS) of Steller sea lions, and on designated critical habitat. Based on the best available commercial and scientific information, the consultation resulted in a biological opinion (FMP biop) that found that the Steller sea lion protection measures implemented in the BSAI since 2003 could not insure that the groundfish fisheries were not likely to jeopardize the continued existence of the Steller sea lion or to adversely modify designated critical habitat for the WDPS of Steller sea lions. A reasonable and prudent alternative (RPA) to the protection measures was included in the FMP biop to insure the groundfish fisheries were not likely to result in jeopardy or adverse modification of critical habitat. This RPA was implemented by an interim final rule as the 2011 Steller sea lion protection measures (75 FR 77535, December 13, 2010, corrected 75 FR 81921, December 29, 2010).

The 2011 Steller sea lion protection measures primarily affected the Pacific cod and Atka mackerel fisheries in the Aleutian Islands subarea. The FMP biop determined that the weight of evidence indicated that fisheries for Steller sea lion prey might be appreciably reducing the reproduction, and thus, numbers, of Steller sea lions, and adversely modifying the conservation value of their critical habitat in Statistical Areas 543, 542, and 541, by removing large quantities of prey species important to the basic nutrition and reproductive capacity of Steller sea lions. Competition for prey with fisheries is likely one component of an intricate suite of natural and anthropogenic factors affecting Steller sea lion numbers and reproduction. While natural factors may be contributing, NMFS must insure that actions authorized by NMFS are not likely to jeopardize the continued existence of the WDPS of Steller sea lions, nor adversely modify designated critical habitat.

The RPA was developed based on performance standards that addressed the effects of the groundfish fisheries on the population status and foraging behavior of Steller sea lions in the Aleutian Islands subarea. The details of these standards are described in the FMP biop. The RPA was structured to mitigate effects of the fishery in locations where Steller sea lion abundance continues to be of concern (Statistical Areas 543, 542, and 541).

One of the performance standards required that the protection measures be commensurate with the rate of Steller sea lion population decline, with more stringent measures in those locations with greater population declines. The RPA met this standard by applying more fisheries restrictions in Area 543 where Steller sea lions had the highest population decline and applying fewer fisheries restrictions in Areas 542 and 541, where Steller sea lion population decline was less than in Area 543.

Implementation of the RPA was expected to reduce potential competition between Steller sea lions and the Atka mackerel and Pacific cod fisheries in Area 543. This was intended to improve foraging success and prey availability for juvenile and adult Steller sea lions. The RPA also reduced the potential competitive overlap between Steller sea lions and fisheries for Atka mackerel and Pacific cod in Areas 542 and 541. This was intended to improve foraging success and prey availability for Steller sea lions, particularly adult females with dependent young, in winter.

[3] The details of the current Steller sea lion protection measures for the Alaska groundfish fisheries are available on the NMFS Alaska Region website at http://www.alaskafisheries.noaa.gov/sustainablefisheries/sslpm/.

On March 5, 2012, NMFS was ordered by the U.S. District Court of Alaska to prepare an EIS on the Steller sea lion protection measures implemented in January 2011.[4] The Court ordered NMFS to prepare an EIS for the Steller sea lion protection measures because NMFS had failed to provide sufficient environmental information for informed public comment to the agency decision-making when it prepared the environmental assessment for this action in 2010, and failed to provide for adequate public participation. In addition, the Court determined that NMFS's conclusions about the effects of the action were highly controversial and uncertain. The Court identified examples of scientific controversy for this action such as the use of single species rather than multi-species models for groundfish fisheries stock assessments and the effects of the groundfish fisheries on the availability of Steller sea lion prey resources.

The Court ordered the completion of the final EIS by March 2, 2014. The Court also ordered that any subsequent rulemaking for the BSAI groundfish fisheries as a result of the EIS must be completed by January 1, 2015.

At its April 2012 meeting, the Council chose to reconvene its Steller Sea Lion Mitigation Committee (SSLMC). (NPFMC 2012a) This committee met repeatedly during the spring, summer, and fall of 2012, and proposed two new alternatives to the Council at its December 2012 meeting. At this meeting, the Council adopted a statement of purpose and need, and recommended a suite of four alternatives for evaluation in the EIS. Following the Council's meeting, NMFS reviewed the alternatives in light of the statement of purpose and need, and the requirements of the ESA and National Environmental Policy Act, and adopted a set of five alternatives and a protective option for analysis in the EIS. These alternatives are described in detail in Chapter 2 of this EIS.

On March 21 and 22, 2013, the Council's SSLMC reviewed a preliminary draft of the EIS, and received a draft erratum addressing errors NMFS had identified since it had distributed the preliminary draft. The SSLMC recommended a preliminary preferred alternative (PPA). The Council's Advisory Panel (AP) endorsed the SSLMC's PPA at the April 2013 Council meeting, with minor clarifications of the text. The Council recommended the AP's PPA for analysis, as a part of its broader motion on the preliminary draft EIS. The Council's recommended PPA has been incorporated into this analysis as Alternative 5.

In May 2013, NMFS issued the draft EIS, starting a 60-day public comment period that ended on July 16, 2013. NMFS received 13 submissions of comment from which NMFS staff identified 227 specific, substantive comments. NMFS staff prepared a draft comment analysis report, and briefed the Council on it at the Council's October 2013 meeting. At that meeting, the Council passed a motion adopting Alternative 5, its PPA, as its recommended preferred alternative.

In consideration of public comments, NMFS introduced an additional alternative that was more protective than the status quo. This new Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock in Areas 541, 542, and 543, is discussed in detail in Chapter 2.

8.1.1 What is a Regulatory Impact Review?

As noted, this economic analysis follows NMFS guidelines for the preparation of an RIR meeting the requirements of EO 12866. An RIR is required for rulemaking under EO 12866 (58 FR 51735,

[4] The Court's decision and order for this action are available on the NMFS Alaska Region website at http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/eis/.

September 30, 1993). The requirements for all regulatory actions specified in EO 12866 are summarized in the following statement from the order:

> *In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

EO 12866 further requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." A significant regulatory action is one that is likely to –

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

8.1.2 Statutory Authority

NMFS manages the U.S. groundfish fisheries of the BSAI in the exclusive economic zone off Alaska under the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) (NPFMC 2012c). The Council prepared, and the Secretary of Commerce approved, this FMP under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, *et seq*.).

The Endangered Species Act of 1972 (ESA) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. NOAA's National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous species. NMFS has jurisdiction over 87 listed species, including the Steller sea lion.[5]

Federal agencies are directed, under section 7(a)(1) of the ESA, to use their authority to carry out programs for the conservation of threatened and endangered species. Federal agencies must also consult with NMFS, under section 7(a)(2) of the ESA, on activities that may affect a species for which NMFS has responsibility. These interagency consultations, or "Section 7" consultations, are designed to assist Federal agencies in fulfilling their duty to insure Federal actions do not jeopardize the continued existence of a species or destroy or adversely modify critical habitat. Should NMFS determine that it cannot insure

[5] See the NOAA Fisheries Service web page http://www.nmfs.noaa.gov/pr/laws/esa/.

that its action is not likely to jeopardize or adversely modify, NMFS will suggest Reasonable and Prudent Alternatives (RPAs) that would not violate section 7(a)(2).[6] In the current instance, the agency taking the action is the Sustainable Fisheries Division of NMFS Alaska Region, and the "consulting" agency is the Protected Resources Division of NMFS Alaska Region. A history of recent, relevant consultations and actions leading up to this action is presented in the 2010 FMP biop (NMFS 2010a).

8.1.3 Purpose and Need

This action is needed to comply with the ESA requirement that a Federal agency insure that the agency's actions are not likely to jeopardize the continued existence of endangered species or to adversely modify or destroy critical habitat. In this case, NMFS's action is the management of the Alaska groundfish fisheries (including the authorization of research necessary to support such management) and the endangered species is the WDPS of Steller sea lions. In the FMP biop, NMFS determined that it could not insure that the Alaska groundfish fisheries were not likely to jeopardize the continued existence of the WDPS of Steller sea lions and not adversely modify their designated critical habitat. In response to this determination, NMFS recommended an RPA to mitigate the fishery impacts that had been identified as having the potential to cause jeopardy. The RPA restricted the Aleutian Islands Atka mackerel and Pacific cod fisheries, to provide additional protection to the WDPS of Steller sea lions and their critical habitat. The RPA and other existing fishery management measures designed to protect Steller sea lions in the Aleutian Islands are known, collectively, as the Steller sea lion protection measures. The Steller sea lion protection measures restrict the Atka mackerel, Pacific cod, and pollock fisheries in a manner that causes economic impacts.

The purpose of this action is to implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries, and their supporting research, in a manner that mitigates the Aleutian Islands groundfish fisheries potential impacts on Steller sea lions and minimizes, to the extent practicable, economic impacts to the groundfish fisheries. New information is available to evaluate and potentially revise the Steller sea lion protection measures to reduce the economic impacts, to the extent practicable, on the fisheries while still providing necessary protection to Steller sea lions.

8.1.4 Alternatives

Chapter 2 of this EIS provides a detailed description of, and rationale for, the alternatives under consideration in this action. There are six alternatives:

1. Alternative 1: Status Quo (no action).
2. Alternative 2: Modified 2011 Steller Sea Lion Protection Measures
3. Alternative 3: Further modified 2011 Steller Sea Lion Protection Measures
4. Alternative 4: Modified 2010 Steller Sea Lion Protection Measures
5. Alternative 5: Recommended by the Council at its October 2013 meeting
6. Alternative 6: More protective alternative adopted by NMFS in February 2014.

This analysis in Chapter 8 is organized as follows. Alternatives 1 and 4 are to some extent mirror images of each other, given the 2004 through 2010 baseline used for analysis of the Atka mackerel and Pacific cod fisheries. Alternative 1 is a deviation from conditions in the years 2004 through 2010 (reflecting the provisions of the interim final rule which is the current status quo), while Alternative 4 is, to some extent,

[6] See the NOAA Fisheries Service web page http://www.nmfs.noaa.gov/pr/consultation/.

a return to it. Thus, these alternatives are evaluated together with respect to the fleets immediately impacted. This is done in four sections, each discussing the impacts on a different sector (Sections 8.3, 8.4, 8.5, and 8.6).
The SSLMC recommended alternatives dealing with pollock, and formulated its other proposed alternatives (2 and 3) on a species-by-species basis. For Pacific cod, it further developed separate alternatives for trawl and non-trawl gears. These alternatives are evaluated in a series of six sections organized by species, and, for Pacific cod, by trawl and non-trawl and catcher/processor and catcher vessel, status. Thus, the first section, dealing with pollock, compares the pollock elements of Alternatives 2 and 3 (Section 8.7). Similar sections deal with Atka mackerel (Section 8.8), and trawl catcher/processor fishing for Pacific cod (Section 8.9), non-trawl catcher/processor fishing for Pacific cod (8.10), trawl catcher vessel fishing for Pacific cod (8.11), and non-trawl catcher vessel fishing for Pacific cod (8.12). This approach was chosen for these alternatives because it reflects the thought process used by the SSLMC in designing the alternatives. For two species, Atka mackerel and pollock, much of the impact falls on a single sector. The Pacific cod alternatives and analysis are more complex.

Alternative 5, which the Council adopted as its preferred alternative in October 2013, is evaluated in Section 8.13.1, and Alternative 6, introduced by NMFS in February 2014, is evaluated in Section 8.13.2.

Following the fleet oriented discussion in Sections 8.3 to 8.13, additional sections look at potential non-consumptive benefits from protecting Steller sea lions, community economic impacts, and other issues. Section 8.20 provides a summary comparison of the alternatives.

The elements of Alternatives 2, 3, 5, and 6 are summarized at the start of the relevant species-specific sections for those alternatives. The remainder of this sub-section describes the elements of Alternatives 1 and 4. As explained earlier, all of the alternatives and options are described in much more detail in Chapter 2 of the EIS.

Alternative 1: the Status Quo

Under Alternative 1, no changes would be made to current groundfish fisheries management in the Aleutian Islands. The Status Quo Alternative is the RPA in the final FMP biop. The features of the Status Quo Alternative are—

<u>In Area 543</u>:

- Prohibit retention of Atka mackerel and Pacific cod by all federally permitted vessels.
- Establish a TAC for Atka mackerel sufficient to support the incidental discarded catch that may occur in other target groundfish fisheries (e.g., Pacific ocean perch).
- Eliminate the Atka mackerel platoon management system in the HLA.

<u>In Area 542</u>:

Groundfish

- Close waters from 0–3 nm around Kanaga Island/Ship Rock to directed fishing for groundfish by federally permitted vessels.

Pacific cod

- Close 0–6 nm zone of critical habitat year round to directed fishing for Pacific cod by federally permitted vessels using non-trawl gear. For vessels 60 ft or greater, close

critical habitat from 6 nm–20 nm January 1 to March 1, to directed fishing for Pacific cod using non-trawl gear by federally permitted vessels.

- Between 177° E to 178° W long., close critical habitat from 0–20 nm year round to directed fishing for Pacific cod by federally permitted vessels using trawl gear.
- Between 178° W to 177° W long., close critical habitat from 0–10 nm year round to directed fishing by federally permitted vessels using trawl gear. Between 178° W to 177° W long., close critical habitat 10 nm–20 nm June 10 to November 1, to directed fishing for Pacific cod using trawl gear by federally permitted vessels.
- Prohibit directed fishing for Pacific cod by all federally permitted vessels from November 1 to January 1. (This extends the trawl gear restriction to non-trawl gear.)
- Reinitiate ESA consultation if the non-trawl harvest of Pacific cod exceeds 1.5 percent of the BSAI Pacific cod acceptable biological catch (ABC) (equivalent to the Area 542 maximum annual harvest amount from 2007 through 2009). Similarly, reinitiate ESA consultation if the trawl harvest of Pacific cod exceeds 2 percent of the BSAI Pacific cod ABC (equivalent to the Area 542 maximum annual harvest amount from 2007 through 2009).

Atka mackerel

- Set TAC for Area 542 to no more than 47 percent of the ABC amount apportioned to Area 542 by the Council's Scientific and Statistical Committee (SSC).
- Between 177° E to 179° W long. and 178° W to 177° W long., close critical habitat from 0–20 nm year round to directed fishing for Atka mackerel by federally permitted vessels.
- Between 179° W to 178° W long., close critical habitat from 0-10 nm year round to directed fishing for Atka mackerel by federally permitted vessels. Between 179° W and 178° W long., close critical habitat from 10 nm–20 nm to directed fishing for Atka mackerel by federally permitted vessels not participating in a harvest cooperative or fishing a Community Development Quota (CDQ) allocation.
- Add a 50:50 seasonal apportionment to the CDQ Atka mackerel allocation to mirror seasonal apportionments for Atka mackerel harvest cooperatives.
- Limit the amount of Atka mackerel harvest allowed inside critical habitat to no more than 10 percent of the annual allocation for each harvest cooperative or CDQ group. Evenly divide the annual critical habitat harvest limit between the A- and B-seasons.
- Change the Atka mackerel seasons to January 20 to June 10, for the A-season and June 10, to November 1, for the B-season.
- Eliminate the Atka mackerel platoon management system in the HLA.

<u>In Area 541</u>:

Pacific cod

- Close 0–10 nm of critical habitat year round to directed fishing for Pacific cod by all federally permitted vessels.
- Limit the amount of catch that can be taken in the 10 nm–20 nm area of critical habitat based on gear type used:
    - Close critical habitat 10 nm–20 nm January 1 to March 1 to directed fishing for Pacific cod using non-trawl gear by federally permitted vessels.
    - Close critical habitat 10 nm–20 nm June 10 to November 1, to directed fishing by for Pacific cod using trawl gear by federally permitted vessels.
- Prohibit directed fishing for Pacific cod by federally permitted vessels November 1, to January 1. (This extends this trawl gear restriction to non-trawl gear.)

- Reinitiate ESA consultation if the non-trawl harvest of Pacific cod exceeds 1.5 percent of the BSAI Pacific cod ABC (equivalent to the Area 541 maximum annual harvest amount from 2007 through 2009). Similarly, reinitiate ESA consultation if the trawl harvest of Pacific cod exceeds 11.5 percent of the BSAI Pacific cod ABC (equivalent to the Area 541 maximum annual harvest amount from 2007 through 2009).

Atka mackerel

- Change the Bering Sea/Area 541 Atka mackerel seasons to January 20 to June 10, for the A-season and June 10 to November 1, for the B-season.
- Close the Bering Sea subarea year round to directed fishing for Atka mackerel.

Federally permitted vessels participating in the State-managed guideline harvest level (GHL) fishery (5 AAC 28.647) would be exempt from the Atka mackerel and Pacific cod closures under this alternative. NMFS has published a final rule providing that the owner of a pot or hook-and-line catcher/processor vessel who surrenders a Federal fisheries permit (FFP) will not be reissued a new FFP for that vessel within the 3-year term of the permit (76 FR 73513, November 29, 2011). This may have reduced opportunities to participate in the State-managed GHL fishery without complying with all Federal fisheries management measures. The State applies the 2003 Steller sea lion protection measures to this fishery. This would provide for continued harvest in this fishery, as analyzed in the cumulative effects of the FMP biop.

Alternative 4: Return to modified 2010 measures

Alternative 4 reinstates the measures that were in place in 2010, with certain exceptions:

- The HLA program, which was eliminated in 2010 by the interim final rule, is not reinstated.
- Critical habitat open to fishing by Amendment 80 vessels under the HLA program is open all year long.
- The fishing season for Amendment 80 vessels and for vessels fishing CDQ is extended from November 1 to December 31.
- Bering Sea subarea closed to directed fishing; revise Amendment 80 and CDQ MRA calculation for Atka mackerel as an incidental species

In addition, Alternative 4 includes an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their vessel monitoring system (VMS) is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions.

8.2 Background

Section 8.2 provides background on topics necessary to understand the analysis of the six alternatives. Background material has been segregated here to allow the analytical sections to focus on the impacts associated with the changes caused by the alternatives. In addition to allowing a tighter focus in the analytical sections, this segregation of background material from the analysis may reduce confusion if some readers would otherwise mistake some background material as being directly applicable to the incremental analysis required for alternatives. Readers familiar with the fisheries, fishery management, and fishing communities involved in the Aleutian Islands, may choose to pass over this section and start with the analysis beginning in Section 8.3.

The vessels harvesting Atka mackerel and Pacific cod in the Federal and State parallel fisheries in the Aleutian Islands have been grouped into four sectors for analysis: (1) trawl catcher/processors; (2) non-trawl (hook-and-line and pot) catcher/processors; (3) trawl catcher vessels; and (4) non-trawl (hook-and-line, pot, and jig) catcher vessels.

These four sectors have been defined so as to balance several considerations: (1) to group vessels with similar functions (e.g., vessels that simply catch fish, as opposed to vessels that both catch and process); (2) to group vessels with similar gear types; (3) to group vessels in categories that reflect vessel categories adopted for regulation in the interim final rule; and (4) to group vessels so as to minimize the need to protect the confidentiality of some types of information.[7]

This background section discusses each of these groups, as well as other topics. The table of contents lists the topics.

8.2.1 Trawl catcher/processors

This sector includes:

- trawl catcher/processor vessels targeting, or taking incidental catches of, Atka mackerel and/or Pacific cod in the Aleutian Islands,
- trawl catcher/processors acting as motherships to trawl catcher vessels making deliveries of Atka mackerel, and
- catcher vessels delivering Atka mackerel to catcher/processors acting as motherships.

The North Pacific Fishery Management Council's (Council's) report, "Fishing Fleet Profiles" provides descriptions of the trawl catcher/processors and trawl catcher vessels participating in the Bering Sea and Aleutian Islands fisheries (NPFMC 2012d).

Numbers of vessels

Table 8-1 provides estimates of the numbers of trawl catcher/processors with retained targeted or incidental catches of Atka mackerel or Pacific cod from the fisheries in the Aleutian Islands. Many of the vessels in this fleet are fishing under the catch share system created by Amendment 80, and under these rules (at least for the six species for which shares were created) the distinction between a target and an incidental catch becomes blurred, since both are counted against a vessel operator's quota share holdings. Because of this, this fleet has been defined in this analysis as the set of trawl catcher/processors retaining targeted and incidental catches of Atka mackerel and Pacific cod. The other fleets defined here, including the non-trawl catcher/processors, trawl catcher vessels, and non-trawl catcher vessels, have been defined more narrowly as the vessels with retained targeted catches of Pacific cod (although, for these vessels, subsequent tables report their incidental catches).[8]

As shown in Table 8-1, the number of unique vessels in this sector before the interim final rule ranged between 11 in 2008, and 16 in 2007; the median fleet size was 13 vessels. Fleet size appears to have

[7] Numbers of vessels are not confidential, while volumes and value of catch are. Data are confidential if there are fewer than three observations. When confidential data has been suppressed, a "C" is substituted for the data. Sometimes it is necessary to suppress data that is not itself confidential in order to protect confidential data from back calculation. When this is done, an "S" for "suppressed" is substituted for the data point.

[8] For clarity, these latter fleet sectors do not include vessels that do not target Pacific cod, but which do retain it incidentally to their harvests of other target species.

decreased somewhat in the three years just prior to the introduction of the interim final rule; this took place following the introduction of the Amendment 80 and Amendment 85 rules in 2008, and may have been associated with fleet rationalization and changes in sector allocations. Fleet size does not appear to have decreased at the same time as the introduction of the interim final rule in 2011; both the Atka mackerel and Pacific cod vessel subsets increased in 2011. However, the vessel count did drop in 2012. The numbers of vessels participating tended to be larger in Area 541 and to get smaller moving towards more westerly management areas.

Some trawl catcher/processors act as motherships, and accept deliveries of Atka mackerel and Pacific cod from trawl catcher vessels operating in the Aleutian Islands. Table 8-2 reports the numbers of catcher vessels making deliveries of Atka mackerel to catcher/processors, and of the numbers of catcher/processors accepting these deliveries. Table 8-3 provides similar information for vessels catching and accepting deliveries of Pacific cod.

Catcher vessels began delivering Atka mackerel to catcher/processors in 2007. The number rose gradually from one in 2007 to three in 2011. During this period, deliveries were never received by more than one catcher/processor in a year. Catcher vessels delivered Pacific cod to catcher/processors throughout the period. The numbers actually reached their highest levels (11 to 12 vessels) in 2011 and 2012. From one to three catcher/processors accepted deliveries of Pacific cod during this period. The small numbers of catcher/processors acting as motherships and receiving Atka mackerel and Pacific cod from trawl catcher vessels generally precludes reporting information on this activity separately.

Eighteen Amendment 80 trawl catcher/processors had endorsements to fish in the Aleutian Islands. All of them had endorsements allowing them to trawl in the Bering Sea, while three of them also had endorsements permitting the use of non-trawl gear in the Aleutians and Bering Sea. Among the seven Amendment 80 trawl catcher/processors that specialized in Atka mackerel in the Aleutian Islands, all had endorsements to use trawl gear in the Bering Sea and the Western Gulf, and four had endorsements to trawl in the Central Gulf.

Table 8-1 Numbers of trawl catcher/processors with retained Atka mackerel and Pacific cod from retained targeted or incidental catches in the Federal or State of Alaska parallel fisheries[9] in the Aleutian Islands, 2004–2012[10]

Year	Retained from Atka mackerel targets				Retained from Pacific cod targets				Unique Vessels
	541	542	543	AI (unique vessels)	541	542	543	AI (unique vessels)	
2004	10	10	9	11	14	12	9	15	15
2005	11	10	10	11	12	11	11	13	13
2006	12	11	9	12	15	13	10	15	15
2007	11	11	9	12	16	14	9	16	16
2008	8	7	7	8	11	8	8	11	11
2009	10	9	7	11	11	9	8	11	12
2010	9	7	7	9	11	7	7	11	12
2011	11	7	0	11	13	7	1	13	13
2012*	10	8	0	10	11	8	3	11	9

Notes: Federally licensed trawl catcher/processor vessels with retained catches of targeted non-CDQ and CDQ Atka mackerel and/or Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543. *The 2012 vessel counts are estimated as of December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

Table 8-2 Numbers of trawl catcher/processors receiving Atka mackerel deliveries from catcher vessels, and the numbers of catcher vessels delivering Atka mackerel to catcher/processors, 2004–2012

Year	Counts of trawl catcher vessels making deliveries				Counts of catcher/processors receiving deliveries			
	541	542	543	AI (unique vessels)	541	542	543	AI (unique vessels)
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0
2007	1	1	0	1	1	1	0	1
2008	1	1	1	1	1	1	1	1
2009	1	1	1	1	1	1	1	1
2010	1	2	1	2	1	1	1	1
2011	3	2	0	3	1	1	0	1
2012*	2	1	0	2	NA	NA	NA	NA

Notes: Federally licensed trawl catcher vessels with retained catches of targeted no-CDQ and CDQ Atka mackerel, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the entities to which they delivered. *The 2012 vessel counts are estimated as of December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Sources: AKFIN, December 18, 2012.

[9] A State parallel fishery is a fishery that occurs in State waters, is open at the same time as Federal groundfish fisheries in Federal waters, and whose groundfish catch is deducted from the Federal TAC.

[10] Background information is provided for the period from 2004 through early December 2012. The year 2004 was chosen as the starting point, because it is the first year that complete data are available systematically from the AKRO Catch Accounting System (CAS). While complete data could be provided for 2003, this would involve greater analytical resources as CDQ data has not been integrated into the CAS for that year. CAS data are not available prior to 2003. The usefulness of data from earlier years is also limited since there have been important changes in the fisheries operating in the Aleutian Islands Atka mackerel and Pacific cod fisheries, including the introduction of the Amendment 80 cooperatives in 2008, the Pacific cod sector allocation in Amendment 85, and the cooperative established among freezer longline operations that became fully operational in August 2010. Thus, data from earlier years would not be as relevant to the analysis of these alternatives as the more recent data used here. Data for 2012 were incomplete at the time these tables were compiled. There is an important fundamental discontinuity between data from 2004 through 2010, before the interim final rule went into effect, and data from 2011 through 2012, while the rule was in effect. The years 2004 through 2010 are generally used as the baseline years in the analysis.

Table 8-3 Numbers of trawl catcher/processors receiving Pacific cod deliveries from catcher vessels, and the numbers of catcher vessels delivering Pacific cod to catcher/processors, 2004–2012

Year	Counts of trawl catcher vessels making deliveries				Counts of catcher/processors receiving deliveries			
	541	542	543	AI (unique vessels)	541	542	543	AI (unique vessels)
2004	2	3	0	3	1	2	0	2
2005	2	2	0	2	1	1	0	1
2006	2	2	2	2	1	1	1	1
2007	3	2	3	4	2	1	2	2
2008	8	4	4	8	3	2	2	3
2009	4	4	3	5	1	2	2	2
2010	5	5	5	5	2	2	2	2
2011	11	6	0	11	3	2	0	3
2012*	12	4	0	12	NA	NA	NA	NA

Notes: Federally licensed trawl catcher vessels with retained catches of targeted no-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the entities to which they delivered. *The 2012 vessel counts are estimated as of December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Sources: AKFIN, December 18, 2012.

Amendment 80 trawl catcher/processors targeting Atka mackerel

Amendment 80 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) identified groundfish trawl catcher/processors that were not covered by the American Fisheries Act (AFA) (i.e., the head-and-gut fleet or Amendment 80 vessels) and established a framework for future fishing by this fleet. The framework provided for an allocation of the TACs of six groundfish species among trawl fishery sectors, created Amendment 80 quota share (QS) for these vessels, facilitated the development of cooperative arrangements among the vessels, provided for a competitive fishery among Amendment 80 vessels not entering a cooperative, and created an economic data reporting (EDR) program to collect data about the fleet. The fleet currently includes 23 vessels. Seven of these vessels currently consistently target Atka mackerel in the Aleutian Islands, and it is these seven vessels that are included in this category of trawl catcher/processors.

Amendment 80 established criteria for harvesters in the Amendment 80 sector to apply for and receive QS, and for NMFS to initially allocate and transfer QS. Amendment 80 assigned QS based on the historical proportional levels of participation by Amendment 80 vessels. Amendment 80 vessels may choose to operate in a cooperative or in an open access fishery. Vessels in a cooperative may pool their quota share and fish in a rationalized fishery; vessels choosing to operate in an open access fishery contribute their quota share and associated harvest rights to the common fishery for competitive fishing.

Table 8-4 shows the share of Amendment 80 quota held by the different Amendment 80 firms in 2012. Firms are defined as the corporations recorded in Federal records as holders of Amendment 80 quota share. This level of reporting misses ownership affiliations between many of the corporations, and the actual concentration of the Atka mackerel quota share holdings, in particular, are greater than the table indicates. As shown in Table 8-4, seven firms hold more than 5 percent of the Atka mackerel QS. Among these firms, the lowest holding is 8 percent, and the largest is 25 percent. The top four firms hold about 67 percent of the Atka mackerel QS.

Table 8-4 Share of Amendment 80 quota share, by firm, 2012

Firm	Atka Mackerel	Flathead Sole	Pacific Cod	Pacific ocean Perch	Rock Sole	Yellowfin Sole
ALASKA ALLIANCE, LLC	0%	1%	2%	0%	1%	0%
ALASKA JURIS, INC.	13%	2%	3%	16%	5%	8%
ALASKA LEGACY, LLC	1%	3%	4%	0%	5%	3%
ALASKA SPIRIT, INC.	8%	2%	3%	2%	7%	8%
ALASKA VAERDAL, LLC	1%	1%	4%	0%	3%	2%
ALASKA VICTORY, INC.	11%	1%	3%	7%	3%	7%
ARCTIC SOLE SEAFOODS, INC.	0%	1%	0%	0%	1%	0%
ARICA VESSEL LLC	0%	7%	6%	0%	5%	5%
CAPE HORN VESSEL, LLC	0%	9%	5%	0%	4%	3%
FCA HOLDING INC	1%	0%	1%	2%	1%	1%
M/V SAVAGE, INC.	18%	1%	5%	18%	2%	5%
NORTH PACIFIC FISHING, INC.	1%	2%	6%	0%	7%	4%
OCEAN ALASKA, LLC.	0%	2%	1%	0%	1%	1%
OCEAN PEACE, INC.	9%	5%	5%	13%	4%	4%
O'HARA CORPORATION	1%	33%	19%	0%	18%	14%
REBECCA IRENE VESSEL LLC	0%	7%	5%	0%	4%	4%
SEAFREEZE ALASKA LLC	8%	3%	6%	14%	3%	4%
THE FISHING COMPANY OF ALASKA, INC.	25%	3%	6%	27%	8%	16%
TREMONT VESSEL, LLC	0%	9%	3%	0%	4%	3%
U.S. FISHING, L.L.C.	1%	3%	9%	0%	7%	4%
UNIMAK VESSEL, LLC	0%	3%	5%	0%	7%	5%
Grand Total	100%	100%	100%	100%	100%	100%

Note: Rounding errors prevent precise calculation of summary statistics from reported percentages. While some firms actually have no holdings of some species QS, in other instances firms appear to have zero QS holdings due to rounding.
Source: AKR RAM website, 2010 QS holdings. Retrieved on June 10, 2012, from http://alaskafisheries.noaa.gov/sustainablefisheries/amds/80/default.htm ("A-80 Quota Share Holders").

Table 8-5 shows the allocations of Atka mackerel among Amendment 80 cooperatives in the years since Amendment 80 became effective. One cooperative was formed immediately, and has functioned each year since 2008; from 2008 through 2010, several firms operated in an open access fishery, but a second cooperative was formed in 2011, and there have been no open access allocations since that year.

Table 8-5 Annual allocation of Atka mackerel (measured in metric tons) among Amendment 80 Cooperatives and the open access fishery, 2008–2013

Year	Alaska Seafood Cooperative (formerly Best Use Cooperative) (metric tons)	Alaska Groundfish Cooperative (metric tons)	Open Access (metric tons)
2008	22,914	No co-op	30,339
2009	27,356	No co-op	38,398
2010	26,181	No co-op	36,749
2011	18,048	25,325	0
2012	16,542	23,211	0

Notes: Amendment 80 took effect in 2008. Shaded years are years during which the interim final rule was in effect.
Source: Various annual specifications for the BSAI, as published in the *Federal Register*.

Cooperative participants could consolidate fishing operations on a specific Amendment 80 vessel or subset of Amendment 80 vessels, thereby reducing monitoring, enforcement, and other operational costs, and permitting more efficient harvest. The opportunity to trade harvest privileges among cooperatives encourages efficient harvesting, and discourages waste.

Each Amendment 80 cooperative receives an exclusive allowance of crab and halibut prohibited species catch (PSC), which the cooperative may use while harvesting in the BSAI. This halibut and crab PSC cooperative quota (CQ) is assigned to a cooperative in an amount proportionate to the amounts of Amendment 80 QS held by its members, and is not based on the amount of crab or halibut PSC historically removed by the cooperative members.

A cooperative structure may allow Amendment 80 vessel operators to better manage PSC rates than do operators who must race to harvest fish as quickly as possible before PSC causes a fishery closure. By reducing PSC through more efficient cooperative operations (such as through gear modifications or "hot spot" avoidance) Amendment 80 vessel operators may also increase the harvest of valuable targeted groundfish species and improve revenues that would otherwise be forgone.

Amendment 80 cooperatives may receive a reallocation of an additional amount of CQ, if a portion of the Amendment 80 species, or of crab or halibut PSC allotted to the BSAI trawl limited access sector, is projected to go unharvested. This reallocation to the Amendment 80 cooperatives is at the discretion of NMFS, based on projected harvest rates in the BSAI trawl limited access sector and other criteria. Each Amendment 80 cooperative would receive an additional amount of CQ based on the proportion of the Amendment 80 QS held by that Amendment 80 cooperative, as compared with all other Amendment 80 cooperatives.

The Amendment 80 program established groundfish and halibut PSC sideboards to limit the ability of Amendment 80 firms to expand their harvest efforts in the Gulf of Alaska (GOA) (75 FR 11749, March 12, 2010). Groundfish harvesting sideboard limits were established for all Amendment 80 vessels, other than the F/V *Golden Fleece*. Sideboard limits in the GOA cover pollock in the Western and Central Regulatory Areas and in the West Yakutat district, Pacific cod GOA-wide, Pacific ocean perch, and pelagic shelf rockfish in the Western Regulatory Area and West Yakutat district, and northern rockfish in the Western Regulatory Area. (75 FR 11749, March 12, 2010) The harvest of Pacific ocean perch, pelagic shelf rockfish, and northern rockfish in the Central Regulatory Area of the GOA are subject to regulation under the Central GOA Rockfish Program. Amendment 80 vessels not qualified under the Rockfish Program are excluded from directed fishing for these rockfish species in the Central GOA. The F/V *Golden Fleece* is prohibited from directed fishing for pollock, Pacific cod, Pacific ocean perch, pelagic shelf rockfish, and northern rockfish in the GOA. (75 FR 11749, March 12, 2010) All targeted or incidental catch of sideboard species made by Amendment 80 vessels will be deducted from the sideboard limits. (75 FR 11749, March 12, 2010)

A minimum groundfish retention standard (GRS) applied to all Amendment 80 vessels and Amendment 80 cooperatives fishing in the BSAI. The GRS became effective in 2008. The percentage of catch that must be retained was 65 percent in 2008, increasing to 75 percent in 2009, 80 percent in 2010, and 85 percent in 2011 and all future years.

In a June 2010 report to the Council, NMFS identified two issues with the GRS Program. First, the regulatory methodology adopted for implementation of the GRS differed from that used in the analysis of the GRS at the time of final action, and required groundfish retention beyond levels intended by the Council. Thus, the current GRS calculation schedule could have imposed economic hardships to the Amendment 80 fleet beyond those considered in the analysis. Second, NMFS enforcement had concerns with the cost of enforcing a GRS violation, and this may have hindered its ability to enforce the current GRS Program.

In 2010, the Council approved an emergency action to temporarily suspend the GRS regulations. NMFS published the emergency rule in December 2010, and subsequently published an extension through December 17, 2011, in June 2011 (75 FR 78172; 76 FR 31881), which had the effect of suspending the

GRS for 2010 and 2011. NMFS lacked the authority to extend the emergency rule beyond 2011, thus, the GRS was reinstated in January 2012. On February 25, 2013, NMFS published a final rule repealing the GRS with an effective date on March 27, 2013 (78 FR 12627).

Trawl catcher/processors targeting Pacific cod

The trawl catcher/processors targeting Pacific cod include Amendment 80 vessels, both the seven that are important in the Atka mackerel fishery, and others. Prior to the effective date of the interim final rule in 2011, and for a while after, this fleet segment also included the AFA trawl catcher/processor, the F/V *Katie Ann*. As a catcher/processor, the F/V *Katie Ann* harvested a portion of the AFA's Pacific cod sideboard, and as a mothership, she accepted deliveries from three catcher vessels fishing in the Federal/parallel Pacific cod fishery, and then in the State GHL Pacific cod fishery. (Jacobs, personal communication, 2010).[11] In the period prior to the interim final rule she had a market for large Area 543 Pacific cod with Ivar's Restaurant Company, a chain of 60 seafood restaurants in the Pacific Northwest (Table 8-6 does suggest that Pacific cod tend to be larger in the Aleutian Islands). In 2010, representatives of Ivar's indicated that they valued the large Pacific cod from the *Katie Ann*, because they made it possible to prepare a high quality product. (Donegan 2010; Jacobs, 2010; Jacobs, personal communication, 2010).

The interim final rule prohibited retention of Pacific cod from Area 543 from 2011 on. While the *Katie Ann* continued to try and meet Ivar's needs with Area 541 and 542 Pacific cod, it was eventually unsuccessful, and the American Seafood Company and Ivar's ended their supply agreement. In addition, the *Katie Ann* was also affected by changing patterns in the AFA pollock fishery. Under Amendment 85, the AFA catcher/processors were allocated 2.3 percent of the pollock TAC. The *Katie Ann* was the AFA vessel that used this allocation for targeted fishing. However, incidental AFA catches of Pacific cod in the pollock fishery were also to be deducted from this allocation. Increasing incidental catches of Pacific cod in the directed pollock fishery in recent years have reduced the share of this 2.3 percent allocation available for the *Katie Ann's* own directed fishing. (Jacobs, personal communication, April 3, 2013).

In response to these pressures, the American Seafood Company withdrew the *Katie Ann* from the Pacific cod fishery. The processing plant in the vessel was reconstructed, and the vessel's Alaska groundfish fishery focus is now yellowfin sole. Of the three catcher vessels that had been delivering to the *Katie Ann*, one, the F/V *Forum Star*, was tied up in 2013. (Jacobs, personal communication, April 3, 2013).

[11] Jan Jacob. Director of Government Affairs, American Seafood Company.

Table 8-6 Average weights of retained Pacific cod in the BSAI, by year and management area and by gear type, measured in kilograms

Hook-and-line gear									
BSAI mgt area	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
509	3.09	3.41	3.94	3.80	2.77	2.08	2.39	2.51	2.78
512	2.90	3.05			2.86	2.36	2.55	2.38	
513	3.07	3.53	3.94	3.70	3.45	3.10	2.41	2.43	2.25
514	2.78	3.31	2.57		2.96		2.49	2.78	
516	3.64	3.46	3.45	4.37	2.97	2.21	2.62	1.98	2.64
517	3.61	3.84	4.14	3.95	3.35	2.54	2.59	2.63	2.63
518	2.86	2.75	4.86	3.09	2.83		3.45		
519	3.55	3.25	3.42	3.29	2.44	2.44	2.99	2.82	3.02
521	3.37	3.99	3.99	4.41	4.09	3.89	3.51	3.34	2.91
523	3.83	4.77	4.35	3.81	3.57	3.15	3.29	2.97	2.75
541	5.12	5.53	5.30	5.34	4.86	4.58	4.97	3.84	4.58
542	5.69	5.09	5.35	5.67	7.10	5.72	6.00	4.51	3.62
543	3.37	2.59	5.36	5.69	7.63	6.17	5.87		5.69
Pot gear									
BSAI mgt area	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
509	3.43	3.54	3.77	4.81	4.27	5.07	3.63	3.85	3.57
512								3.20	
513	3.72	4.00	4.08	4.25	4.96	4.66	5.22	4.06	
516		3.20			3.40				
517	3.76	4.45	5.11	5.01	4.45	4.18	3.40	3.38	3.81
518	3.55	4.51	4.39		3.02	2.57		3.38	2.98
519	4.31	4.59	4.38	4.30	3.58	3.51	3.28	2.97	2.69
521	3.93	3.50	4.34	6.10	6.18	4.90	5.56	2.85	
523								3.07	
524	3.15	3.58	3.29	3.28		5.33	3.75		
541	2.43	2.35	4.45	3.45	4.27		5.00	2.66	
542			5.07				9.47	3.23	
Trawl gear									
BSAI mgt area	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
509	2.72	3.12	3.89	3.01	1.55	1.57	1.71	1.98	1.55
512	2.27	1.79	2.37	1.36	1.16	1.03	1.15	1.77	1.48
513	2.13	1.76	1.42	0.95	0.85	0.73	1.60	1.83	1.86
514	2.12	2.52	3.21	2.95	2.55	1.88	1.72	1.82	1.67
516	4.39	4.68	4.67	3.86	0.97	1.90	2.12	3.00	3.20
517					2.90	3.26	3.34	3.35	4.20
518	4.18	3.61	3.02	2.31	3.11	2.04	2.26	2.93	3.49
519	2.70	3.46	3.00	2.46	2.88	1.80	2.28	1.59	2.08
521		2.90	5.16	2.65			9.35	3.22	8.54
523	1.52	2.09	2.51	2.22	2.77	3.37	2.03	4.30	2.80
541	7.53	7.61	8.44	9.49	9.19	8.66	8.04	6.56	6.44
542	7.80	8.89	7.20	9.20	6.69	7.53	6.73	6.47	6.70
543	7.77	8.26	9.37	9.26	10.56	10.36	10.14	3.41	

Notes: Shaded rows identify areas in the Aleutian Islands.
Source: Observer Program.

Retained catches and processed deliveries

Table 8-7 shows the targeted and incidental catches of Atka mackerel by trawl catcher/processors in the three Aleutian Islands management areas (this excludes small amounts of retained catch from the eastern Bering Sea). Overall, the aggregate catches of Atka mackerel rose from about 46,000 metric tons round weight in 2004, to 65,000 to 70,000 metric tons in 2009 and 2010, just before the introduction of the interim final rule. Catches fell in the first year of the interim final rule (2011) to about 49,000 metric tons. The composition of retained Atka mackerel catches changed somewhat at the time of the

introduction of Amendment 80 rules in 2008; incidental catches increased relative to targeted catches. Rockfish targets were the largest source of Atka mackerel incidental catch.

Table 8-7 Trawl catcher/processor retained Atka mackerel catch in the Aleutian Islands (Areas 541, 542, and 543)

Metric tons (round weight)									Aggregate Atka mackerel in the AI
	Retained catch in Atka mackerel target				Atka mackerel incidental catch				
Year	541	542	543	Aggregate	Pcod Tgt	Rockfish Tgt	Other	Aggregate	
2004	2,900	26,427	16,514	45,841	235	172	0	407	46,248
2005	3,094	33,472	18,793	55,359	291	157	0	448	55,806
2006	3,833	38,410	14,361	56,603	S	52	C	232	56,835
2007	19,503	25,389	8,680	53,573	S	156	C	501	54,074
2008	17,406	21,788	14,563	53,757	S	2,202	C	2,774	56,531
2009	25,406	27,843	13,866	67,116	354	2,191	1	2,546	69,661
2010	22,678	23,677	16,836	63,191	181	1,071	126	1,378	64,568
2011	38,594	8,751	0	47,345	97	1,491	109	1,697	49,042
2012*	34,629	9,019	0	43,648	393	1,047	546	1,986	45,634

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. Production from Bering Sea subarea not included. *The 2012 data reflect production through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN. December 20, 2012.

Table 8-8 shows the targeted and incidental catches of Pacific cod by trawl catcher/processors in the three Aleutian Islands management areas. Retained catches were highest (from about 10,000 to about 12,000 metric tons round weight) in the earliest years, from 2004 through 2007. Retained catches dropped in 2008, at the time the Amendment 80 rules came into effect, and were between about 4,000 metric tons and about 5,300 metric tons from 2008 through 2010. With the introduction of the interim final rule in 2011, retained catches fell further to about 1,600 metric tons in 2011; catches grew somewhat in 2012.

Table 8-8 Trawl catcher/processor retained Pacific cod catch in the Aleutian Islands (Areas 541, 542, and 543)

Metric tons (round weight)									Aggregate Pacific cod in the AI
	Retained catch in Pacific cod target				Pacific cod incidental catch				
Year	541	542	543	Aggregate	Amack Tgt	Rockfish Tgt	Other	Aggregate	
2004	5,469	1,515	2,923	9,906	2,069	129	0	2,199	12,105
2005	5,018	1,150	3,135	9,303	2,018	83	0	2,101	11,404
2006	4,877	877	2,662	8,417	1,431	67	0	1,498	9,915
2007	7,307	1,207	1,875	10,389	1,640	S	C	1,708	12,098
2008	2,653	S	C	4,107	978	S	C	1,164	5,271
2009	S	C	C	3,259	1,835	47	0	1,882	5,141
2010	S	C	C	2,390	1,479	70	17	1,566	3,956
2011	C	C	C	C	1,246	93	91	1,431	1,560
2012*	C	C	C	C	1,043	66	21	1,129	2,225

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data reflect production through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN. December 20, 2012.

Table 8-9 summarizes trawl catcher/processor incidental catch of groundfish species other than Atka mackerel and Pacific cod (which were summarized in Table 8-7 and Table 8-8). Incidental catch is larger in the Atka mackerel target fishery, consisting of flatfish, pollock, rockfish, and other species; rockfish incidental catch is clearly the greatest in each year. Rockfish incidental catch increased in 2008, the same year the Amendment 80 rules were introduced. Rockfish incidental catch dropped from 2010 levels in 2011, when the interim final rule was introduced, but remained at Amendment 80 levels from earlier

years. Incidental catch in the Pacific cod target fishery tends to be comparable to or less than incidental catch in the Atka mackerel targets, and, in contrast to rockfish incidental catch in the Atka mackerel target, decreases with the advent of the Amendment 80 rules.

Table 8-9 Incidental catch of other groundfish species in the trawl catcher/processor Atka mackerel and Pacific target fisheries in the Aleutian Islands

Metric tons (round weight)								
	Atka mackerel target				Pacific cod target			
Year	Flatfish	Pollock	Rockfish	Other bycatch	Flatfish	Pollock	Rockfish	Other bycatch
2004	133	265	1,766	16	170	397	78	5
2005	294	250	2,249	48	250	368	119	1
2006	227	194	2,306	36	247	36	137	20
2007	237	95	2,600	26	288	142	43	13
2008	417	124	5,254	90	46	1	9	1
2009	316	343	5,790	80	147	21	46	C
2010	449	325	8,264	125	156	7	4	C
2011	488	243	5,224	94	C	C	C	C
2012*	1,628	337	5,310	252	C	C	C	C

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" Indicates confidential data. Bycatch of Atka mackerel and Pacific cod is summarized in Table 8-7 and Table 8-8.
Source: AKFIN, December 20, 2012.

Table 8-10 summarizes trawl catcher/processor PSC from 2004 through early 2012. Since 2007, the Atka mackerel target fisheries have tended to take more of all three prohibited species categories, but especially of crab, than the Pacific cod target fisheries.

Table 8-10 PSC in the trawl catcher/processor Atka mackerel and Pacific target fisheries in the Aleutian Islands

	Atka mackerel			Pacific cod		
Year	Crab	Halibut	Salmon	Crab	Halibut	Salmon
2004	C	32	C	13,339	24	617
2005	C	37	2,425	2,408	44	405
2006	C	54	587	2,396	37	545
2007	1,828	90	895	1,207	47	919
2008	23,011	56	650	399	3	429
2009	4,816	67	422	947	14	288
2010	3,994	55	1,026	607	3	156
2011	35,214	111	410	C	C	C
2012*	8,150	144	651	C	C	C

Notes: PSC, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are partial year estimates. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data.
Source: AKFIN, December 20, 2012.

Gross revenues

Table 8-11 through Table 8-15 summarize estimates of gross first wholesale revenues from trawl catcher/processor Atka mackerel and Pacific cod fishing in the Aleutian Islands. Tables are included for revenues from retained targeted and incidental catches of Atka mackerel and Pacific cod, and for the revenues from catches of other species taken incidentally to the target fisheries for Atka mackerel and Pacific cod. Finally, Table 8-15, based on the preceding tables, summarizes all trawl catcher/processor gross revenues. In Table 8-11 through Table 8-15, revenues are shown in nominal dollars (that is in the

dollars earned in the year of fishing) and in "real" dollars, which have been adjusted to factor out the estimated influence of inflation. These real dollar estimates have been adjusted to 2012 dollars.[12]

Table 8-11 Trawl catcher/processor Atka mackerel first wholesale gross revenues, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	2.5	15.8	9.0	27.3	1.19	3.0	18.8	10.7	32.5
2005	2.4	20.7	12.3	35.5	1.16	2.8	24.1	14.3	41.2
2006	3.0	21.6	7.9	32.5	1.12	3.4	24.3	8.8	36.6
2007	14.7	17.9	5.4	38.0	1.10	16.1	19.7	5.9	41.6
2008	13.5	13.4	10.1	36.9	1.05	14.2	14.1	10.7	38.9
2009	26.4	25.9	13.7	65.9	1.06	27.9	27.4	14.5	69.8
2010	28.2	25.8	18.9	72.9	1.04	29.4	26.9	19.7	76.0
2011	61.4	11.3	0.0	72.7	1.01	62.3	11.5	0.0	73.8

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

Table 8-12 Trawl catcher/processor Pacific cod first wholesale gross revenues, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	6.7	3.3	3.1	13.1	1.19	7.9	3.9	3.7	15.6
2005	6.4	2.4	4.6	13.5	1.16	7.4	2.8	5.4	15.6
2006	8.3	2.7	4.3	15.3	1.12	9.4	3.0	4.8	17.2
2007	15.1	4.4	4.8	24.3	1.10	16.6	4.8	5.3	26.6
2008	5.9	1.1	3.8	10.8	1.05	6.2	1.2	4.0	11.4
2009	1.8	1.4	2.5	5.7	1.06	1.9	1.5	2.7	6.0
2010	2.8	2.1	0.9	5.7	1.04	2.9	2.2	0.9	6.0
2011	1.8	S	C	2.5	1.01	1.9	S	C	2.5

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

[12] Gross revenue estimates are reported in nominal (the actual dollar values they took in a given year) and in real (adjusted to make annual comparisons more meaningful by taking out the effect of inflation) forms. In this case, the real values were estimated by converting to "2012" dollars using the Personal Consumption Expenditures (PCE) implicit price deflator for June of each year. This effectively increased the values from earlier years in comparison to the most recent 2011 values. The PCE implicit price deflator was chosen because it captures changes in prices of goods and services purchased by households and non-profits serving households, and this allows an intuitively meaningful welfare comparison by the reader, and this is best accomplished with a broad index of prices reflecting the goods that individuals might actually consume. While other consumer price indices might have been used, the PCE price deflator has been the Federal Reserve Board's preferred index of inflation since 2000 (Anon 2012). Any conversions to "real" dollars will be imprecise, and alternative indices would have produced somewhat different results.

Table 8-13 Trawl catcher/processor first wholesale gross revenues from incidental catches other than Atka mackerel or Pacific cod, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	0.4	0.8	0.5	1.7	1.19	0.5	0.9	0.6	2.0
2005	0.6	1.1	2.1	3.8	1.16	0.7	1.3	2.4	4.4
2006	0.7	1.8	1.0	3.4	1.12	0.7	2.0	1.1	3.8
2007	1.3	1.3	0.9	3.4	1.10	1.4	1.4	0.9	3.7
2008	0.8	1.7	1.7	4.2	1.05	0.8	1.8	1.8	4.4
2009	1.5	2.4	2.5	6.4	1.06	1.6	2.6	2.6	6.8
2010	3.0	3.3	3.5	9.7	1.04	3.1	3.4	3.6	10.2
2011	8.2	3.0	0.0	11.3	1.01	8.4	3.1	0.0	11.4

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

Table 8-14 Aggregate trawl catcher/processor first wholesale gross revenues, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	9.6	19.9	12.6	42.1	1.19	11.4	23.7	14.9	50.0
2005	9.4	24.3	19.0	52.7	1.16	10.9	28.2	22.1	61.2
2006	12.0	26.1	13.2	51.3	1.12	13.5	29.3	14.8	57.7
2007	31.0	23.6	11.1	65.7	1.10	34.0	25.9	12.1	72.0
2008	20.1	16.2	15.7	51.9	1.05	21.2	17.0	16.5	54.7
2009	29.6	29.7	18.7	78.0	1.06	31.4	31.4	19.8	82.6
2010	33.9	31.2	23.3	88.4	1.04	35.4	32.5	24.3	92.1
2011	71.4	S	C	86.5	1.01	72.5	S	C	87.8

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

Table 8-15 Summary of aggregate trawl catcher/processor first wholesale gross revenues by source, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	Atka mackerel	Pacific cod	Other incidental catches	Total		Atka mackerel	Pacific cod	Other incidental catches	Total
2004	27.3	13.1	1.7	42.1	1.19	32.5	15.6	2.0	50.0
2005	35.5	13.5	3.8	52.7	1.16	41.2	15.6	4.4	61.2
2006	32.5	15.3	3.4	51.3	1.12	36.6	17.2	3.8	57.7
2007	38.0	24.3	3.4	65.7	1.10	41.6	26.6	3.7	72.0
2008	36.9	10.8	4.2	51.9	1.05	38.9	11.4	4.4	54.7
2009	65.9	5.7	6.4	78.0	1.06	69.8	6.0	6.8	82.6
2010	72.9	5.7	9.7	88.4	1.04	76.0	6.0	10.2	92.1
2011	72.7	S	C	86.5	1.01	73.8	S	C	87.8

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

As shown in Table 8-2 and Table 8-3, some catcher/processors act as motherships, receiving deliveries of Atka mackerel and of Pacific cod from trawl catcher vessels. The tables show that small numbers of both catcher vessels and catcher/processors are involved. These small numbers make it impossible to report detailed information on these product flows.

In this analysis, Atka mackerel mothership deliveries are treated as catcher/processor production and included in the reports of catcher/processor retained catch and in catcher/processor first wholesale gross revenues. As shown in Table 8-2, no more than one trawl catcher/processor received deliveries of Atka mackerel in any year. There were no deliveries before 2007; since then, the number of catcher vessels making deliveries gradually grew, from 1 in 2007 to 3 in 2011. As noted above, the gross ex-vessel revenues associated with these deliveries cannot be reported; however, they did grow, along with the number of catcher vessels making deliveries, over this period (Fey, personal communication, July 13, 2012).[13]

In this analysis, Pacific cod mothership deliveries are combined with shoreside deliveries for reporting purposes. This is again done to preserve the confidentiality of the data. As shown in Table 8-3, from one to three catcher/processors received Pacific cod deliveries in every year. Deliveries to three catcher/processors were only made in one year, 2008, and these amounted to about $8.2 million in that year. In general, trawl catcher/processor revenues from this source were higher in the second half of the period than in the first. During the years 2004 through 2011, average first wholesale gross revenues were $6.7 million, and median revenues were $7.1 million. (Fey, personal communication, July 13, 2012)

Aleutian Islands revenues as a proportion of revenues from all sources

Table 8-16 summarizes gross earnings information for the trawl catcher/processor sector, and reports Atka mackerel and Pacific cod gross earnings as a proportion of the sector's gross earnings from all other fishing activities in Alaska, and on the Pacific coast. Revenues from Atka mackerel range between about 16 percent and about 40 percent of the sector's earnings from all sources, while revenues from Pacific cod range between about 1 percent and about 10 percent of the sector's earnings from all sources. Overall sector percentages may obscure heavier dependence by some vessels (as well as lesser dependence by others). To the extent that these vessels have non-fishing revenues, or revenues from activities other than operating as a mothership for other groundfish fishing vessels, these percentages may overstate the importance of Aleutian Islands Atka mackerel and Pacific cod fisheries to the revenue pictures of these vessels, for example, if a vessel is used to tender salmon at some time in the year (as, for example, the F/V *Katie Ann* was in earlier years) (NMFS 2010b; page 10-16). These latter revenue sources are generally believed to be small.

[13] Michael Fey. Data manager, Alaska Fisheries Information Network, Anchorage, Alaska.

Table 8-16 Proportion of trawl catcher/processor gross revenues earned from fishing for Atka mackerel and Pacific cod in the Aleutian Islands, 2004–2011 (revenues reported in millions of dollars)

	Atka mackerel		Pacific cod						
Year	Targeted and incidental Atka mackerel in AI	Incidental catch of other groundfish in the Atka mackerel Target in AI (excluding Pacific cod)	Targeted and incidental Pacific cod in AI	Incidental catch of other groundfish in the Pacific cod Target in AI (excluding Atka mackerel	Total groundfish fishing gross revenue	Other Alaska fishing gross revenues	Other West Coast gross revenues	Percent of gross revenues from AI Atka mackerel	Percent of gross revenues from AI Pacific cod
2004	27.3	1.3	13.1	0.4	150.4	12.6	0.0	17.5%	8.3%
2005	35.5	3.1	13.5	0.6	184.7	24.4	0.0	18.5%	6.7%
2006	32.5	2.9	15.3	0.5	206.7	19.4	0.0	15.5%	7.0%
2007	38	2.9	24.3	0.5	234.5	7.7	0.0	16.9%	10.2%
2008	36.9	4.1	10.8	0	205.2	0.5	0.0	19.9%	5.3%
2009	65.9	6.3	5.7	0.1	185.5	0.3	0.0	38.9%	3.1%
2010	72.9	9.6	5.7	0.1	207.5	0.3	0.0	39.7%	2.8%
2011	72.7	11.3	2.5	0	205.8	1.8	0.0	40.5%	1.2%

Notes: Gross revenues from retained harvests of commercially caught species, valued at first wholesale value (unless the vessel operated as a catcher vessel in a specific fishery). Aleutian Islands gross revenues from Federal fisheries and from State of Alaska parallel fisheries. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN January 7, 2013. AKR calculations.

Crew

Table 8-17 shows estimates of the crew sizes, based on Weekly Processor Report (WPR) and Alaska fish ticket records, for vessels in the four different sectors defined for analysis in this action. The average of the mean annual crew sizes on a trawl catcher/processor, over the years 2004 to 2012, was about 52 persons.[14]

Four years of EDR data (2008 through 2011) are now available for the Amendment 80 fleet. (Haynie, personal communication, July 10, 2012).[15] The seven Amendment 80 trawlers that form the core of the Atka mackerel fishery, and which also target Pacific cod, had average crew sizes that varied across the years from a low of 47.6 positions in 2009, to a high of 53.3 positions in 2008; the average for the four years was 49.8 positions. This includes an average of 8 deck crew, 33 processing crew, and 8.8 others, including officers, engineers, and cooks. The median number of employees that worked on a vessel during a year was 158.8.[16] The number of employees exceeds the number of positions, because of turnover and crew rotations during the year. On the basis of this, the seven Amendment 80 catcher/processors are estimated to use a total 349 crew positions during the Atka mackerel and Pacific cod fisheries.

[14] The crew size information in this table is used in later sections on other fleet sectors.

[15] Alan Haynie. Economist. National Marine Fisheries Service, Alaska Fisheries Science Center. Supplied data.

[16] Median was used for number of employees to offset potential undue influence of an outlying data point which is currently being verified.

Table 8-17 Estimated crew sizes for trawl and non-trawl catcher/processors and catcher vessels operating in the Aleutian Islands Atka mackerel and Pacific cod fisheries

	Average crew size estimated from weekly observations		Average crew size estimated over landings	
Year	Trawl C/P	Non-trawl C/P	Trawl CV	Non-trawl CV
2004	47.73	20.77	NA	NA
2005	49.68	22.07	NA	NA
2006	50.71	17.74	NA	NA
2007	50.61	19.61	4.62	3.69
2008	54.16	20.42	4.65	4.55
2009	55.59	19.29	4.37	3.44
2010	53.82	19.25	4.54	4.14
2011	51.75	19.87	4.38	3.65
2012	53.83	18.87	NA	NA

Notes: Catcher/processor crew sizes are averages of crew from WPR records for weeks in which catcher/processors retained Atka mackerel or Pacific cod in the Aleutian Islands with the indicated gear type. Catcher vessel crew sizes are averages associated with landings of Pacific cod reported on Alaska fish ticket records. Years during which the interim final rule was in effect have been shaded. *The 2012 data are incomplete. Source: AKFIN, June 25, 2012.

The EDR data provides information on crew compensation, as well as on the numbers of crew members, for the period 2008 to 2011. The average annual aggregate deck crew compensation on an Amendment 80 vessel targeting Atka mackerel and Pacific cod in the Aleutian Islands was about $1.1 million during these years, the average processing crew compensation was about $2.4 million, and the average for other employees was about $1.4 million. This compensation is annual payments by the vessel's owners, and covers payments for activity in fisheries other than the Atka mackerel and Pacific cod fisheries. These average labor expenses came to a total of about $4.9 million.[17] In addition to these expenses, identified as labor expenses on the survey, the crew would have received some portion of a $700,000 category described as "Employee," which includes recruitment, travel, and benefits. Focusing only on the expenses identified as labor, the information about the number of employees and compensation implies that the average person would have earned about $30,900, while the average position would have received about $98,400, in 2008.[18]

In 2010, a representative of American Seafood Co. estimated that the F/V *Katie Ann* carried a crew of about 100 persons, and that there were no crew rotations during the winter-spring Pacific cod season (Jacobs, personal communication, August 24, 2010).[19] An examination of daily processor reports for the spring-winter season of 2010 shows the reported crew sizes ranging between 94 and 96 (NMFS AKR estimate). For the purposes of this discussion, the crew size is estimated to be 96 persons.

Costs and net returns

Table 8-18 summarizes data on total gross revenues from all fisheries (from reported Commercial Operator's Annual Report [COAR] values) and reported operating costs for different cost categories in all fisheries (from the EDR) for Amendment 80 trawl catcher/processors processing Atka mackerel in the Aleutian Islands. Some of these revenues come from harvesting and processing Pacific cod in the Aleutian Islands.

[17] Medians used to offset potential undue influence of an outlying data point which is currently being verified.

[18] Average per person equals labor expenses divided by median number of employees during a year (158.8); average per position equals labor expenses divided by average number of positions (49.8).

[19] Jan Jacobs. Director of Government Affairs, American Seafoods Company. Seattle, Washington.

Table 8-18 Estimated aggregate revenues and costs for the seven Amendment 80 trawl catcher/processors targeting Atka mackerel consistently in recent years (millions of dollars)

	2008	2009	2010	2011
GROSS REVENUES	137.6	128.4	152.2	195.9
ADMINISTRATION	9.8	8.4	6.1	19.9
CO-OP	0.2	0.2	0.3	0.4
EMPLOYEE	4.5	4.1	4.3	6.8
FISH GEAR	3.3	4.4	4.1	5.0
FISH TAX	1.2	1.1	0.5	0.7
FOOD	2.9	2.8	2.6	3.0
FREIGHT GEAR	0.4	0.6	0.8	0.8
FREIGHT SALES	2.2	6.6	7.5	7.4
FUEL	18.0	14.0	15.8	21.1
INSURANCE	4.9	6.1	5.5	8.8
LABOR CREW	6.0	14.2	5.2	5.8
LABOR OTHER	7.7	7.6	10.7	11.9
LABOR PROC	17.9	10.4	18.3	20.2
LUBE	1.3	0.8	3.3	6.4
OBSERVER	1.4	1.3	1.3	1.3
PACKAGING	1.9	1.2	1.6	2.2
RAW FISH	3.3	0.0	0.0	1.6
REPAIRS AND MAINTENANCE	12.0	14.8	22.2	13.7
VESSEL LEASE	0.0	0.0	0.0	0.0

Source: AFSC, July and August 2012. Revenue estimates from AKFIN COAR data, cost estimates are from EDR supplied by AFSC.

8.2.2 Non-trawl catcher/processors

This sector includes non-trawl (hook-and-line and pot gears) catcher/processors targeting Pacific cod in the Aleutian Islands. Hook-and-line and pot gears have been grouped for analysis because the interim final rule groups non-trawl gears for regulatory purposes, and because the small numbers of pot vessels would create confidentiality issues if these were treated as a separate sector. The Council's recent report "Fishing Fleet Profiles" provides descriptions of the non-trawl catcher/processors participating in the Bering Sea and Aleutian Islands fisheries (NPFMC 2012d).

Numbers of vessels

Non-trawl catcher/processors target Pacific cod in the Aleutian Islands. Table 8-19 summarizes estimates of the numbers of hook-and-line and pot catcher/processors with retained targeted Pacific cod from the three Aleutian Islands management areas. Unlike the tables with trawl catcher/processor counts, this table only counts vessels targeting Pacific cod and does not include non-trawl catcher/processors merely retaining incidental catches of Pacific cod. Table 8-19 shows that the number of hook-and-line vessels operating in the Aleutian Islands management areas ranged from four to 11 between 2004 and 2011 (2012 data are incomplete); the number of pot vessels ranged from none to four. Aleutian Islands Pacific cod activity, by vessels using each gear type, declined in 2011 and 2012.

Table 8-19 Numbers of non-trawl catcher/processor vessels with retained Pacific cod catches in the Aleutian Islands, 2004–2012

	Hook-and-line gear				Pot gear				Unique vessels
Year	541	542	543	AI (unique vessels)	541	542	543	AI (unique vessels)	
2004	6	2	3	6	0	0	0	0	6
2005	4	1	0	4	0	0	0	0	4
2006	10	1	1	11	1	0	0	1	12
2007	5	3	3	7	0	1	0	1	8
2008	7	7	3	9	2	4	1	4	13
2009	6	5	2	6	2	3	1	3	9
2010	10	7	4	10	2	2	1	3	13
2011	6	2	0	6	1	1	0	1	7
2012*	4	1	0	4	0	0	0	0	4

Notes: Federally licensed non-trawl catcher/processor vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543. Shaded years are those during which the interim final rule was in effect.
*2012 is a partial year; data shown is through December 8, 2012.
Source: AKFIN, December 18, 2012.

Hook-and-line (Freezer longline) vessels

The primary target species in the freezer longline fisheries are Pacific cod, sablefish (black cod), and Greenland turbot. In addition, longline vessels also have incidental harvests of species such as skates, rockfish, arrowtooth flounder, and pollock. Retention of non-target species depends on fishing regulations, such as increased retention/increased utilization, and maximum retainable amounts (MRA), as well as market price and the pace of fishing. (NMFS, 2012: 15)

At the end of 2011, 35 licenses carried Aleutian Islands catcher/processor hook-and-line Pacific cod endorsements. There were 31 licensed vessels (three vessels carried two license limitation program [LLP] licenses, and one LLP was not attached to a vessel). All of these licenses carried similar endorsements for the Bering Sea. Sixteen carried similar endorsements for the Western Gulf of Alaska, and 21 carried similar endorsements for the Central Gulf. Three of these licenses carried Aleutian Islands and Bering Sea pot catcher/processor endorsements and one carried a Western Gulf pot catcher/processor endorsement. (AKR RAM 2011 LLP file).[20]

Since 2006, most of the persons holding LLPs endorsed for freezer longline catcher/processors in the BSAI have been members of the Freezer Longliner Conservation Cooperative (FLCC). In June 2010, the remaining LLP holders joined the cooperative, so that with the start of the 2010 B-season on August 15, all holders of LLPs authorizing the use of these vessels were members of the cooperative.

Each year, an allocation is made to the freezer longline catcher/processor sector through the annual harvest specifications process. Cooperative members each receive a share of the quota for harvest; shares are issued in proportion to historical fishing activity with the LLP. Cooperative members are free to exchange their quota shares among themselves, and to stack shares on individual vessels. Compliance with the agreement is monitored by SeaState, Inc., and the contract signed by the members imposes heavy financial penalties for non-compliance. In the past, even without 100 percent membership, the cooperative has been able to organize GOA harvests, so as to make reliable commitments that members would reach halibut PSC avoidance goals. NMFS has relied on these commitments to open fisheries that would not otherwise have been opened. Cooperative efforts have led to the withdrawal of vessels from the fishery. (NMFS 2010b: 10-23)

[20] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 31, 2012.

A harvest cooperative running an individual quota program, such as the FLCC, creates the conditions for reorganization of fishing activity. Individual operations now have effectively guaranteed harvest quotas each year, and have the opportunity to fish these in the way that they find most profitable. While it is difficult to project exactly how the fishery will evolve, given the technology used in the freezer longline Pacific cod sector, reductions in the number of active vessels, reductions in the speed of harvest, improvements in product quality, or a lengthening of the fishing season are all possible. Harvest rates declined, the season lengthened, and fewer vessels were actively participating, when the 2011 A-season is compared to the 2010 A-season. Sector profits are likely to increase and the fleet may be able to redeploy some fishing effort from the rationalized Pacific cod fishery into other targets, such as sablefish and Greenland turbot, all else equal. The vessels and techniques that were best adapted for a competitive fishery may not be the vessels best adapted for a rationalized fishery, which may lead to a replacement of segments of the fleet. (NMFS, 2012: 30)

Before 2011, the vessels in this sector generally began fishing for Pacific cod on January 1 and continued until the initial seasonal allocation was fully harvested in February, March, or April. They subsequently returned to fishing Pacific cod from August 15, when the next halibut PSC allowance became available, through November or December. In 2011, the A-season remained open until June 10, possibly because the introduction of the voluntary cooperative slowed the harvest rate and spread out effort. Also in 2011, the harvest specifications for halibut PSC in this fleet were modified, to release the halibut PSC limit on June 10, as well as August 15. In 2011 and 2012, the fleet operated during more of the year than in the past. (AKR In-season managers, personal communication, April 18, 2013)

In 2010, Congress passed and the President signed the "Longline Catcher Processor Subsector Single Fishery Cooperative Act." This legislation requires the Secretary of Commerce to approve a single fishery cooperative for the longline catcher/processor subsector in the BSAI no more than two years after the receipt of a request from 80 percent of the licenses issued for that subsector. The legislation authorizes the cooperative to harvest an allocation made to it, provide for a subsector "non-cooperative limited access fishery," provides for an allocation between cooperative and non-cooperative fisheries, and authorizes measures to control a shift by the rationalized fleet into GOA fisheries. The private cooperative currently in place was not set up under the auspices of this act. (NMFS, 2012: 33)

In October 2012, the Council took final action on an amendment to change the maximum length overall (MLOA) on LLP licenses with Pacific cod hook-and-line catcher/processor endorsements for the Bering Sea or Aleutian Islands. The MLOA on all LLP licenses would be increased to 220 feet. The Council also affirmed that the large vessel capacity restrictions of the AFA would no longer apply to freezer-longliners, given the conservation and management measures in place in the BSAI Pacific cod fishery, including the direct sector allocation and limited numbers of fishery participants. An option was included to allow qualifying LLP license holders with pot cod endorsements to choose either to (a) receive the larger MLOA and give up their pot cod endorsements, or (b) retain the original MLOA and keep the pot cod endorsement. Vessel owners have 36 months to make this one time decision. (NPFMC 2012e)

New investments are being made in the hook-and-line catcher/processor fleet (Stewart 2013). The Petersburg-based Alaska Longline Company is replacing two of its existing five hook-and-line catcher/processors with a new 136-foot freezer longliner constructed by the Ketchikan-based Alaska Ship & Drydock company (Bowlen 2012). Alaska Leader Fisheries has contracted with J.M. Martinac Shipbuilding of Tacoma, to build the new 184-foot F/V *Northern Leader*, for delivery in 2013, as well (Singleton and Delaney 2012). Blue North Fisheries has signed a contract with Dakota Creek Industries to construct a new freezer longliner, as well. (Stewart 2013)

Pot catcher/processor vessels

The Council's recent report, "Fishing Fleet Profiles" provides descriptions of the pot catcher/processor fleet participating in the Bering Sea and Aleutian Islands fisheries (NPFMC 2012d). Pot catcher/processor vessels target Pacific cod with pots usually set on single lines. Pot catcher/processors are allocated 1.5 percent of the BSAI Pacific cod TAC. As with other fleets, the pot catcher/processor Pacific cod allocation is a BSAI-wide allocation and may be caught in the Bering Sea and/or in the Aleutian Islands. To fish for Pacific cod with pot gear in the Aleutian Islands, a vessel must have an Aleutian Islands sub-area endorsement on its LLP, as well as a non-trawl endorsement, and a Pacific cod pot gear endorsement if the vessel is 60 feet or greater, length overall. Vessels active in the fishery may also fish for halibut and sablefish, crab, or target Pacific cod for use as crab bait.

In 2011, five distinct vessels carried five distinct licenses to fish for Pacific cod in the Aleutian Islands as catcher/processors with pot gear. These licenses also carried five endorsements to fish as catcher/processors with pot gear in the Bering Sea, four endorsements to fish with hook-and-line gear in the Aleutian Islands (three as catcher/processors and one as a catcher vessel), four endorsements to fish with hook-and-line gear in the Bering Sea (three as catcher/processors and one as a catcher vessel), three endorsements to fish with hook-and-line gear in the central and/or western Gulf of Alaska, and one to fish with pot gear in the western Gulf (all as catcher/processors). (AKR RAM 2011 LLP file).[21]

Retained catches and processed deliveries

Table 8-20 provides estimates of the catcher/processor non-trawl retained catches of Aleutian Islands Pacific cod from 2004 through 2012 (including targeted Pacific cod, and incidental catch of Pacific cod in other targets). Aggregate retained catches (targeted and incidental), shown in Table 8-20, generally rose from 2004 through 2005 levels through 2010, and then declined in 2011, at the start of the effective period of the interim final rule. Catches rose somewhat in 2012 from 2011 levels, but did not return to the levels observed in the years just prior to the interim final rule.

Table 8-20 Estimated non-trawl catcher/processor retained catches of Aleutian Islands Pacific cod, 2004–2012

	Retained catch in AI Pacific cod targets				Aggregate Pacific cod in the AI
Year	541	542	543	Aggregate	
2004	1,557	C	S	2,923	2,937
2005	S	C	C	2,780	2,794
2006	S	C	C	2,986	3,056
2007	1,760	706	1,660	4,125	4,160
2008	1,897	2,510	2,308	6,715	6,723
2009	1,401	1,923	2,741	6,066	6,090
2010	2,659	2,407	3,163	8,228	8,231
2011	S	C	0	1,150	1,161
2012*	S	C	0	3,137	3,140

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are partial year production. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data. Source: AKFIN, December 20, 2012.

Table 8-21 summarizes information about the incidental catch of other groundfish species and PSC in the non-trawl Aleutian Islands Pacific cod fishery. Incidental species were a diverse group; PSC was predominately crab and halibut.

[21] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 31, 2012.

Table 8-21 Incidental catch of other groundfish species and PSC in the non-trawl catcher/processor Pacific target fisheries in the Aleutian Islands (metric tons)

	Incidental catch				PSC		
Year	Flatfish	Rockfish	Sablefish	Other bycatch	Crab	Halibut	Salmon
2004	1	1	C	161	8,002	31	0
2005	6	C	C	51	339	22	C
2006	23	8	31	89	2,682	25	0
2007	53	39	C	310	17,156	78	0
2008	12	36	19	211	247,478	68	C
2009	C	41	C	258	167,236	70	0
2010	22	124	28	222	62,591	64	0
2011	4	6	6	54	3,191	19	C
2012*	17	36	10	88	156	18	0

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data.
Source: AKFIN, December 20, 2012.

Gross revenues

Table 8-22 summarizes the fleet's first wholesale gross revenues from the Aleutian Islands Pacific cod fishery, including the value of the Pacific cod, and of the incidental groundfish catch in that fishery. Estimates are provided in both nominal dollars, and in real, inflation adjusted, 2012, dollars. During the baseline years, and focusing on the real dollar values, first wholesale gross revenues are estimated to have ranged between about $4.6 million (in 2011) and about $19.2 million (in 2010). Revenues had been generally rising since 2004, reaching a maximum in 2010, and then dropping to their lowest levels in the following year, the first during which the interim final rule was effective.

Table 8-22 Estimated non-trawl catcher/processor first wholesale gross revenues from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	1.7	C	S	3.8	1.19	2.0	C	S	4.6
2005	S	C	C	4.3	1.16	S	C	S	5.0
2006	S	C	C	7.3	1.12	S	C	C	8.2
2007	4.4	1.8	3.6	9.8	1.10	4.9	1.9	3.9	10.7
2008	4.5	6.3	4.7	15.5	1.05	4.7	6.7	5.0	16.3
2009	1.9	3.5	5.6	11.0	1.06	2.0	3.7	6.0	11.7
2010	5.3	5.4	7.8	18.5	1.04	5.5	5.6	8.1	19.2
2011	S	C	0.0	2.4	1.01	S	C	0.0	2.4

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for May each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

Aleutian Islands revenues as a proportion of all revenues

Table 8-23 shows estimates of the annual percentage of their revenues that the non-trawl catcher/processors operating in the Aleutian Islands Pacific cod fisheries have earned from their harvests in that fishery for the years 2004 through 2011. These percentages range from about 6 percent to about 39 percent. The percentages tended to rise from about 2006, and reached their highest level in 2010.

During 2011, the first during which the interim final rule was in effect, they fell to their lowest level during the period.

Table 8-23 Proportion of fixed-gear catcher/processor revenues earned from fishing for Pacific cod in the Aleutian Islands, 2004–2011 (gross revenues in millions of dollars)

Year	Targeted Pacific cod in AI	Total Groundfish revenues	Other Alaska revenues	Other West Coast revenues	Percent of revenues from AI Pacific cod
2004	3.8	31.0	1.4	0.0	11.7%
2005	4.3	23.4	2.3	0.0	16.7%
2006	7.3	68.0	3.6	0.0	10.2%
2007	9.8	50.1	0.0	0.0	19.6%
2008	15.5	58.8	6.4	0.0	23.8%
2009	11.0	34.2	5.3	0.0	27.8%
2010	18.5	43.0	4.9	0.0	38.6%
2011	2.4	31.1	7.0	0.0	6.3%

Notes: Gross revenues from retained harvests of commercially caught species, valued at first wholesale value (unless the vessel operated as a catcher vessel in a specific fishery). Non-trawl includes hook-and-line and pot. Only includes vessels targeting Pacific cod in the three Aleutian Islands management areas in the year shown. Aleutian Islands revenues from Federal fisheries and from State of Alaska parallel fisheries. Shaded year is that during which the interim final rule was effective.
Source: AKFIN, December 20, 2012.

As discussed on page 8-73, freezer-longliner representatives indicate that they receive a higher price for the head-and-gut product produced in the Aleutian Islands. While NMFS was unable to find strong statistical evidence for an Aleutian Islands price premium, the statistical test was weak, and this analysis assumes that this regional price variation exists, although NMFS is unable to determine its size. This implies that the sector's Aleutian Islands gross revenues, and changes in those gross revenues, are underestimated to an unknown extent, in absolute terms, and relative to revenues from outside the Aleutian Islands.

Crew sizes

Table 8-17 shows estimates of the crew sizes, based on WPR and Alaska fish ticket records, for vessels in the four different fleet categories defined for analysis in this action. The average estimated crew size on a non-trawl catcher/processor, over the years 2004 to 2012, was 19.8 persons.

8.2.3 Trawl catcher vessels

This sector includes trawl catcher vessels targeting Pacific cod in the Aleutian Islands, whether they deliver the retained Pacific cod to shoreside plants, shoreside floating processors, or to catcher/processors operating in the Aleutian Islands acting as motherships. The Council's recent report "Fishing Fleet Profiles" provides descriptions of the trawl catcher vessels participating in the Bering Sea and Aleutian Islands fisheries (NPFMC 2012d).

Numbers of vessels

Table 8-24 provides estimates of the numbers of trawl catcher vessels retaining targeted Pacific cod in the three Aleutian Islands management areas and making deliveries to shoreside plants. Table 8-3 reports the numbers of trawl catcher vessels making deliveries to catcher/processors acting as motherships.

Table 8-24 Numbers of trawl catcher vessels targeting Pacific cod and making shoreside deliveries

	Counts of trawl catcher vessels making deliveries				Counts of shoreside plants receiving deliveries			
Year	541	542	543	AI (unique vessels)	541	542	543	AI (unique vessels)
2004	18	14	0	18	4	2	0	4
2005	14	5	0	14	4	2	0	4
2006	12	10	0	16	4	2	0	4
2007	23	20	0	31	7	3	0	7
2008	24	6	0	26	7	2	0	7
2009	19	11	0	22	4	1	0	4
2010	22	5	0	22	4	2	0	4
2011	6	0	0	6	1	0	0	1
2012*	10	0	0	10	NA	NA	NA	NA

Notes: Federally licensed trawl catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the entities to which they delivered. The 2012 data are partial year data, through December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

Description of this sector

Trawl catcher vessels active in the Aleutian Islands fish against the BSAI trawl catcher vessel allocation of Pacific cod. This allocation is 22.1 percent of the total BSAI Pacific cod TAC. Many of the vessels that participate in the directed fishery are AFA trawl catcher vessels. These vessels have a sideboard limit of 86.09 percent of the seasonal allocations of trawl catcher vessel Pacific cod. Between 2004 and 2011, the AFA trawl catcher vessels harvested an average of 65 percent of the total BSAI trawl catcher vessel Pacific cod harvest. However, AFA trawl catcher vessels harvested an average of 85 percent of the total amount of Pacific cod caught by trawl catcher vessels in the Aleutian Islands. The remaining amount of Pacific cod was harvested by unaffiliated trawl catcher vessels.

Catcher vessels deliver their products to several outlets. These include catcher/processors acting as motherships (such as the F/V *Katie Ann)*, shoreside processors, or floating processors. Within Area 541, Adak and Atka have shoreside processing plants. Atka Pride Seafoods in Atka has not processed Pacific cod in the past. The plant at Adak was very active processing Pacific cod, but the firm operating this plant filed for bankruptcy in late 2009; processing activity was renewed in 2011 and 2012 when Icicle Seafoods leased the processing plant. The earlier owners of the plant at Adak waived their rights to confidentiality in another analysis, and the information from that analysis is summarized elsewhere in this Environmental Impact Statement (EIS). Relatively small amounts of catcher vessel product have been delivered to several other ports.

Floating processors are vessels that anchor within State waters and accept deliveries. For example, at times Trident's vessel, the M/V *Independence* (353 feet long, with a crew of about 235 when processing Pacific cod) has processed Pacific cod in the winter-spring season. The M/V *Independence* could buy from as many as 20 catcher vessels, independents as well as Trident boats. These were primarily trawlers, but there were some non-trawl vessels as well. Aside from providing a market for catcher vessels, the M/V *Independence* interacted with local communities through its need for logistical support and through State of Alaska fish taxes (Soper, McManus, Scheibert, personal communication).[22]

Catcher vessels fish in federally managed fisheries under the authority of licenses issued under a license limitation program. Vessel licenses carry endorsements, authorizing fishing in different areas with trawl

[22] Paul Soper, Vic Scheibert, and Jim McManus, officials of the Trident Company. Seattle, WA. Personal communication, September 27, 2010.

and non-trawl gears. Forty-three catcher vessels have LLP endorsements to trawl in the Aleutian Islands; 12 of these also have endorsements allowing them to use non-trawl (hook-and-line or pot) gear in the Aleutian Islands. Many of these vessels have endorsements allowing them to fish in other management areas as well. Forty-two have endorsements to trawl in the Bering Sea; 11 have endorsements to fish with non-trawl gear in the Bering Sea. Five have endorsements to trawl in the Western Gulf, while 10 have endorsements to use non-trawl gear in the Western Gulf. Four have endorsements to use trawl gear in the Central Gulf, while seven have endorsements to use non-trawl gear in the Central Gulf. Only one has an endorsement to fish in the Southeastern Gulf. Only one of these vessels had an endorsement to fish for Pacific cod; this vessel's endorsements allowed it to fish for Pacific cod in the Aleutian Islands and Central Gulf with hook-and-line gear. (AKR RAM 2011 LLP file)

Retained catches

Table 8-25 summarizes the volumes of retained Pacific cod harvested by trawl catcher vessels in the Aleutian Islands from 2004 through 2012. The table shows the volumes taken in Pacific cod target fisheries, and the volumes taken as incidental catch in other target fisheries.

Table 8-25 Trawl catcher vessel Pacific cod production in the Aleutian Islands

Metric tons (round weight)									Aggregate Pacific cod in the AI
	Retained catch in Pacific cod target				Retained Pacific cod by-catch				
Year	541	542	543	Aggregate	Amack Tgt	Rockfish Tgt	Other	Aggregate	
2004	10,989	2,454	0	13,443	0	0	0	0	13,443
2005	6,693	1,280	0	7,973	0	0	0	0	7,973
2006	5,085	S	C	6,907	0	0	C	C	6,907
2007	11,016	S	C	13,130	C	C	C	C	13,234
2008	10,280	S	C	13,933	C	C	C	C	13,993
2009	9,695	S	C	14,880	C	C	C	165	15,044
2010	8,280	S	C	12,611	C	C	C	143	12,754
2011	6,759	C	S	7,493	C	C	C	C	7,749
2012*	S	C	0	7,278	C	C	C	C	7,525

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN. December 20, 2012.

Table 8-26 shows the estimated incidental catch and PSC in the trawl catcher vessel Pacific cod target fishery in the Aleutian Islands, from 2004 through 2012.

Table 8-26 Incidental catch of other groundfish species and PSC in the trawl catcher vessel Pacific target fisheries in the Aleutian Islands

	Incidental catch (mt)				PSC (number crab and salmon; mt halibut)		
Year	Flatfish	Pollock	Rockfish	Other incidental catch	Crab	Halibut	Salmon
2004	7	C	6	C	567	5	169
2005	C	37	0	C	3,416	13	558
2006	C	3	0	0	1,664	20	416
2007	6	22	C	1	1,468	19	1,363
2008	7	15	77	1	792	15	1,113
2009	18	4	12	1	1,244	16	785
2010	30	7	2	C	874	12	646
2011	130	49	18	3	256	15	475
2012*	55	13	26	C	586	32	228

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data.
Source: AKFIN, December 20, 2012.

Gross revenues

Table 8-27 provides estimates of historical gross ex-vessel revenues accruing to the trawl catcher vessel fleet in the Aleutian Islands Pacific cod fisheries, from 2004 through 2011. Estimates are shown in nominal and in real, inflation-adjusted, 2012 dollars. In real terms, aggregate fleet ex-vessel gross revenues grew from the $4.9 million to $7.6 million level in the years 2004 through 2006, to the $13.8 to $18.2 million level in 2007 and 2008. They declined considerably in 2009 and 2010, and declined further at the time of the introduction of the interim final rule in 2011.

Table 8-27 Estimated trawl catcher vessel ex-vessel gross revenues from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011

	Nominal gross revenues				Inflation Adjustment factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	5.4	1.0	0.0	6.4	1.19	6.4	1.1	0.0	7.6
2005	3.6	0.7	0.0	4.2	1.16	4.1	0.8	0.0	4.9
2006	3.9	S	C	5.4	1.12	4.4	S	C	6.1
2007	10.7	S	C	12.6	1.10	11.7	S	C	13.8
2008	12.8	S	C	17.2	1.05	13.5	S	C	18.2
2009	5.2	S	C	7.6	1.06	5.5	S	C	8.0
2010	4.2	S	C	6.4	1.04	4.4	S	C	6.7
2011	4.2	C	S	4.6	1.01	4.2	C	S	4.7

Notes: Estimated ex-vessel value to catcher vessels with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

Table 8-28 provides corresponding estimates of the processor first wholesale value to processors of the trawl catcher vessel retained catch. Note that it is incorrect to sum ex-vessel and wholesale revenues for the same product at different levels in the product chain, ex-vessel revenues to the fisherman are a cost to the processor. Revenue estimates for the different levels are provided here to provide distributional information.

Real wholesale revenues to processors in Table 8-28 follow the pattern shown in Table 8-27, since the volumes of retained catch used to produce each are the same. The wholesale revenues include revenues

earned by catcher/processors acting as motherships and accepting deliveries from trawl catcher vessels, as well as revenues earned by shoreside, and shoreside floating, processors. Thus, these revenues should not be interpreted as shoreside revenues alone.

Table 8-28 Estimated wholesale gross revenues to processors and catcher/processors acting as motherships from trawl catcher vessel retained catches from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 (millions of dollars)

	Nominal gross revenues				Inflation Adjustment Factor	Real gross revenues (2012 dollars)			
	541	542	543	Total		541	542	543	Total
2004	12.4	2.9	0.0	15.3	1.19	14.8	3.4	0.0	18.2
2005	9.2	1.7	0.0	10.9	1.16	10.7	2.0	0.0	12.7
2006	8.3	S	C	11.0	1.12	9.3	S	C	12.4
2007	23.2	S	C	28.3	1.10	25.5	S	C	31.0
2008	20.8	S	C	28.6	1.05	21.9	S	C	30.1
2009	10.8	S	C	16.8	1.06	11.5	S	C	17.8
2010	12.0	S	C	18.4	1.04	12.5	S	C	19.2
2011	11.6	C	S	13.0	1.02	11.8	C	S	13.2

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKR, February 6, 2013, August 17, 2012; PCE implicit price deflator for June each year from St. Louis FRB FRED.

Aleutian Islands Pacific cod revenues as a proportion of all revenues

Table 8-29 compares estimates of ex-vessel gross revenues from fishing Pacific cod in the Aleutian Islands, to revenues from other fishing sources on the West Coast and in Alaska, for the vessels in this sector. This is the one sector with meaningful fishing activity in West Coast fisheries outside of Alaska. The percentage of revenues from Aleutian Islands Pacific cod compared to revenues from all sources, may be found in the rightmost column of the table. This ranges from 10 percent in 2006 to 23 percent in 2008.

Table 8-29 Proportion of trawl catcher vessel ex-vessel gross revenues earned from fishing for Pacific cod in the Aleutian Islands, 2004–2011 (gross revenue estimates in millions of dollars)

Year	Targeted Pacific cod in AI	Total groundfish revenues	Other Alaska revenues	Other West Coast revenues	Percent of revenues from AI Pacific cod
2004	6.4	27.2	3.5	0.6	20%
2005	4.2	23.8	1.2	0.5	17%
2006	5.4	48.6	1.3	2.5	10%
2007	12.6	62.4	2.7	1.8	19%
2008	17.2	65.7	3.3	5.6	23%
2009	7.6	30.8	3.9	1.3	21%
2010	6.4	29.1	3.1	1.9	19%
2011	4.6	25.3	0.0	2.3	17%

Notes: Gross revenues from retained harvests of commercially caught species, valued at ex-vessel value (unless the vessel operated as a catcher/processor in a specific fishery). Only includes vessels targeting Pacific cod in the three Aleutian Islands management areas in the year shown. Aleutian Islands revenues from Federal fisheries and from State of Alaska parallel fisheries. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 7, 2013

Crew sizes

Table 8-17 shows estimates of the crew sizes, based on Weekly Processor Reports and Alaska fish ticket records, for vessels in the four different fleet categories defined for analysis in this action. As shown in the table, the estimated average crew size on trawl catcher vessels, over the years 2007 to 2011, was about 4.5 persons.

8.2.4 Non-trawl catcher vessels

This sector includes catcher vessels targeting Pacific cod with jig, hook-and-line, and pot gear in the Aleutian Islands. Atka mackerel and pollock are not targeted with these gear types. These vessels deliver their products to shoreside processors. The Council's recent report "Fishing Fleet Profiles" provides descriptions of the non-trawl catcher vessels participating in the Bering Sea and Aleutian Islands fisheries (NPFMC 2012d).

Numbers of vessels

Table 8-30, Table 8-31, and Table 8-32 summarize information about the numbers of catcher vessels using each of these non-trawl types, and the number of shoreside plants receiving deliveries from them. For each gear type, vessel participation was greatest in Area 541, less in Area 542, and absent in Area 543. The tables also show that in many years and areas the number of these vessels using a gear type and the number of processors to which they deliver are too few to provide summary catch or revenue information without releasing confidential information. Thus, these gear types have been grouped together for this analysis.

Table 8-30 Numbers of jig catcher vessels targeting Aleutian Islands Pacific cod

	Counts of jig catcher vessels making deliveries				Counts of shoreside plants receiving deliveries			
Year	541	542	543	AI (unique vessels)	541	542	543	AI (unique plants)
2004	0	0	0	0	0	0	0	0
2005	1	0	0	1	1	0	0	1
2006	1	1	0	1	1	1	0	1
2007	2	0	0	2	1	0	0	1
2008	8	6	0	9	1	1	0	1
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	1	0	1	NA	NA	NA	NA

Notes: Federally licensed jig catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI Areas 541, 542, and 543, and the firms to which they delivered. These 2012 data are incomplete; only activity through December 8, 2012 is included. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

Table 8-31 Numbers of longline catcher vessels targeting Aleutian Islands Pacific cod

	Counts of longline catcher vessels making deliveries				Counts of shoreside plants receiving deliveries			
Year	541	542	543	AI (unique vessels)	541	542	543	AI (unique plants)
2004	2	2	0	2	2	2	0	2
2005	0	1	0	1	0	1	0	1
2006	3	0	0	3	1	0	0	1
2007	6	2	0	6	1	1	0	1
2008	6	2	0	6	1	1	0	1
2009	1	0	0	1	1	0	0	1
2010	1	0	0	1	1	0	0	1
2011	0	1	0	1	0	1	0	1
2012	0	0	0	0	NA	NA	NA	NA

Notes: Federally licensed longline catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the firms to which they delivered. These 2012 data are incomplete; only activity through December 8, 2012 is included. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

Table 8-32 Numbers of pot catcher vessels targeting Aleutian Islands Pacific cod

	Counts of pot catcher vessels making deliveries				Counts of shoreside plants receiving deliveries			
Year	541	542	543	AI (unique vessels)	541	542	543	AI (unique plants)
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	2	2	0	2	1	1	0	1
2007	2	1	0	3	1	1	0	1
2008	2	0	0	2	2	0	0	2
2009	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	1	0	0	1	NA	NA	NA	NA

Notes: Federally licensed pot catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the firms to which they delivered. These 2012 data are incomplete; only activity through December 8, 2012 is included. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

Description of this sector

Pot catcher vessels target Pacific cod with square or conical pots, usually set on single lines. Pot catcher vessels less than 60 feet length overall share 2 percent of the BSAI TAC with hook-and-line vessels in that size class, while pot catcher vessels 60 feet or over are allocated 8.4 percent of the TAC. As with other fleets, the pot catcher vessel Pacific cod allocations are BSAI-wide and may be caught in the Bering Sea and/or in the Aleutian Islands. Vessels active in the fishery may also fish for halibut, sablefish, and crab, if licensed to do so, or target Pacific cod for use as crab bait. (NPFMC 2012d)

To fish for Pacific cod with pot gear in the Aleutian Islands, a vessel must have an Aleutian Islands sub-area endorsement on its LLP, as well as a non-trawl endorsement, and a Pacific cod pot gear endorsement, if the vessel is 60 feet length overall or greater. Three LLP licenses have this combination of endorsements. Two of these licenses carry endorsements allowing them to fish for Pacific cod with pots in the Bering Sea, and one has an endorsement allowing it to fish for Pacific cod with pots in the Western Gulf of Alaska. These licenses have no other Pacific cod endorsements. (AKR RAM LLP license list for 2011)[23]

[23] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 30, 2012.

Jig vessels target Pacific cod using fishing lines with baited hooks, dropped vertically from the vessel. The action of the lines is controlled by machines that move the jigs up and down a modest amount to induce the fish to bite. Machines are adjusted to haul back when the tension on the line indicates a target weight of fish has been hooked. Jig vessels are less than 60 feet length overall, and no LLP is required for catcher vessels in this length class using jig gear. In the BSAI, the jig sector is allocated 1.4 percent of the Pacific cod TAC. As with other Pacific cod allocations, this may be fished in the Aleutian Islands and/or in the Bering Sea. (NPFMC 2012d)

Longliners deploy ground lines, anchored at each end, along the sea bottom. Shorter lines with baited hooks diverge from the longline at intervals. Catcher vessels might deploy 12,300 fathom lengths of longline at a time (73,800 feet or nearly 14 miles), for soak times lasting from two to 24 hours. Longliners under 60 feet length overall share 2 percent of the Pacific cod TAC with pot vessels of the same length. Longline catcher vessels 60 feet or greater receive an allocation of 0.2 percent of the TAC. As with other Pacific cod allocations, this may be fished in the Aleutian Islands and/or in the Bering Sea. (NPFMC 2012d)

To fish for Pacific cod with longline gear in the Aleutian Islands, a vessel must have an Aleutian Islands sub-area endorsement on its LLP, as well as a non-trawl endorsement, and a Pacific cod longline gear endorsement if the vessel is 60 feet in length overall, or greater. Seven LLP licenses carry the hook-and-line catcher vessel endorsement allowing them to fish in the Aleutian Islands. Four of these licenses also carry endorsements to fish for Pacific cod with catcher vessels in the eastern Bering Sea. Licenses also carry a selection of other Pacific cod endorsements (1 for Bering Sea catcher/processor pot gear, 1 for Aleutian Islands catcher/processor pot gear, 1 for western Gulf of Alaska catcher/processor pot gear, 1 for western Gulf catcher vessel pot gear, and 1 for Central Gulf catcher vessel hook-and-line gear). (AKR RAM LLP license list for 2011)[24]

While there are not enough observations to report harvest and gross revenue information, even across all management areas in a given year (primarily because of the small numbers of processors), there are enough to report summary information for the whole period 2004 to 2010. During that time, a total of 26 vessels and 4 separate processors operated in this sector (NMFS AKR In-season management staff). Over the seven years, these vessels retained almost 1,000 metric tons of Pacific cod, for a mean weight of about 150 metric tons a year. Retained catches ranged up to about 400 metric tons a year. (AKR report, February 7, 2013)

The fishing vessels in the sector had estimated aggregate ex-vessel gross revenues of about $1.2 million (2012 inflation adjusted dollars) for the seven baseline years 2004 through 2010, for a mean value of about $170,000 a year. Wholesale revenues totaled about $2.1 million, or an average of about $290,000 a year. (AKR report, February 7, 2013)

Table 8-17 shows estimates of the crew sizes, based on Weekly Processor Reports and Alaska fish ticket records, for vessels in the four different fleet categories defined for analysis in this action. As shown in the table, the estimated average crew size on a non-trawl catcher vessel, over the years 2007 to 2011, was about 3.9 persons.

[24] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 30, 2012.

8.2.5 State of Alaska Aleutian Islands Pacific cod GHL fishery[25]

Before 2006, the BSAI Pacific cod fishery in State-waters was managed as a parallel fishery to the Federal fishery; the Federal government managed all harvests (inside or outside State waters) against the Federal BSAI Pacific cod TAC and allocations, opened and closed seasons, and established gear restrictions. (NPFMC, 2011a: 9)

In February 2006, the Alaska Board of Fisheries created a new regulation establishing a State waters Pacific cod fishery in the Aleutian Islands. Since 2006, the plan has been modified in almost every year (Hartill, 2011: 2). The following description of the 2012 fishery management plan has been excerpted from Hartill (2011):

> The 2012 State-waters Pacific cod season is managed using a guideline harvest level (GHL) based on three percent of the Federal BSAI Pacific cod TAC. The State-waters Pacific cod GHL is split between an A and B-season, where the A-season is allocated 70 percent of the GHL and the B-season 30 percent. Unharvested A-season GHL may be rolled over to the B-season; however, the total GHL available during the B-season may not exceed 70 percent of the entire State-waters GHL. The State-waters season is closed when the GHL has been reached.
>
> The State-waters A-season opens January 1 from 175° W long to 178° W long to vessels 60 feet OAL [overall length] or less using trawl, pot, and jig gear, and vessels 58 feet or less OAL using longline gear. Harvest occurring between 175° W long to 178° W long will accrue toward the GHL, while harvest occurring in State waters outside of 175° W long to 178° W long will be managed under parallel rules and accrue toward the Federal TAC. State waters outside of 175° W long to 178° W long will open for the State-waters A-season four days after the Federal catcher-vessel trawl fishery closes. If the Federal catcher-vessel trawl fishery has not closed by noon March 14, and State-waters A-season GHL remains, the parallel season outside of 175° W long to 178° W long will close and a State-waters season will open at noon on March 15. Beginning March 15 in State waters inside and outside of 175° W long to 178° W long, vessels using trawl gear may not be greater than 100 feet OAL, pot vessels may not be greater than 125 feet OAL, and mechanical jig vessels and longline vessels may not be greater than 58 feet OAL.
>
> If the State-waters A-season GHL has not been taken by April 1st, when the Federal catcher-vessel trawl B-season opens, the State-waters A-season in the waters outside of 175° W long to 178° W long will close and a parallel fishery will immediately open. Within State waters from 175° W long to 178° W long the State-waters A-season will remain open to vessels 60 feet OAL or less using trawl, pot, and jig gear, and vessels 58 feet or less OAL using longline gear. If State-waters A-season GHL remains when the Federal catcher-vessel trawl B-season closes, the State-waters A-season will reopen and remain open until the State-waters A-season GHL is reached, or through June 9. If the State-waters A-season reopens, in State waters outside and within 175° W long to 178° W long, vessels using trawl gear may not be greater than 100 feet OAL, pot vessels 125 feet OAL, mechanical jig vessels and longline vessels 58 feet OAL.
>
> The State-waters B-season opens June 10. From June 10 through July 31 a vessel participating in the State-waters B-season may be not greater than 60 feet OAL. Beginning August 1, pot vessels may not be more than 125 feet OAL; however, vessel length limits for all other gear types may

[25] In this analysis, the State managed fishery in State waters that takes place while the Federal fishery is open is called the "parallel fishery," while the State managed fishery in State waters that takes place when the Federal fishery is closed (the fishery discussed in this section), is called the "GHL fishery."

> not be greater than 60 feet OAL. If the State-waters B-season GHL has not been taken by September 1, the State-waters B-season will close and a parallel season will immediately open concurrent with the Federal catcher-vessel pot fishery B-season for vessels over 60 feet in length. If State-waters B-season GHL remains when the Federal catcher-vessel pot fishery B-season for vessels over 60 feet in length closes, the State-waters B-season will re-open. Vessel length restrictions from 175° W long to 178° W long during the State-waters A-season do not apply to the State-waters B-season.
>
> Registration for the Aleutian Islands District State-waters Pacific cod season is non-exclusive. Vessels registered for the Aleutian Islands District State-waters Pacific cod season may also register for any other non-exclusive or one other exclusive State-waters Pacific cod season. Processors and tenders for Pacific cod are required to register for the State-waters season prior to beginning operations….
>
> During a State-waters season, a vessel may harvest up to 150,000 pounds of Pacific cod per day and may not have more than 150,000 pounds of unprocessed Pacific cod on board the vessel at any time. All Pacific cod caught must be retained, and any overage must be immediately reported to the Department, with proceeds from the overage forfeited to the State. Enforcement action against vessel operators who incur overages of the daily or trip limit will be pursued….
>
> Steller sea lion protection measures in State waters depend on whether a State-waters or parallel season is open….
>
> During the 2012 Aleutian Islands District State-waters Pacific cod season, Steller sea lion closures in place prior to 2011 will be in effect (5 AAC 28.647(g)(1) and (2)). Descriptions of closures in effect during a State-waters season and their coordinates are found in Table 5 to 50 CFR Part 679 (69 FR 75865, December 20, 2004), posted on the NMFS website[26] and Table 12 to 50 CFR Part 679 (73 FR 76136, December 15, 2008), also posted on the NMFS website.[27]

Table 8-33 shows catch of Aleutian Islands Pacific cod from 2006 through June 2012. The guideline harvest level for this fishery has ranged from about 11.5 million pounds to about 20.8 million pounds since the inception of the fishery, with the majority of the harvest taken in the A-season (70 percent is allocated prior to June 10).

Table 8-34 describes the fishing seasons from 2006 through 2012, and provides estimates of the fishery value. Much of the value information is confidential, but the estimates show A-season values that gradually increase from 2006, peaking in 2008, and then falling in 2009 and 2010. B-season data are only reported for 2007 and 2008. All the value data for 2011 and 2012 are confidential.

Table 8-35 shows estimates of harvest by gear type and season in the GHL fishery, from 2006 through June 2012. Much of this information is confidential; however, the data indicate that trawl and pot gear dominate the aggregate harvests. The trawl fishery takes place entirely in the A-season, while the pot harvest is divided between the two seasons.

While trawl, longline, pot, and jig gear are allowed at various times during the GHL fishery, overall, as shown in Table 8-35, the majority of the GHL fishery has been harvested by vessels using trawl and pot gear. Since the fishery was initiated, Pacific cod harvested in the fishery has been delivered to shorebased

[26] http://www.alaskafisheries.noaa.gov/cm/rules/?Year=2004&rule_type=3
[27] http://www.alaskafisheries.noaa.gov/cm/rules/?Year=2008&rule_type=3

plants, floating processors, and catcher/processors. While the majority of the processing data are confidential due to a low number of processors, a few general trends can be discussed.

Since 2006, approximately 80 percent of the harvest has been delivered to shorebased and floating processors (each receiving roughly 40 percent). The remaining 20 percent has been harvested by catcher/processors. The proportion of harvest and deliveries each processor type receives varies each year. Variability is primarily a function of vessel participation and season timing. From 2009 through 2011, operation of the shorebased processor in Adak was intermittent, resulting in fewer shorebased deliveries and therefore a greater proportion of floating processor deliveries. In addition, proportionally higher floating processor deliveries typically correspond with years when the fishery opened March 15 or prior. This was evidenced in 2006, 2008, and 2010; in each of those years floating processors accounted for over half of the harvest.

Catcher/processor participation was highest in 2009 and 2010. In both years, the fishery remained open until June 9 and June 4, respectively. In 2006, the fishery closed March 24, however, catcher/processors accounted for approximately 21 percent of the harvest. This proportion is a direct result of the catcher/processors operating trawl gear. Since 2007, catcher/processor activity has been by pot vessels. In 2007, trawl vessel size was limited to 100 feet overall length or less. This restriction prohibited the larger trawl catcher/processors from participating.

Table 8-33 Aleutian Islands State-waters Pacific cod fishery guideline harvest level and harvest apportionment (2006–2012)

Year	Season	Initial GHL[a]	Harvest[a]	Number of Vessels	Number of Deliveries
2006	A season	8,981,540	8,502,781	26	68
	B season	3,849,232 [b]	CF	5	CF
	TOTAL	12,830,772	CF	30 [c]	CF
2007	A season	8,148,202	8,229,931	27	97
	B season	3,492,086 [d]	3,409,070	15	106
	TOTAL	11,640,288	11,639,001	41 [c]	203
2008	A season	8,148,202	7,477,507	30	116
	B season	3,492,086 [e]	4,241,692	18	77
	TOTAL	11,640,288	11,719,199	45 [c]	193
2009	A season	8,425,981	5,537,886	22	50
	B season	3,611,135 [e]	CF	5	CF
	TOTAL	12,037,116	CF	27	CF
2010	A season	8,055,608	7,959,514	16	84
	B season	3,452,404 [e]	CF	3	CF
	TOTAL	11,508,012	CF	16 [c]	CF
2011	A season	10,879,701	CF	3	CF
	B season	4,662,729 [e]	CF	4	CF
	TOTAL	15,542,430	595,289	6 [c]	19
2012	A season	14,537,132	11,462,339	20	201
	B season	6,230,200 [e]	CF	3	CF
	TOTAL	20,767,332	CF	22 [c]	CF

Note: CF = Confidential data.
[a] In whole pounds.
[b] Alaska Department of Fish and Game made available 3.5 million pounds of the GHL to the Federal fishery (NMFS) effective on September 1.
[c] Some vessels participated in both seasons.
[d] Overage from the A-season was deducted from the B-season GHL. Initial GHL shown.
[e] A-season GHL was not fully harvested, and the remaining A-season GHL rolled over into B-season GHL. Initial GHL shown.

Table 8-34 Aleutian Islands State-waters Pacific cod fishery economic performance, season length and dates (2006–2012)

Year	Season	Season Dates		Season Length[a]	Fishery Value[b]	Average Price per Pound [c]
		Opened	Closed			
2006	A season	15-Mar	24-Mar	9	$1.3	$0.23
	B season	10-Jun	1-Sep	84	CF	CF
2007	A season	16-Mar	23-Mar	7	$3.6	$0.45
	B season	10-Jun	1-Sep	83	$0.9	$0.52
	B season	1-Oct	3-Dec	63	$0.4	$0.52
2008	A season	10-Mar	18-Mar	8	$4.5	$0.63
	B season	10-Jun	9-Jul	29	$1.8	$0.57
2009	A season	25-Mar	1-Apr	7	$0.4	$0.25
	A season	7-Apr	9-Jun	63	$0.6	$0.22
	B season	10-Jun	1-Sep	83	CF	CF
2010	A season	16-Mar	4-Jun	81	$1.6	$0.25
	B season	10-Jun	1-Sep	83	CF	CF
	B season	15-Nov	31-Dec	46	CF	CF
2011	A season	30-Mar	1-Apr	2	CF	CF
	A season	5-Apr	9-Jun	65	CF	CF
	B season	10-Jun	1-Sep	83	CF	CF
	B season	25-Oct	31-Dec	67	CF	CF
2012	A season	1-Jan	9-Jun	8	NA	NA
	B season	10-Jun	Current	NA	NA	NA

[a] In days.
[b] In millions of dollars.
[c] Per pound dressed weight.

Table 8-35 Summary information on harvests by gear type in the Pacific cod GHL fishery in the Aleutian Islands (millions of whole pounds)

Year	Season	Longline	Trawl	Pot	Jig	Total
2006	A season	CF	7,053,035	CF	0	8,502,781
	B season	CF	0	CF	0	CF
2007	A season	0	6,998,224	1,231,707	0	8,229,931
	B season	CF	0	2,383,163	CF	3,409,070
2008	A season	CF	6,130,304	CF	0	7,477,507
	B season	362,410	0	3,786,710	92,572	4,241,692
2009	A season	CF	1,295,595	3,879,737	CF	5,537,886
	B season	CF	0	0	CF	CF
2010	A season	0	4,899,783	3,059,731	0	7,959,514
	B season	CF	0	CF	0	826,171
2011	A season	0	CF	CF	0	CF
	B season	CF	0	CF	0	CF
2012	A season	CF	5,983,213	CF	0	11,462,339
	B season	CF	0	CF	CF	CF

Note: CF = Confidential data.

8.2.6 Atka mackerel fishing in the Bering Sea

Prior to 1993, the Bering Sea subarea catch of Atka mackerel was counted against the BSAI Atka mackerel TAC. With the division of the Atka mackerel ABC and TAC into three separate ABCs and TACs in mid-1993, the eastern Bering Sea catch was counted against a combined "Eastern Aleutian Islands (Area 541) and eastern Bering Sea" ABC and TAC. (Lowe et al., 2011: 1084-1086)

Prior to 2011, directed fishing for Atka mackerel in the Bering Sea subarea was open outside critical habitat, but closed inside critical habitat. In the Bering Sea, however, Atka mackerel is found primarily inside Steller sea lion critical habitat. Although critical habitat was closed to directed fishing for Atka mackerel, vessels could retain Atka mackerel caught inside critical habitat in amounts of up to 20 percent of other groundfish catch (the maximum retainable amount or MRA).[28] The "other groundfish catch" is referred to as the "basis species."

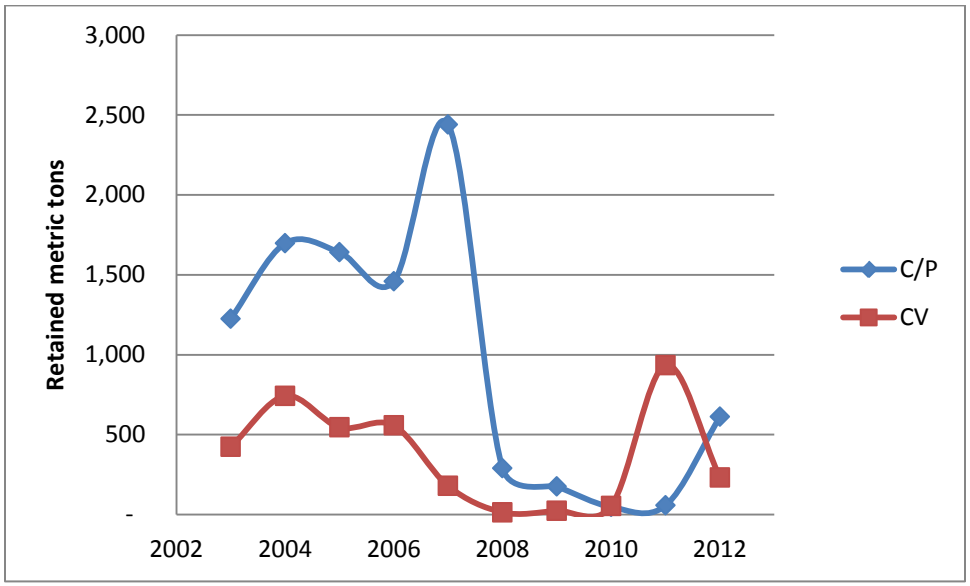
However, the other groundfish species used as basis species for retaining Atka mackerel occur primarily outside critical habitat. Moreover, the Atka mackerel MRA was fishing trip specific, and new fishing trips were triggered by crossing the boundary between open and closed fishing areas (see the definition of fishing trip at § 679.2, particularly the condition that a fishing trip terminates when "the vessel enters or leaves an area where a different directed fishing prohibition applies"). Thus, an operation that fished a species such as yellowfin sole in the Bering Sea subarea, outside of critical habitat, could not use that retained yellowfin sole as a basis species for retaining Atka mackerel inside critical habitat, which is where the Atka mackerel was available. Once the vessel entered critical habitat, a new fishing trip was

[28] This MRA is measured "instantaneously", rather than at the time the groundfish are delivered (50 CFR 679.20(e)(3)(ii)). This means that at all times during the trip, the vessel must carry enough basis species to allow for the volume of Atka mackerel on board. This may require the vessel to discard Atka mackerel if it inadvertently takes a large amount of it early in the trip.

triggered, and the yellowfin sole it had caught and retained outside critical habitat could not be used as a basis species.

The interim final rule closed the Bering Sea subarea year round to directed fishing for Atka mackerel, thus eliminating the different fishing prohibitions inside and outside critical habitat. Since regulations no longer triggered a new "trip" when a vessel crossed the critical habitat boundary, vessel operators could use groundfish harvested outside of critical habitat as basis species for calculation of the Atka mackerel MRA within critical habitat.

Figure 8-1 summarizes Bering Sea subarea Atka mackerel retained catches for trawl catcher/processors and trawl catcher vessels (catches by other vessel classes were very small), from 2003 through 2012.[29] Catcher/processor retained catches ranged between about 1,200 and about 2,500 metric tons between 2003 and 2007, then fell to about 50 to about 300 metric tons in later years (possibly due to changes in fishing practices with the advent of Amendment 80 in 2008). Catches rose to higher levels in 2012. Almost all of the remaining retained catch in this region was taken by trawl catcher vessels.

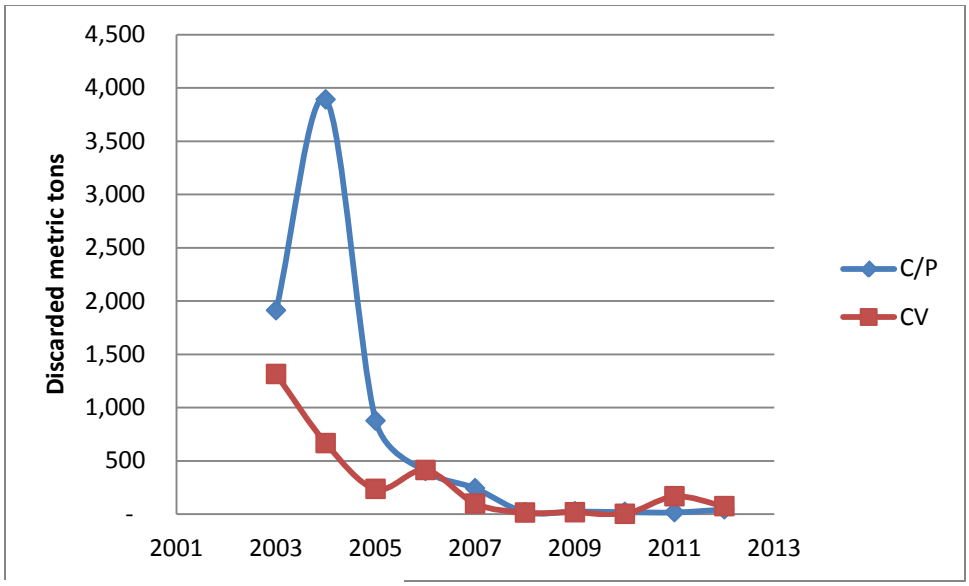


Source: AKRO CAS. December 5, 2012.

Figure 8-1 Retained trawl Atka mackerel catches in the Bering Sea subarea, 2003–2012

Estimates of Atka mackerel discards by these fleet sectors in the Bering Sea subarea from 2003 through 2012 are shown in Figure 8-2. Discards were quite high relative to retained Atka mackerel in the early years, but fell off considerably thereafter. The majority of the discards in the early years occurred in the trawl catcher/processor sector and in cod targets. Both discard levels and retained catches may have been affected by Amendment 85, the cod sector allocation, and by Amendment 80, which implemented the rights-based management program covering Atka mackerel and other key species, in the non-AFA catcher/processor fleet.

[29] 2012 data includes landings through December 2, 2012.



Source: AKRO CAS. December 5, 2012

Figure 8-2 Discarded trawl Atka mackerel catches in the Bering Sea subarea, 2003–2012

8.2.7 CDQ groups

The large scale commercial groundfish and crab fisheries of the BSAI originally developed without much participation from rural western Alaska communities. Communities in the region are small, remote, and often have few development opportunities. The Community Development Quota (CDQ) Program was created to improve conditions in coastal western Alaska communities by making it possible for them to participate in the BSAI fisheries. The program does this by allocating a portion of commercially important BSAI species fishing limits, including halibut, crab, pollock, and various other groundfish, to such communities.

The CDQ Program was implemented by the Council and NMFS in 1992 with allocations of 7.5 percent of the BSAI pollock TAC. Allocations of halibut and sablefish were added to the program in 1995. Authorization for the CDQ Program was added to the Magnuson-Stevens Fishery Conservation and Management Act by the U.S. Congress in 1996. In 1998, the Council expanded the CDQ Program by adding allocations of additional groundfish species, prohibited species, and crab.

In 2013, the CDQ Program was allocated 10.7 percent of the Amendment 80 species (Atka mackerel, Pacific cod, flathead sole, rock sole, yellowfin sole, and Aleutian Islands Pacific ocean perch), 20 percent of the sablefish TAC allocated to hook-and-line or pot gear, 7.5 percent of the sablefish TAC allocated to trawl gear, 10.7 percent of the TACs for Bering Sea Greenland turbot and arrowtooth flounder, and 10 percent of the TAC for pollock. (78 FR 13815; March 1, 2013)

Sixty-five communities participate in the program through six CDQ groups.[30] CDQ groups are non-profit corporations that manage and administer the CDQ allocations, economic development projects, and

[30] The CDQ entities include the Aleutian Pribilof Island Community Development Association (APICDA), the Bristol Bay Economic Development Corporation (BBEDC), the Central Bering Sea Fishermen's Association (CBSFA), the Coastal

investments, including ownership interests in the at-sea processing sector and catcher vessels. Annual CDQ allocations provide a revenue stream for CDQ entities through various channels, including the direct catch and sale of some species, leasing quota to various harvesting partners, and income from investments.

Geographically dispersed, the member communities extend westward to Atka, on the Aleutian Islands chain, and northward along the Bering Sea coast to the village of Wales, near the Arctic Circle. The overall population of these communities is about 28,600 persons. Large proportions of the persons in the CDQ communities are Alaska Natives. CDQ communities are remote, isolated settlements with few commercially valuable natural assets with which to develop and sustain a viable, diversified economic base. As a result, economic opportunities are few and unemployment rates tend to be high.

The only CDQ community within Areas 541, 542, and 543 is Atka, a member of the Aleutian Pribilof Islands Community Development Association (APICDA). APICDA is an equal partner with the Atka Fishermen's Association in the Atka Pride Seafoods Plant, and owns the Nazan Bay Inn in Atka. The Atka Pride plant has processed halibut and sablefish in the past, but in 2012 began developing Pacific cod processing. In 2013 and 2014 the plant operators plan to substantially expend Pacific cod and crab production. APICDA has invested in Atka infrastructure, or assisted the community in obtaining infrastructure finding. (Aleutian Pribilof Islands Community Development Association, 2012: 9)

The Atka mackerel CDQ allocation is divided among the three Aleutian Islands management areas in proportion to the allocation of TAC across those three areas. In the 7-year period prior to the interim final rule (from 2004 through 2010), CDQ groups were able to use their Atka mackerel allotments effectively: over 90 percent was fished in almost all year-area combinations. Only in Area 541 in 2005, was a smaller percentage (85 percent) harvested. Otherwise, in each area, from 2007 to 2010, over 90 percent was harvested in each year, and usually over 95 percent. These high levels of CDQ harvest persisted in Areas 541 and 542 in 2011 and 2012, under the interim final rule. Use of CDQ from Area 543, however, declined to about 3 percent, as a consequence of the prohibition on retained catch in that area (Table 8-36).

Table 8-36 Percentages of CDQ Aleutian Islands Atka mackerel allocations harvested by year

Year	Area 541	Area 542	Area 543
2004	91	96	95
2005	85	95	96
2006	93	94	94
2007	99	99	96
2008	97	98	96
2009	98	99	98
2010	98	98	100
2011	98	91	3

Note: Shaded year is that during which the interim final rule was in effect.
Source: NMFS AKR: 2004–2007 from NMFS AKR MS CDQ/PSQ Catch to Date; 2008–2012 from Bering Sea Aleutian Islands Catch Report (CDQ Only). Downloaded on May 15, 2012, and January 2, 2012, from http://www.alaskafisheries.noaa.gov/sustainablefisheries/catchstats.htm.

Atka mackerel CDQ allocations are not distributed equally among the six CDQ groups. Table 8-37 shows the distribution of the Amendment 80 species among the CDQ groups in 2012. These have not

Villages Region Fund (CVRF), the Norton Sound Economic Development Corporation (NSEDC), and the Yukon Delta Fisheries Development Association (YDFDA).

changed since 2004. Three groups, APICDA, BBEDC, and YDFDA, have relatively large allotments of Amendment 80 species. APICDA, especially, gets a relatively large share of the Atka mackerel allotment (30 percent). Pacific cod is divided relatively evenly among five of the groups, for these the allocations range between 15 percent and 21 percent. One CDQ group, CBSFA, has relatively small allotments of Amendment 80 species (8 percent to 9 percent of each).

Table 8-37 Proportional allotments of Amendment 80 species CDQ allocations among CDQ Groups

	APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA
Pacific cod	15	21	9	18	18	19
Atka mackerel	30	15	8	15	14	18
Yellowfin sole	28	24	8	6	7	27
Rock sole	24	23	8	11	11	23
Flathead sole	20	21	9	15	15	20
Pacific ocean perch in the AI	30	15	8	15	14	18

Note: Distributions are reported by management area for Atka mackerel and Pacific ocean perch, but the percentages are the same across areas.
Source: NMFS AKR worksheet retrieved on June 12, 2012, from http://alaskafisheries.noaa.gov/cdq/current_historical.htm.

Most Pacific cod CDQ is harvested in the Bering Sea, rather than in the Aleutian Islands. Table 8-38 shows harvests of Pacific cod CDQ in each of the three Aleutian Islands management areas, and in the BSAI as a whole. From 2004 through 2012,[31] from 2 percent to 18 percent of the harvest of the annual CDQ Pacific cod allocation was harvested in the Aleutian Islands fisheries.

Table 8-38 CDQ Pacific cod harvests in the Aleutian Islands (metric tons)

Year	541	542	543	Total	BSAI	AI % of BSAI
2004	S	246	C	273	16,030	2%
2005	690	S	C	1,002	14,689	7%
2006	756	S	C	1,101	14,255	8%
2007	1,684	158	226	2,068	12,773	16%
2008	1,435	186	109	1,730	18,183	10%
2009	628	C	S	887	18,538	5%
2010	1,596	1,185	433	3,214	18,029	18%
2011	C	C	C	C	22,847	S
2012	1,294	S	C	1,370	20,199	7%

Source: AKR CAS. "C" indicates confidential. "S" indicates data suppressed to protect data in a confidential cell.

In 2011, the six CDQ groups earned nearly $311.5 million in revenue and had operating expenses of about $248.8 million; net assets increased in 2011 by nearly $63 million. About 25 percent of revenues came from CDQ royalties. Direct income exceeded royalty income for the first time in 2004. That pattern has continued since that time with direct income ranging from 55 percent to 83 percent annually. (Blandford, personal communication)[32]

In 2011, the CDQ groups made over $151 million in fisheries-related investments and paid over $45.5 million in payroll to about 2,400 persons. CDQ processors, fish-buying stations, and other fisheries businesses made ex-vessel payments of over $32.2 million to more than 1,360 permit holders. The Western Alaska Community Development Association estimates that there were an additional 2,000 crew

[31] Except for 2011, for which the data are confidential.

[32] Aggie M. Blandford, Executive Director, Western Alaska Community Development Association. Email on January 3, 2013.

positions associated with those permits. The CDQ groups contributed almost $7.3 million to community infrastructure and over $17.7 million in other community benefit projects. The groups granted over 725 scholarships and additional training opportunities for 865 eligible residents. (Blandford, personal communication)

8.2.8 Aleut Corporation

The Aleut Corporation is a regional Native Corporation formed under the Alaska Native Claims Settlement Act (ANCSA) of 1971. When it was established, the Aleut Corporation's 3,249 voting stockholders received a cash settlement of $19.5 million, 70,789 acres of surface land, and 1.572 million subsurface acres. (Aleut Corporation, 2010: 9) ANCSA stock was initially issued to persons who were at least one-fourth Alaska Native. While a complex set of rules governs how shares can be distributed and inherited, it is assumed that the vast majority of Aleut Corporation shareholders continue to identify as Alaska Native.

Aleut Corporation shareholders are widely distributed. Currently there are 3,523 voting shareholders, 2,097 of whom live in Alaska, and 1,426 of whom live outside the state (almost entirely within the United States). Shareholders in other states are widely distributed: 65 percent live in the three West Coast states with the remainder distributed among 44 states and Canadian provinces. Of those in Alaska, 430 live within the boundaries of the Aleutians West Census Area, which include the civilian communities of Adak, Atka, Nikolski, Unalaska, St. George, and St. Paul. (Bourdukofsky, personal communication)[33]

Corporate income comes from several sources, including Federal government operating and maintenance contracting, fuel sales and storage, rental properties and gravel sales, industrial products and services, and other income and investments. Fuel sales and storage income comes from a wholly owned subsidiary of the Aleut Corporation, Aleut Enterprise, LLC. Real estate sales and rental income come from a second wholly owned subsidiary, Aleut Real Estate, LLC. Aleut Real Estate has residential and commercial properties located on Adak. (Aleut Corporation, 2012: 7-9)

As discussed in detail in Chapter 3, when the directed pollock fishery reopened in 2005, the directed fishing allowance was allocated to the Aleut Corporation[34], pursuant to the requirements of The Consolidated Appropriations Act of 2004 (Public Law 108–199). Through this allocation, the act sought to promote the economic development of Adak, Alaska. The law required the Aleut Corporation to select participants in the Aleutian Islands directed pollock fishery and limited participation to American Fisheries Act (AFA) qualified entities and vessels 60 feet (18.3 m) or less length overall (LOA). The law restricted the annual harvest of pollock in the Aleutian Islands directed pollock fishery by vessels 60 feet (18.3 m) LOA or less to less than 25 percent of the annual allocation until 2009, and to less than 50 percent of the annual allocation prior to 2013. These vessels were to receive 50 percent of the annual directed pollock fishery allocation in 2013 and in later years. (70 FR 9856, March 1, 2005). The Council incorporated this legal requirement into its management regime when it adopted Amendment 82 to the BSAI groundfish FMP in June 2004, revising the FMP to establish the management framework for the Aleutian Islands directed pollock fishery. The Aleut Corporation has not been able to take large amounts of pollock since 2005, however, alternatives under consideration in this analysis may open new areas for

[33] Angela Bourdukofsky, Shareholder Relations Manager, Aleut Corporation. Spreadsheet of voting shareholder residences supplied December 6, 2012.

[34] The term "Aleut Corporation" means the Aleut Corporation or its authorized agent(s) for purposes of describing activities required for managing the Aleutian Islands directed pollock fishery.

this fishery, and create a revenue stream for the corporation. Chapter 3 includes more details on Aleutian Islands pollock management.

The Aleut Enterprise Corporation was created in 1997 to help privatize the U.S. Navy base at Adak and since then has evolved into a fuel services company providing bulk fuel supplies to its own customers and fuel storage for third parties, from facilities at Adak and Cold Bay. Corporate headquarters are in Anchorage. At Adak, Aleut Enterprise provides a range of fuel products to many types of customers, including commercial fishing vessels, marine cargo vessels, commercial aviation customers, government agencies, scientific researchers, private tourists, other industries that may operate regionally, and residential customers in Adak. With respect to fishing vessels, Aleut Enterprise advertises that its facility in Adak can reduce run time to Dutch Harbor by four days, maximizing fishing time, minimizing fuel costs, and increasing fishing profits. (Aleut Enterprise LLC (Adak web site); Aleut Enterprise LLC (Corporate web site)

The alternatives under consideration in this analysis may affect the demand for fuel purchases at Adak from the Aleut Enterprise Corporation, particularly fuel purchases by catcher/processors operating in the western Aleutian Islands. The president of the Aleut Enterprise Corporation has indicated that fuel sales were hurt by the interim final rule (Tsukada 2010). The Aleut Enterprise Corporation is also the lessor of a fish processing plant at Adak. (Aleut Corporation, 2012: 27)

Table 8-39 summarizes several measures of Aleut Corporation and Aleut Enterprise Corporation revenues for the years 2008 through 2012. The 2011 annual report of the Aleut Corporation reported that a drop in FY 2011 gross revenues (which included the first three months of the current action, from January 2011 to March 2011) reflected lower revenues from fuel sales. The report elaborated that the decline in net revenues was due to the Steller sea lion restrictions, the tsunami in Sendai, Japan, the loss of equipment and inventory due a fire in Adak, and accrued expenses for projected costs related to clean-up of miscellaneous environmental matters. (Aleut Corporation, 2011: 10-11).

Table 8-39 Aleut Corporation and Aleut Enterprise LLC income flows, 2008–2012.

	Aleut Corporation			Aleut Enterprise LLC		
Year	**Gross revenues (million $)**	**Before tax net revenue (million $)**	**After tax net revenue (million $)**	**Revenues (million $)**	**Expenses (million $)**	**Net (million $)**
2008	116.1	13.3	36.6	15.2	13.3	1.8
2009	146.1	17.9	43.5	25.9	24.8	1.1
2010	159.4	11.8	26.7	15.3	14.9	0.4
2011	148.4	8.4	8.4	13.1	13.2	-0.1
2012	98.1	-10.8	-8.5	15.3	13.6	1.7

Notes: Years are fiscal years, beginning on April 1 of the prior year, and ending March 31 of the year shown. Numbers may not add up due to rounding to the nearest hundred thousand dollars.
Source: (Aleut Corporation 2009; Aleut Corporation 2010; Aleut Corporation 2011; Aleut Corporation 2012)

The Aleut Corporation profits may be affected by actions affecting the restrictions on fishing in the Aleutian Islands in several ways. Actions may affect the volume of fuel sales by the Aleut Enterprise Corporation, they may affect the Aleut Enterprise Corporation lease payments from the rental of the processing plant at Adak, they may affect the value of the Aleut Real Estate corporation real estate holdings on the island and its rental income from island properties, and they may make it possible for the Aleut Corporation to obtain royalty income from its rights to the directed fishery allowance of pollock in the Aleutian Islands.

In turn, Aleut Corporation profits may impact the Aleut community in several ways. Aleut shareholders receive dividends on their stock holdings. In the 2011 fiscal year, the company paid about $7.7 million in

dividends and elder benefits. In February the company declared dividends of $21 per share. In addition, the company pays an elder benefit to shareholders 60 years old or older at the end of the fiscal year. In the 2011 fiscal year, 847 elders received an elder benefit of $1,000. (Aleut Corporation, 2011: 13) In the 2012 fiscal year, the dividend and elder payments were much lower. In FY 2012, the company declared dividends of $5.00 per share, declared elder benefits of $500 per elder, and aggregate dividend and elder benefits were about $2.1 million. (Aleut Corporation, 2012: 11)

In addition the company makes donations to support the Aleut Foundation. In its 2011 fiscal year, the company made $790,000 in contributions to charitable and non-profit organizations, of which $600,000 went to the Aleut Foundation. In 2012, total charitable donations were about $1.1 million, of which $1.0 million were made to the Aleut Foundation. The Aleut Foundation is a non-profit, formed to "support the economic and social needs of the Aleut people with scholarships for postsecondary education, career development, and burial assistance for shareholders of The Aleut Corporation." In the 2012 fiscal year, the Aleut Foundation provided 247 student scholarships, community development programs in Sand Point and Saint Paul, job placement training, internship funding, and funding for high school students to attend a leadership summit. (Aleut Corporation, 2011: 13, 2012: 11)

8.2.9 Subsistence[35]

Steller sea lions

Alaska Natives hunt Steller sea lions for subsistence.[36] They have done so for at least 6,000 years, as indicated by remains found at prehistoric archeological sites (Turek, Pedersen, Ratner, & See, 2008: 14). Harvest data collected intermittently between 1981 and 1991, from 25 communities on the lower Alaska Peninsula, lower Cook Inlet, Prince William Sound, and Kodiak Island, indicate an annual harvest of between 300 and 400 animals in those areas (Turek et al., 2008: 34). Systematic harvest estimates are available from 1992 through 2008; the point estimates of total takes (harvested animals and animals struck and lost) range from 146 animals in 2008 to 549 animals in 1992. The 95 percent confidence interval around the 2008 point estimate was 106 to 224 animals. The harvest declined from 1992 to 1996, and then leveled off at a lower level through 2008 (Wolfe, Fall, & Riedel, 2009: 25-26).

Relatively small numbers of subsistence users harvest Steller sea lions. In 2008, an estimated 57 Alaska Native households reported hunting Steller sea lions, and an estimated 50 households reported harvesting sea lions. These participation levels had dropped considerably since 1992, when 135 households reported hunting sea lions, and 91 reported harvesting sea lions. In 2008, 96.8 percent of the households surveyed did not hunt Steller sea lions (Wolfe et al., 2009: 35, 38).

Persons from both Atka and Adak are Steller sea lion subsistence hunters. Atkans are relatively active in Steller sea lion harvests, compared to residents of other Alaska subsistence communities. The 2008 Atka take of 35 sea lions by 10 households was a large percentage of the statewide 2008 take of 146 sea lions. Residents of Adak households are estimated to have taken four sea lions in 2008 (Wolfe et al., 2009: 86, C-87).[37]

[35] Section 10.4.5.1 of Chapter 10 of this EIS includes a discussion of Steller sea lion subsistence hunting.

[36] As discussed at greater length in Section 10.4.5.1, subsistence harvest of marine mammals, including Steller sea lions, is limited to Alaska Natives, under the Marine Mammal Protection Act of 1972.

[37] Section 10.4.5.1 of Chapter 10 provides more details about Adak and Atka harvests.

Steller sea lion products are distributed through subsistence trade and sharing networks (Wolfe et al., 2009: 38), thus, the number of households potentially impacted by Steller sea lion subsistence harvests is larger than the number actually engaged in hunting. For example, in Atka in 2008 there were 25 Alaska Native households and an estimated Alaska Native population of 84 persons. Atka residents harvested an estimated 35 sea lions in 2008. An estimated 40 percent of the households harvested sea lions, 70 percent received sea lion products, and 60 percent gave away sea lion products (Wolfe et al., 2009: C-91). The reported survey information does not distinguish between sea lion products entering and leaving the community. The percentages suggest that people receiving sea lion products will also give them away, and that households harvesting sea lions may still receive sea lion products through exchange networks.

Turek et al., (2008), citing Haynes & Mishler (1991: 14), describe the traditional subsistence uses for sea lions:

> Traditionally, Steller sea lions were taken for food, clothing, and for materials for skin boats. Sea lion blubber and meat, including the livers and hearts, was dried, baked, boiled, or eaten raw. Boots soles were made from the skin of the flippers and boot uppers from the skin of the throats. The stomach was used as a water-tight container, and the bladder was made into a fishing float. Sea lion whiskers decorated wooden hunting hats and cleaned tobacco pipes.

As noted, harvests of sea lions declined in the early 1990s and then leveled off for the remainder of the period. Subsistence harvests of sea lions have not been regulated or controlled by the State or Federal government; therefore, this is not the reason for the decline in subsistence hunting. The size of the sea lion population may affect harvests in three ways. [38]

First, a smaller population may lead to lower harvest per unit of effort. Even if effort stayed at historical levels, harvests could drop. Steller sea lions aggregate reasonably persistently at known haulout and rookery locations year after year. Declining populations would still do so, except if a haulout or rookery population crossed a threshold leading to abandonment of a site. Under these circumstances catch per unit of effort could remain relatively high as population declined.

Second, effort may not stay at historical levels. If catch per unit of effort gets smaller, time required to find and harvest each sea lion increases, and the opportunity costs of harvesting sea lions, as opposed to pursuing other subsistence activities, or using time for other purposes, becomes larger. A day spent hunting sea lions could have a higher cost in terms of forgone harvests of other fish and game species. Some subsistence hunters would spend less time hunting sea lions, and others would stop hunting altogether.

Third, reductions in numbers of observed animals, or publicity about declining stocks and the listing of the animals, may cause subsistence hunters to stop or limit hunting because of a conservation motive, or because of confusion about hunting regulations. Haynes & Mishler, (1991: 33) observed "a widespread misapprehension among Native hunters that it is illegal for them to take sea lions for subsistence because of their widely publicized listing as a threatened species. All over the State Native hunters are increasingly afraid of being prosecuted if they do take sea lions…. This misunderstanding in itself will almost certainly lead to a reduced overall harvest in coming years."

[38] It is possible that increasing productivity in other subsistence activities, or increasing wage income opportunities, may increase the opportunity costs of hunting sea lions. Desire to harvest Steller sea lions may also change as village culture evolves.

Successful efforts to improve the Steller sea lion population health, and a possible associated change in listing from endangered to threatened, or a possible delisting, could lead to increased harvest per unit of effort, reduced opportunity costs of harvesting, or to a reduction in conservation or regulatory concerns about hunting, and a greater willingness to hunt sea lions. If sea lion hunting or butchering skills have been lost, or cultural interest in harvesting sea lions has declined, due to relatively low participation in hunts in recent years, hunting might not return to historical levels, or may only do so with a delay.

An increase in the catch per unit of effort for hunting sea lions could improve welfare if households are able to consume more sea lions and/or to spend more time on collection and preparation of other subsistence resources, while maintaining existing sea lion harvests. An increased variety of species for hunting may allow subsistence hunters and communities to diversify their "portfolios" of resources, and reduce income risks associated with changes in the availability of individual resources.

This result could strengthen subsistence based communities. Individual hunting households could be better off, as could individual households receiving sea lion products through exchange or as a gift. Native community cultures originated in subsistence communities and continue to depend on subsistence production (even if most communities are now subsistence-market hybrids). Improved subsistence hunting opportunities could strengthen Alaska Native communities.

Improved stocks in the western Aleutian Islands might have little impact on harvest per unit of effort for most subsistence hunters, since there are no local subsistence communities within Areas 542 and 543. This may also be the case if harvest per unit of effort remained high while populations were low as depleted populations remained concentrated in a few locations. There might be some benefits to small communities, particularly to Atka, where subsistence harvests remain high and might be directly influenced by improvements in local populations. Benefits might be greater if subsistence hunters elsewhere in the BSAI or GOA regions are refraining from targeting sea lions to some extent from a precautionary motive, and if improvement in stocks leads to a change in listing status for the western distinct population segment, as a whole. If this is the mechanism by which the action benefits subsistence activities, the impact may be delayed for some years, until listings are modified.

The relationship between Steller sea lion population size and subsistence hunting activity is not well defined. As noted in Chapter 10 of this EIS, "…while there is clearly some relationship between the Steller sea lion population level and subsistence harvest from that population, the strength of that relationship cannot be determined given other factors in play." The difficulties are connected with limited knowledge "both in terms of precise measurement as well as in terms of causal linkages…" (Chapter 10 of this EIS)

Groundfish

While there is relatively little information on current subsistence fishing for Atka mackerel, Pacific cod, or pollock in the Aleutian Islands, there is some evidence that residents of Atka have subsistence fished for Pacific cod in the past. There have been subsistence harvests of Atka mackerel elsewhere. It is possible that actions that resulted in localized depletion associated with commercial fishing could have some impact on subsistence fishing; however, there is no evidence that commercial fishing for these species has had adverse impacts on subsistence fisheries. (Chapter 10 of this EIS)

Indirect impacts on other subsistence harvests

Participation in other subsistence activities may be affected by this action if it affects the income available to subsistence households for pursuing subsistence activities, or if it affects the availability of vessels and gear used jointly in commercial and subsistence activities. Income impacts could extend beyond the local

area through impacts on CDQ revenue streams. For a number of reasons, the potential incidence of these indirect impacts is very difficult to predict (Chapter 10 of this EIS). Given the limited local participation in the directly regulated fisheries, the impacts to existing local households may be small.

8.2.10 Benefits from Steller sea lion stock health

People value the health of the Steller sea lion population for a variety of reasons. As discussed in Section 8.2.9, subsistence hunters may value the health of the stock. Others may value stock health, if it allows them to view Steller sea lions, or if it draws eco-tourism clients. Some, who do not use the stock in these ways, may still place a value on knowing that the stock is healthy. They may value the existence or characteristics of the stock, or value the option of one day hunting or viewing the animals. On the other hand, it is also possible that some people would incur net costs if stock health improves: Steller sea lions compete with humans for prey species and can be a nuisance for fishing operations when they interact with fishing gear.

Ideally, the economic value people place on a good or service could be inferred from their behavior. For an environmental good, like the health of the Steller sea lion population, however, this is often difficult. In these instances, there may be no information in markets for the good or service, or in related markets, from which to infer a value. Under these circumstances, analysts often use survey research to attempt to estimate the appropriate value.

Willingness to accept (WTA) compensation for a reduction in Steller sea lion health below some ideal level may be appropriate in a context in which individuals may be said to have a property right in the health of the resource, which may be the case in this instance. WTA is the minimum compensation that would have to be paid to people to make them indifferent to the difference between the actual and desired level of population health. However, there are problems with the use of survey methods to gather the information needed to estimate WTA measures. Under these circumstances, it is common practice to estimate a related measure, willingness to pay (WTP). WTP is an estimate of the maximum amount individuals would be willing to pay for something, rather than go without it. In general, estimated WTA tends to be higher than estimated WTP. (Goldar & Misra, 2001: 150)

A recent study, prepared at the NMFS Alaska Fisheries Science Center, provides some information on WTP for improvements in the Steller sea lion population trajectory (Lew, Layton, and Rowe 2010).[39] The study was based on survey research conducted in 2007. Survey respondents were presented with a set of scenarios and asked to rank them according to their preferences. Each scenario included information about the state of the eastern and western populations in 60 years, and a cost to the respondent that would be incurred in equal increments over a 20-year period. A copy of one of the questions is shown in Figure 8-3.[40]

[39] An earlier study of WTP for Steller sea lions (Giraud et al. 2002), based on survey research conducted in 2000, has not been used in the present EIS. The survey results are seven years older than Lew et al. (2010), and the analysis was less focused on specific growth rate and listing outcomes.

[40] Each survey contained three separate versions of this question and three separate versions of the survey were used.

Q10 **Which of the following three alternatives do you most prefer, and which you least prefer? Please indicate your responses below the table.**

	Results in 60 years for each alternative		
	Alternative A Current program	**Alternative B**	**Alternative C**
Western Stock Population status…… (Endangered now)	Endangered	Threatened	Endangered
Population size…… (45,000 now)	45,000	75,000	45,000
Eastern Stock Population status…… (Threatened now)	Recovered	Recovered	Recovered
Population size…… (45,000 now)	60,000	80,000	80,000
Added cost to your household each year for 20 years……	$0	$40	$10

	Alternative A	**Alternative B**	**Alternative C**
Which alternative do you prefer the most? *Check one box------>*	☐	☐	☐
Which alternative do you prefer the least? *Check one box------>*	☐	☐	☐

Figure 8-3 Typical information in the choice question in the AFSC Steller sea lion 2007 valuation survey

The questions posed in the survey framed the scenarios in terms of outcomes known with certainty. Value estimates based on these will overstate, by an unknown margin, the willingness to pay for results that are uncertain.[41]

The 2010 environmental assessment (EA) evaluating the interim final rule included an appendix using the results from Lew et al. (2010) to infer the values households place on changes that are expected to lead to a -2 percent, +1 percent, and +2 percent change in the annual rate of western Steller sea lion population growth. The -2 percent decline was associated with an endangered population in 60 years, the +1 percent with a relisting to "threatened" status, and the +2 percent with a delisting to "recovered" status. Assuming that the baseline was a stable stock,[42] the mean WTP estimates for respondents were $0 per responding household for the -2 percent growth change, about $100 (with a 95 percent confidence interval of $72 to $128) per responding household for 1 percent growth, and about $116 (with a 95 percent confidence interval of $77 to $157) per responding household for 2 percent growth. (NMFS, 2010b: 10-86)

There are about 116.7 million households in the United States according to the 2010 Census. Arguably, a portion of these households should be excluded from the households assumed to have average WTP when aggregate WTP is calculated. These include households that would correspond to survey non-respondents, individuals who did not have confidence in their own responses, who did not provide responses to the choice question, or who clearly lacked an understanding of how to answer this type of

[41] Assuming people are risk-neutral or risk averse (and not risk loving).

[42] In the analysis, "stable stock" means that the Steller sea lion population will remain listed as endangered and maintain its current population size in 60 years. The analysis used the stable stock assumption on the basis of the most recent stock assessment available at the time it was completed (Allen & Angliss, 2010: 3). This is discussed in the text following Table 10-53. The biological opinion states that the western distinct population segment has been increasing at a rate of about 1.4 percent, however, it notes that the estimate is not statistically significant. (NMFS 2010a: 374)

question. To be conservative, these respondents, assumed to be in similar proportions to the general population, will be assumed to have a zero WTP when calculating aggregate WTP. Thus, the positive average household values would only be applied to 51.84 percent of the households (NMFS, 2010b: 10-103). Following this procedure leaves 60.5 million households. The aggregate annual WTP from 1 percent growth would thus range between $4.4 billion and $7.7 billion over 20 years. The aggregate annual WTP for a 2 percent growth increment would range between $4.7 billion and $9.5 billion.

A more recent study based on Lew et al. (2010) (Sanchirico et al. 2012) assumed an increasing stock in the absence of action, and provided estimated WTP for a change in the population of the western distinct population segment from 60,000 animals to 70,000 animals over a 60-year period. The size of this change is assumed to be known with certainty. In this scenario, the listing status of the Steller sea lion was assumed to remain "endangered" at the end of the period, so there was no change in listing status. The mean annual household WTP in this case was $34.94, with a 95 percent confidence interval ranging from $29.03 to $41.16.[43] (Sanchirico et al., 2012: 525) With the 60.5 million households used in the 2010 appendix, the annual WTP would range from $1.8 billion to $2.5 billion. The estimated WTP for this scenario is smaller than for the scenarios evaluated in 2010 because of the more optimistic outlook for stock growth in the absence of action, a much smaller growth rate for the Steller sea lion stock if action is taken (less than 0.03 percent, as opposed to 1 percent or 2 percent), and because of the lack of a change in ESA listing status.

The WTP estimates based on Lew et al. (2010) are estimates of the value placed on changes in the growth rate of the western distinct population segment of the Steller sea lions. This population segment ranges from the area of Prince William Sound in the east, to the western Aleutian Islands in the west. The action under consideration in this analysis may affect the members of this population segment in the Central and Western Aleutian Islands. The applicability of the estimates from this model will depend on (a) whether the impact of the action on the populations of Steller sea lions in the Central and Western Aleutian Islands can be estimated; (b) the impact such a local population change can be said to have on the rate of change in the overall population segment; and (3) the potential for the action to contribute to a change in the listing status for this population segment. In the 2010 analysis, NMFS was unable to make these connections, or use the model to make WTP estimates for the action alternatives.[44]

The stated preference methods used here continue to be debated within the economics profession. A reviewer of the analysis presented in detail in the 2010 EA explained that, while the "methodology used by Lew et al. (2010) to estimate willingness-to-pay with household surveys is widely used by economists, and the analysis was reported in a peer-reviewed article" there is nevertheless "controversy associated with the reliability of this methodology to estimate non-market environmental benefits that are difficult to describe and of which most people have little direct understanding. There is also controversy associated with the potential biases of surveys in which respondents are asked about their willingness to pay without actually being required to pay, as well as other potential biases associated with all types of survey research" [45] (Bernard, Jeffries, Knapp, & Trites, 2011: 72).

[43] Again, as in the analysis in the technical appendix to Section 10.4 of the RIR for the 2010 RPAs, this is an annual payment over 20 years.

[44] Bernard et al. discuss this issue (Bernard et al., 2011: 72)

[45] For surveys of the issues see (Carson, Flores, and Meade 2001). NMFS guidelines encourage use of these techniques where appropriate, "Whenever practicable, non-market values should be monetized (e.g., consumers' WTP) using appropriate valuation techniques, such as travel cost, stated preference (including contingent valuation), or hedonic methods (NMFS 2007). Three papers in a recent symposium in the Journal of Economic Perspectives provide a relatively accessible summary of the arguments for and against the use of contingent valuation methods (Carson 2012; Hausman 2012; Kling, Phaneuf, and Zhao 2012)

Subsistence users almost certainly did not fall in the sample of the U.S. population surveyed in the WTP analysis discussed above. Thus, the WTP estimates do not include WTP for subsistence. Subsistence values, if they could be had, would be additive with those WTP estimates. While individual subsistence households and subsistence community members may value an improvement in sea lion populations much more than members of the average U.S. household, the number of U.S. households is so much larger (approximately 116.7 million U.S. households) that a quantitative estimate of the value of subsistence consumptive-use would be much smaller than a national valuation of non-consumptive benefits by non-subsistence households.

8.2.11 Public Finance

Three levels of government—Federal, state, and local—impose taxes and fees on the fishing operations in the Aleutian Islands, and spend public money to support those fisheries. Important state tax flows, connected to the fisheries, are shared with local communities in the Aleutian Islands region.

The key Federal taxes are those imposed on personal income and corporate profits earned by fishing in the Aleutian Islands. Federal expenditures include those incurred by the North Pacific Fishery Management Council for Aleutian Islands related management, by the NMFS Alaska Regional Office for fisheries management, by the Alaska Fisheries Science Center for the research and monitoring efforts supporting fisheries management, by the NOAA Office of Law Enforcement and NOAA Office of General Counsel, and by the United States Coast Guard, for law enforcement and emergency response efforts supporting the fisheries. The information on taxable incomes and profits, and on relevant tax rates, that would make it possible to estimate Federal tax revenues is not available. While Federal expenses for the BSAI fisheries in general are discussed in Section 6.2.1 of the BSAI groundfish FMP ("Expected costs of groundfish management"), information on the share of these attributable to the Aleutian Islands, and on how these might change with the management actions, is not provided there.

The State of Alaska taxes fish processed outside of and first landed in Alaska, fish processed in Alaska, and raw fish exported from Alaska, and shares a portion of these revenues with qualified boroughs and/or municipalities in Alaska. The amount of money distributed depends on the taxes collected during the program base year as defined in Alaska statute and on other factors. These other factors include the organization of each borough in which processing or landings occur and number of incorporated cities in each borough. The three cities highlighted in this section, Unalaska, Adak, and Atka all lie within the Aleutian West Census Area, and are not in an organized borough. The State of Alaska also retains portions of the revenues raised from these taxes for its own use.

Both Fisheries Business Taxes and Fisheries Resource Landing taxes are generally levied against fishery resources processed, landed, or exported in the preceding calendar year. For example, fiscal year 2011 payments or shared fishery tax revenues were generally derived from taxes collected in calendar year 2010. In the following tables the reported taxes for 2012 generally reflect fishing and/or processing activity for the 2011 calendar year, and were the first reported fisheries business taxes to fully reflect fishing activity under the interim final rule.

The Alaska Fisheries Business and Resource Landings Taxes

The Fisheries Business Tax is generally paid by the first processor of processed fish, or the exporter of unprocessed fish, on raw fish landed in the State of Alaska, and is based on the ex-vessel price of unprocessed fish. The tax rates vary from 1 percent to 5 percent, depending on whether the fishery resource is considered "established" or "developing," and whether it was processed by a shore-based or

floating processor. Currently, the tax rates for established fisheries are 3 percent for fishery resources processed at shorebased plants and 5 percent for those processed at floating processors (AS 43.75.015).

The State retains half of the Fisheries Business Tax and returns the balance to communities and organized boroughs where, or near where, fish were landed and processed. Revenues for fish landed within a municipality's boundaries are shared with communities by the Alaska Department of Revenue (DOR). Revenues for fish landed outside of municipal boundaries are shared with communities by the Division of Community and Regional Affairs (DCRA) of the Alaska Department of Commerce. The DCRA first allocates the revenues raised statewide in proportion to share of statewide pounds of fish and shellfish processed in 19 different Fishery Management Areas (FMA), and then within FMAs by formulas that may vary by FMA. The Aleutian Islands communities most directly affected by this action, Adak, Atka, and Unalaska, fall in an FMA that distributes 60 percent of these latter revenues equally among four affected communities (in addition to the three mentioned, Akutan is included) and the Aleutians East Borough, and 40 percent in proportion to the populations of the four communities. The shared revenues for Adak, Atka, and Unalaska are summarized in Table 8-40, Table 8-41, and Table 8-42. [46]

The Alaska Fishery Resource Landings Tax is levied on fishery resources processed outside the three-mile limit and first landed in Alaska, or on fish processed subject to section 210(f) of the American Fisheries Act[47]. The tax is collected from floating processors and catcher/processors that process fish outside the State's 3-mile limit and bring products into Alaska for transshipment, or any processed fishery resource subject to section 210(f) of the AFA. The tax is levied each calendar year by multiplying the average annual price (an ex-vessel price) for each landed groundfish species by the amount of unprocessed groundfish. The tax rate applied to this estimate of gross revenue for unprocessed groundfish is 3 percent.[48] Fish products would not be subject to both the Fisheries Business Tax <u>and</u> the Fishery Resource Landing Tax.

The State retains half of the Resource Landings Tax and, as with the Fishery Business Tax, returns the balance to communities and organized boroughs where, or near where, fish were landed and processed. Revenues for fish landed within a municipality's boundaries are shared with communities by the DOR. Revenues for fish landed outside of municipal boundaries are shared with communities by the DCRA. The DCRA allocates the revenues raised statewide in proportion to share of the unprocessed value of taxed statewide fish and shellfish processed in the FMAs, and then within FMAs by formulas that may vary by FMA. The Aleutian Islands communities divide these revenues in the same way they divide those from the Fishery Business Tax. The shared Resource Landings Tax revenues for Adak, Atka, and Unalaska are summarized in Table 8-40, Table 8-41, and Table 8-42.

[46] Reported tax revenues in these tables are total tax revenues from all relevant fishery sources, and include revenues from species other than Aleutian Islands Atka mackerel, Pacific cod, and pollock. These estimates are provided because they provide insight into the importance of these revenues to the local communities; however, they do not themselves provide insight into the changes in these revenue streams that would follow from the different alternatives.

[47] This paragraph requires that parties to a contract implementing an AFA cooperative agree among themselves to pay the State of Alaska, for pollock landed outside of Alaska, revenues in lieu of, and equivalent to, the taxes the state would have charged had the pollock been landed in Alaska.

[48] The rate is 1 percent for a developing commercial fish species.

Table 8-40 Adak, State fisheries business tax revenues

Adak					
DOR FY reporting year	**CY of fishing activity**	**DOR Fishery business tax-shared**	**DOR Landing Tax-shared**	**DCED Fishery business tax shared[1]**	**DCED Landing Tax-shared[1]**
2008	2007	$254,359	$128,199	$124,918	$131,352
2009	2008	$311,439	$97,736	$107,123	$201,055
2010	2009	$13,567	$54,949	$98,973	$92,919
2011	2010	$143,848	$40,219	$122,742	$165,964
2012	2011	$75,469	$61,035	$145,816	$115, 360

Provided by DCED, DCRA –January 6, 2013. Lawrence Blood[49]

Table 8-41 Atka, State fisheries business tax revenues

Atka					
DOR FY reporting year	**CY of fishing activity**	**DOR Fishery business tax-shared**	**DOR Landing Tax-shared**	**DCED Fishery business tax shared**	**DCED Landing Tax-shared**
2008	2007	$18,349	$16,413	$119,953	$126,132
2009	2008	$80,923	$14,134	$99,901	$187,500
2010	2009	$0	$9,682	$93,115	$87,420
2011	2010	$57,861	$10,377	$106,976	$144,645
2012	2011	$51,168	$18,946	$126,575	$100,138

Provided by DCED, DCRA –January 6, 2013. Lawrence Blood

Table 8-42 Unalaska, State fisheries business tax revenues

Unalaska					
DOR FY reporting year	**CY of fishing activity**	**DOR Fishery business tax-shared**	**DOR Landing Tax-shared**	**DCED Fishery business tax shared**	**DCED Landing Tax-shared**
2008	2007	$3,469,175	$4,771,328	$408,526	$429,570
2009	2008	$4,207,955	$4,040,106	$339,130	$636,497
2010	2009	$2,882,391	$3,234,224	$316,899	$297,515
2011	2010	$3,780,072	$2,977,485	$363,706	$491,778
2012	2011	$3,968,378	$4,558,307	$430,062	$340,236

Provided by DCED, DCRA –January 6, 2013. Lawrence Blood

Shared revenues from taxes on Atka mackerel and Pacific cod

The Alaska Department of Revenue has reviewed confidential tax records, and has estimated combined Fisheries Business Tax and Resource Landing Tax Revenues from Atka mackerel and Pacific cod fishing activity in the communities of Adak, Atka, and Unalaska for the fiscal years 2008 through 2012. Revenues represent production from other management areas, including the Eastern Bering Sea, as well

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as the Aleutian Islands. These estimates are summarized in Table 8-43. These estimates have been highly aggregated by the Department of Revenue to protect tax data confidentiality.

The table is most informative with respect to revenues from Atka mackerel, almost all of which is sourced from within the Aleutian Islands. Moreover, the small catches from the Bering Sea area may also be affected by some of the alternatives.

Table 8-43 Combined Fisheries Business Tax and Resource Landing Tax Revenue (in dollars)

Calendar year	Fiscal year	Adak	Atka	Unalaska	Total
2007	2008	$13,344	$6,870	$7,032	$27,245
2008	2009	***	***	***	$15,360
2009	2010	$18,688	7,729	$10,572	$36,989
2010	2011	14,291	8,339	$7,218	$29,848
2011	2012	32,282	$40,383	$37,073	$109,738
Calendar year	**Fiscal year**	**Adak**	**Atka**	**Unalaska**	**Total**
2007	2008	$517,341	$19,681	$3,239,559	$3,776,582
2008	2009	$604,918	$151,548	$3,988,509	$4,744,976
2009	2010	$215,887	$13,856	$2,031,430	$2,261,174
2010	2011	***	***	***	$2,270,734
2011	2012	***	***	***	$3,449,512

Source: Alaska Department of Revenue.

*** indicates confidential data

Notes: This report assumes that tax returns reflect the fiscal year in which they were submitted. Actual tax payments may differ from the data in this report.

Municipal Taxes and Revenues

In addition to the shared Fishery Business tax, and the shared Fisheries Resource Landing tax, described above, municipalities may collect their own raw fish taxes on landings. Municipal raw fish taxes vary by community, and, where they exist, range from approximately 1 percent to 3 percent of the unprocessed value of the fishery resources. Municipalities may impose other taxes that may be affected by fishing activity, including sales taxes, bed taxes, and fuel transfer taxes. Table 8-44, Table 8-45, and Table 8-46, summarize tax revenue reports provided by Adak, Atka, and Unalaska to the State Department of Revenue for recent years or for projected years, based on the most recent tax and revenue reports available from the DCRA web site.[50]

In 2008, Adak levied a 3 percent sales tax and a $0.02/gallon fuel transfer tax. The sales tax increased to 4 percent in 2011 and is reported in FY 2013 as the major component of the local taxes (Table 8-44). Of $1.64 million in FY 2013 estimated taxes, 30.9 percent are from Fisheries Business and Resource Landing taxes. Through 2012, Adak did not levy a dedicated local raw fish tax, although a portion of its sales tax was derived from fish sales. The amount of the sales tax attributed to fish sales is not reported in the DCED data, but approximately 1/3 of the tax base for Adak originated from activities associated with the fishing industry. In December 2012, Adak voted to adopt a 2 percent raw fish tax, and to modify its

[50] As before, reported tax revenues in these tables are total tax revenues from all relevant fishery sources, and include revenues from species other than Aleutian Islands Atka mackerel, Pacific cod, and pollock. These estimates are provided because they provide insight into the importance of these revenues to the local communities, however, they do not themselves provide quantitative insight into the changes in these revenue streams that would follow from the different alternatives.

sales tax so that it no longer applied to raw fish sales by fishermen. The raw fish tax was implemented in January 2013. This was done to set Adak's fish tax rate at a level comparable to other Aleutian Islands and Bristol Bay communities (Layton Lockett, City Manager, City of Adak, personal communication, February 11, 2013).

Atka levies a 2 percent raw fish tax, and a 10 percent bed tax; these taxes rates have been in place for several years, and were not revised for 2013. In 2012, of approximately $921,734 in total municipal revenues in Atka, approximately $250,000 came from the local raw fish tax, the shared Fisheries Business Tax, and the shared Resource Landing Tax. Aggregate fisheries taxes represent approximately 27 percent of the fiscal year 2012 revenues for the municipality.

Of the three municipalities highlighted in this section, Unalaska has the largest tax and fee base. The historical budget for Unalaska from 2008 through 2010 is available on the DCRA website and is used here as the best available date for comparison purposes. Unalaska levies a 2 percent sales tax, a 2 percent raw fish tax, and a 5 percent bed tax. These taxes continue to apply in FY 2013. In 2010 total revenues for the municipality were reported to be $30.9 million. The fisheries revenues from local and shared sources for 2010 represented approximately 41 percent of the total annual revenues for this municipality.

Table 8-44 Adak revenue and tax sources and annual expenditures projected for fiscal year 2013

Source of Local and Shared Taxes and Revenue (projected)	U.S. dollars
Local Taxes	758,250
Leases	116,399
License and Use Fees	16,400
Shared Fishery Business Tax	295,000
Shared Fisheries Landing Tax	210,000
State Aid to local govt.	161,500
Contract Services and Federal Aid	78,001
Total Revenues	1,635,753
Expenditures (projected)	
Administration/Finance	314,049
Clerk	58,549
Council	6,550
Public Safety	102,502
Public Works	234,650
Public Facilities	332,658
Awards and Grants	12,500
Misc. contribution funds	574,215
Total Operating Expenditures	1,635,673

DCRA web site: Community Data **http://www.commerce.state.ak.us/dcra/commfin/Adak/AdakFY13Budget.pdf**

Table 8-45 Atka revenue and tax sources and annual expenditures for fiscal year 2012

Source of Local and Shared Taxes and Revenue (projected)	U.S. dollars FY 2012
Raw Seafood Tax	30,000
AK Fisheries Business	210,000
AK Fisheries Resource Landing	10,000
Transportation & Utility	338,150
Rental Lease	60,584
Investment Earnings	111,500
Other Revenues	161,500
Total Revenues	921,734
Expenditures	
City Salaries and Wages	296,082
Taxes and Benefits	58,128
Contract	41,950
Supplies	18,350
Communications	13,220
Travel	19,000
Other Expenses	310,380
Total Operating Expenditures	757,110

DCRA web site: Community Data http://www.commerce.state.ak.us/dcra/commfin/Atka/AtkaFY12Budget.pdf

Table 8-46 Unalaska revenue and tax sources and annual expenditures for fiscal year 2008 to 2010

Source of Local and Shared Taxes and Revenue (projected)	Tax or Revenue in U.S. dollars		
	2008	2009	2010
Raw Seafood Tax	4,689,810	4,619,222	3,594,173
AK Fisheries Business	3,909,016	3,877,701	4,547,084
AK Fisheries Resource Landing	4,362,451	5,200,897	4,676,603
Property Taxes	4,279,653	4,259,949	4,249,337
Sales Tax	7,348,387	6,913,131	5,808,605
Investment Earnings	5,266,548	5,614,363	2,648,105
Other Revenues	3,044,811	8,397,406	5,390,510
Total Revenues	32,900,676	38,882,670	30,914,418
Expenditures		U.S. dollars	
Mayor & Council	421,496	587,206	751,213
City Administration	1,334,777	1,377,698	1,460,407
City Clerk	458,038	451,241	335,594
Finance	1,130,793	1,293,558	1,242,720
Planning	203,536	126,891	223,185
Public Safety	3,806,767	4,227,891	4,307,627
Public Works	4,743,217	5,015,862	5,202,844
Parks, Culture & Recreation	2,052,736	2,101,374	2,138,623
Other Expenses	4,731,258	5,054,832	5,525,888
Total Operating Expenditures	18,882,619	20,236,553	21,188,100

DCRA web site: Community Data http://www.commerce.state.ak.us/dcra/commfin/Unalaska/UnalaskaFY12Budget.pdf

8.2.12 Community economic impacts

How fisheries may impact communities

Communities in Alaska and the Pacific Northwest will be impacted by the alternatives for management of Atka mackerel, Pacific cod, and pollock fishing in the Aleutian Islands. These impacts will take several forms: (1) incomes of fishing operation stakeholders (including crew, specialized crew, vessel owners, fishing rights holders) will change, and these changes will affect personal incomes in communities directly, and indirectly through changes in local spending by the fishery stakeholders; (2) vessel home ports may see changes in fishing vessel expenditures; (3) communities in which unprocessed Pacific cod is delivered will see changes in processing activity; (4) communities (other than home ports) providing logistical support for the fleet (including providing fuel and supplies, storage, offloading support, and air ports for crew rotation) will see changes; (5) communities participating in the CDQ program may see changes; and (6) communities may be affected by changes in collections of fish taxes and by the sharing of fish taxes by the State of Alaska. This analysis also treats impacts of this action on Aleut Corporation shareholders as a community impact. These shareholders may be affected by changes in Aleut Corporation revenues (see the more detailed discussion in Sub-section 8.2.8).

For analytical purposes, it is convenient to divide the employment and impact effects associated with fishery policy changes into direct, indirect, and induced effects.[51] The direct effects are those reflected in changes in jobs and income directly attributable to participation in the fisheries. In this instance, these are changes in the direct employment of the crew of the fishing vessels and of workers in processing plants, and direct income to various participants in the fishing and processing firms: wages, salaries, or shares for crew, profits for vessel owners, or lease or royalty payments to quota share holders or to holders of CDQ fishing privileges, acquired and used by a participating fishing firm.

The indirect effects are those reflected in changes generated in other businesses, by the changes in purchases of the fishing firms. In this instance, indirect effects would accrue to businesses supplying fuel and supplies, fishing gear and fishing gear repairs, ship construction and repairs, insurance, banking, legal, and accounting services, and lobbying and consulting. In the discussion that follows, activity in a fishing firm's corporate office (overall management and strategic direction, marketing, accounting, human resources, and legal services)[52] will be treated as an indirect employment impact. There is no bright line between the production of many of these services by the fishing firm itself, and their purchase in the market place. The goods and services above are "backward" linkages. Jobs and income may also be associated with "forward" linkages, in firms providing subsequent reprocessing, warehousing, cold storage, brokering, and distribution services.

Alaska's fisheries taxes, the receipts of which are shared with the communities in which fish are landed, are another source of indirect fishery impacts. Changes in "fish" tax receipts may lead to reductions (increases) in community sales tax or property tax assessments, to additional (reduced) municipal expenditures on goods and services within the community, purchases of goods and services outside the community, or some combination of these. Employment and community member income impacts would differ, depending on which of these ways, or which combination of these ways, the tax revenues influenced spending patterns. More information about shared fisheries taxes may be found in Sub-section 8.2.11.

[51] As explained in Section 10.6, the analysis in this section is not a cost-benefit analysis, and is not provided as an input into a cost-benefit analysis.

[52] For example, the F/T *Ocean Peace* employs 7 to 9 persons in its home office (Gleason 2010). These, and the office employees of other fishing firms, will be treated as indirect employment in this discussion.

Induced effects are those generated in an economy when people receiving income from fisheries—through shares or wages, profits, or royalties—spend their money on things like groceries, gas, cars, car repairs, rent, home repairs, home construction, insurance. As the preceding descriptions suggest, these effects can be either positive (increases in direct, indirect, and induced economic activity in the economy of interest) or negative (loss of economic activity in the subject economic unit, e.g., village, community, region).

It is customary to think of these impacts in terms of *multipliers* showing the total employment and income impacts of changes in direct sector jobs, or of direct sector income, as the direct income circulates. Multiplier estimates for Alaskan local economies are typically lower than those for other regions of the nation, because they import a large proportion of the goods and services that are used there, and a large part of the fishing labor force in the Aleutian Islands is seasonal, transient, and from outside Alaska.[53] In general, the smaller the region or community economy examined, the smaller the multiplier, since more goods and services would be purchased from sources outside of the subject economy.

The use of a simple income and employment multiplier analysis assumes that prices and productivity in a community remain unchanged by changes in the size of the community and the scale of production. However, community growth may make it possible for firms to obtain inputs at lower prices, or may contribute to an increase in the productivity with which inputs may be used.[54] Lower input prices, or greater productive efficiency, could then themselves contribute to additional community growth.

For example, a larger community may be able to afford a larger fixed investment in power infrastructure, possibly allowing it to provide power at lower incremental costs, or increasing the reliability and the productivity of the power supply. In a larger community, individuals may have more opportunities for child care, and be less liable to miss work due to sick children. This could increase worker productivity. Increased income, and increased transient and permanent populations, may also create increased demand for and ability to support amenity infrastructure (such as swimming pools or playgrounds). These may also reduce the cost to local firms of attracting employees. A larger market may provide economies of scale, and increased competition, possibly leading to lower prices. Increased economic activity at Adak associated with more port visits by vessels fishing Atka mackerel, Pacific cod, and pollock, or larger deliveries of Pacific cod and pollock for processing, could contribute to lower costs of production, or higher productivity in the production of other species, or allow economies of scale with respect to non-fishing activity, such as airport passenger and air freight services.

However, none of this is certain, this is a complex issue, and we have little information about how these considerations may affect development in communities such as those under consideration here. It is not clear how important these types of growth enhancing factors may be in affected communities as a result of the alternatives under consideration. For example, while increased deliveries of Pacific cod to Adak in the spring may be associated with reduced annual average costs of air passenger service to Adak, or of processing fish at the processing plant, and may reduce average costs within the A-season, they may not have effects that carry over from one season to another within a year. Air service that may be viable in March during the Pacific cod trawl fishery, may or may not be viable in August. Similarly, fish processing may be economically viable in March but not August. In 2013, the fish processing plant

[53] This is, by-in-large, based upon anecdotal information, because good statistics for crew place-of-residence are not available.

[54] The literature on urban and spatial economics refers to these as "agglomeration economies." Agglomeration economies may be "pecuniary" when an increase in community size reduces the costs of inputs, or 'technical" when an increase in community size increases input productivity.

operated by Icicle Seafoods in Adak was scheduled to close for the summer "due to the high operating costs during the slower summer months" (NPFMC 2013a: 19).[55]

Background information on the relevant communities defined for this analysis (Adak, Atka, Unalaska, Other Alaskan Communities, Pacific Northwest, CDQ communities, and Aleut Corporation shareholders) may be found in Sub-sections 8.2.7 (CDQ), 8.2.8 (Aleut Corporation shareholders), and 8.2.9 (Subsistence) of this chapter, and in Chapter 10, which evaluates community social impacts.

A note on employment impacts

A preliminary review of data on weeks with landings for vessels that operated in 2010 in the fisheries that were regulated by the interim final rule does not preclude the possibility that the interim final rule led to large employment declines, but does not support the hypothesis either.

Both income and employment are important dimensions of impacts on individual persons. This discussion about employment does not have implications with respect to the changes in income for the persons employed, and in fact these may not move tightly together. For example, a fishing firm facing reduced revenues may continue to employ the same numbers of people, but they may each receive smaller crew shares.

Table 8-47 provides information on weeks of fishing activity for four groups of vessels. The groupings used reflect the sectors used elsewhere in this analysis, but also differ from them somewhat. Trawl catcher/processors are examined in two groups: the seven Amendment 80 catcher/processors that dominate the Atka mackerel fishery, and the other vessels (Amendment 80 and others) that target Pacific cod. Additionally, both trawl and non-trawl catcher vessels have been grouped together.

The table summarizes information for the vessels in each sector that were fishing in 2010, the year before the interim final rule became effective. It shows the total weeks fishing all groundfish off of Alaska by these vessels in 2009, 2010, 2011, and 2012. The weeks fishing have been multiplied by average crew sizes from Table 8-17 to provide estimates of the number of person-weeks of fishing employment in each year. Finally, to enhance the meaningfulness of the numbers, and comparability, the fishing employment has been reframed as annual-equivalent jobs (AEJs), by assuming an annual job is 48 working weeks.

These are very rough estimates of vessel activity over the course of the year. They do not include activity as tenders, or fishing in non-groundfish fisheries; they do not include transit time, or time in port. A week is included whether the vessel was fishing one day or seven days. Many factors other than the interim final rule could have affected weeks spent fishing (examples include, but are not limited to changes in TACs, prices, PSC levels, or other structural changes in the fisheries, such as the development of the freezer-longline fishing cooperative). The estimates are offered as a preliminary index of activity by these vessels, pending further research.

The results do not indicate reduced levels of activity by the sectors. The number of Atka mackerel annual-equivalent jobs declines somewhat in 2011 from 293 to 276, but then increases above the 2010 levels to 295 in 2012. Similarly, the number of Pacific cod trawl catcher/processor annual jobs drops somewhat in 2011, before rising above the 2010 level in 2012. The non-trawl catcher/processor annual jobs rose considerably in 2011 and 2012. This may be due to rationalization following the formation of a cooperative among the freezer-longliners in the second half of 2010, a provision in the interim final rule

[55] This is mentioned for illustrative purposes. Later in Spring 2013, Icicle Seafoods decided to cease operations at Adak completely. At the end of 2013 the firm Adak Cod Cooperative LLC planned to operate at Adak. (Shedlock 2013).

that altered fishing seasons so as to allow the freezer-longliners to fish a greater part of the year, or an increase in BSAI Pacific cod TACs in 2012. Finally, catcher vessel groundfish annual jobs also increased slightly in 2011 and 2012.

These results do not preclude a reduction in weeks fishing in the Aleutian Islands, but they strongly suggest that vessels active in 2010 responded, at least in part, to the interim final rule by redeploying and fishing more weeks in other groundfish fisheries.[56] These results do not preclude adverse employment impacts from the interim final rule; they are simple approximations of employment, only look at one component of firm employment, do not look at non-groundfish fishing functions, do not look at indirect or induced employment, and do not compare employment to an explicit counter-factual in which the interim final rule had not become effective. As noted above, they do not address changes in income for the persons employed. The only implication is a limited one: they do not appear to provide evidence for the hypothesis that the interim final rule led to large reductions in direct employment in the sectors directly regulated by the action. In 2011, employment dropped by 6 percent and 4 percent in two sectors, but rose in two others; in the second year, employment rose to levels exceeding 2010 levels in three of the sectors (although dropping below 2010 levels in the fourth sector after having risen above 2010 in 2011).

Table 8-47 Estimated annual-equivalent years of groundfish fishing on vessels active in 2010 in fisheries regulated by the interim final rule during the following year

Year	Weeks	Average crew	Total weeks	AEJs	Weeks	Ave crew	Total weeks	AEJs
	Atka mackerel trawl C/Ps				**Pacific cod trawl C/Ps**			
2009	248	56	13,786	287	170	56	9,450	197
2010	261	54	14,047	293	178	54	9,580	200
2011	256	52	13,248	276	179	52	9,263	193
2012	263	54	14,157	295	194	54	10,443	218
	Non-trawl C/Ps				Catcher vessels			
2009	325	19	6,269	131	335	4	1,464	30
2010	317	19	6,102	127	339	5	1,539	32
2011	344	20	6,835	142	362	4	1,586	33
2012	313	19	5,906	123	418	4	1,831	38

Notes: Vessel weeks are weeks of groundfish fishing in the designated year for vessels active in the Aleutian Islands fisheries in 2010 (the year before the interim final rule became effective). These estimates do not include weeks spent in non-fishing activity (transit, tied-up), in non-groundfish fishing, and, for catcher/processors, weeks spent operating as a mothership, but not fishing. Annual equivalent jobs are estimated assuming a 48-week work year. Sectors defined somewhat differently than in remainder of this analysis: trawl and non-trawl catcher vessel sectors group; trawl catcher/processors broken out into seven key Atka mackerel vessels, and other catcher/processors.
Source: Vessel weeks AKR CAS. February 20, 2013. Average crew from Table 8-17.

An alternative approach, using EDR data available from the Amendment 80 vessels targeting Atka mackerel in the Aleutian Islands, provides some confirmation for this last conclusion that this general approach does not provide evidence for a large amount of job loss, and hints at some of the complexities missing from the analysis.

[56] The 2010 EA accompanying the interim final rule included estimates of the employment impacts of this action based on the use of an impact model developed at the Alaska Fisheries Science Center. (NMFS 2010b, Section 10.7.2) This model estimated employment impacts by extrapolating from changes in gross revenues. This analysis has not been updated for this EIS, however, because this preliminary analysis of annual equivalent job impacts raises questions about the application of the model in this instance.

The EDR reporting provides information on the number of days a year a reporting vessel was inactive, and the average crew size of the vessel during the year. Assuming that active days are equal to 365 minus the number of inactive days, that each seven days constitutes a week of activity, and that there are 48 weeks of activity per vessel a year, it is possible to compile an AEJ index for these vessels. This alternative approach to estimating AEJs is based on different data and a different methodology. This methodology (starting from a number of days and dividing by 7 to determine a count of weeks) may have shortcomings of its own. Given the differences in the approaches, the estimated AEJs do not appear to be very different. The results are summarized in Table 8-48.

The results for this fleet sector, the seven trawl catcher/processors targeting Atka mackerel, are similar. These data do not suggest a large decline in direct employment in this sector. This data set does make it possible to compare the results for the Atka mackerel vessels with other vessels in the Amendment 80 fleet. AEJs in both fleets rose from 2010 to 2011, but the percentage increase for the other Amendment 80 vessels was higher than that for the Atka mackerel vessels. This raises the question of whether or not employment in the Atka mackerel fleet might have grown at a similar rate in the absence of this action. This is not a question that can be answered without additional research.

Table 8-48 Estimated annual-equivalent years of activity by Amendment 80 vessels from 2008 through 2011

Year	Average reported Inactive days	Estimated average active days	Average reported crew sizes	Number reporting vessels	Estimated person-weeks fishing	Estimated AEJs
Amendment 80 Atka mackerel vessels						
2008	101	264	53.29	7	14,045	293
2009	126	239	47.57	7	11,356	237
2010	114	251	49.29	7	12,364	258
2011	108	257	49.00	7	12,593	262
Other Amendment 80 vessels						
2008	85	280	29.70	15	17,841	372
2009	98	267	31.40	15	17,961	374
2010	100	265	24.40	15	13,877	289
2011	79	286	26.10	14	14,948	311
Notes: based on EDR data supplied by the AFSC; AKR estimates.						

8.2.13 Product markets

Almost all the supply of Atka mackerel in the United States originates in the Aleutian Islands. Industry sources indicate that larger Atka mackerel bring higher prices than smaller Atka mackerel, and that the size of Atka mackerel in harvests tends to increase as fishing moves from west to east along the Aleutians. Thus, Atka mackerel from Area 541 are likely to bring higher wholesale prices than Atka mackerel from Area 543.

Since most Atka mackerel is believed to be exported to consumer markets in East Asia, and relatively little is said to be consumed in the United States, the reductions in the harvest of this species projected in this analysis would have little impact on U.S. consumers' surplus. Since a Regulatory Impact Review cost-benefit analysis is required to focus on impacts experienced by U.S. domestic consumers, the relevant consumers' surplus impact of the reduction in Atka mackerel supplies is probably close to zero.

Most domestically-produced Pacific cod fillets are destined for the domestic market for use in the foodservice industry. However, Pacific cod harvested in Alaska groundfish fisheries and processed as headed-and-gutted is ultimately exported. While a change in consumers' surplus in foreign markets does not enter into the cost-benefit calculations in an economic analysis from a national accounting perspective, the change in U.S. markets does. (Fissel et al. 2012a)[57]

Industry sources note that the size distribution of Pacific cod in the Aleutian Islands is skewed towards larger fish than are available in the Bering Sea. The F/V *Katie Ann*, which has targeted Pacific cod in the Aleutian Islands on her own behalf, and which has accepted deliveries from catcher vessels targeting Pacific cod, has served a U.S. market of restaurants serving fish and chips. In 2010, representatives of the F/V *Katie Ann*, and of Ivar's, a chain of 60 restaurants in the Pacific Northwest, indicated that Ivar's used Pacific cod from the F/V *Katie Ann* for most of its fish and chips product, citing the large size of the fish, and the resulting quality of the product. The large size of Pacific cod from the Aleutian Islands may limit its substitutability with other products (Donegan 2010; Jacobs 2010; Jacobs, personal communication, August 24, 2010[58]). If access to this source of Pacific cod was limited by an alternative under consideration in this action, firms selling products whose quality depends on the size of the fish would be likely to substitute alternative and less desirable sources of whitefish, leading to a possible loss in domestic consumers' surplus; conversely, if a change in regulations increased the availability of larger, higher quality, fish, consumers' surplus might be increased.

Markets for BSAI pollock fillets and surimi exist in the United States. Aleutian Islands pollock are believed to have relatively large egg sacs. The market for this roe is in Japan and Korea and not to any great extent in the United States (Fissel et al. 2012)

Fisheries off Alaska appear to account for most or all of the world production of rock sole and yellowfin sole. The rock sole fishery has been, predominately, a roe fishery. In the past, most male rock sole were discarded because of their low value, but this is changing in response to the development of markets for male rock sole, and to changing management measures. In the past, most rock sole was exported to Japan, but Japanese imports have declined since 2004, possibly due to preference changes associated with generational change. Exports to China/Hong Kong, where the sole is filleted and re-exported to the United States, have risen considerably since 2004. (Fissel et al. 2012)

Whole round yellowfin sole is sold to South Korea for consumption there. Headed and gutted yellowfin sole are sold to re-processors in China and processed into individual skinless boneless fillets. Most of these are then re-exported to the United States and Canada to the food service market. Apparently increasing amounts of fillets are being exported to Europe or consumed in China itself. China evidently has an advantage in the relatively labor intensive process of filleting the relatively small fillets of the yellowfin. (Fissel et al. 2012)

While Asian markets are important for both rock sole and yellowfin sole, supplies also appear to find their way to the U.S. market. Thus, impacts on these fisheries may affect U.S. consumers' surplus.

[57] Specifically see the section titled "Alaska Groundfish Market Profiles 2008." By Northern Economics Inc., updated by Terry Hiatt and Ben Fissel, November 2012.

[58] Jan Jacobs. Director of Government Affairs, American Seafood Company.

8.2.14 "Revenue-at-risk" methodology

Key measures in the alternatives open or close Steller sea lion critical habitat in the Aleutian Islands to directed fishing for Atka mackerel, Pacific cod, and pollock. Fishing operations of different types are expected to respond to these changes in different ways, as they seek to minimize the costs of the altered regulatory constraints. For any given alternative, the actual fishing responses would vary from year to year, as circumstances change.

It would be desirable to have programming or simulation models, which would make it possible to project how these operations would respond, and how net measures of their returns would be affected, as this happened. While research on the spatial dimensions of vessel fishing activity, including in the North Pacific fisheries, is very active right now, it has not advanced to the point where it can be adapted to this analysis. Moreover, any such analysis would face difficult problems projecting the appropriate future environmental, technological, market, and regulatory conditions under which vessel responses should be assumed to take place.

Notwithstanding these considerable data limitations and model constraints, the analysts are required to use the "best available scientific data and commercial information" to evaluate the likely operational, economic, and social impacts attributable to each action alternative, relative to the baseline "No Action" alternative. Executive Order 12866 (Clinton 1993) expressly mandates that:

> "In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits **(including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity)**, unless a statute requires another regulatory approach." [Emphasis added]

Further guidance on preparation of regulatory impact analyses is found in the President's Office of Management and Budget Circular A-4 (Office of Management and Budget 2003). There, the analyst is advised that:

> "You need to measure the benefits and costs of a rule against a baseline. This baseline should be **the best assessment of the way the world would look absent the proposed action… It may be reasonable to forecast that the world absent the regulation will resemble the present.** If this is the case, however, your baseline should reflect the future effect of current government programs and policies." [Emphasis added]
>
> "In unusual cases where no quantified information on benefits, costs, and effectiveness can be produced, the regulatory analysis should present a qualitative discussion of the issues and evidence."
>
> "Your analysis should also present information on the streams of benefits and costs over time in order to provide a basis for assessing intertemporal distributional consequences, particularly where intergenerational effects are concerned."
>
> "If fundamental scientific disagreement or lack of knowledge prevents construction of a scientifically defensible probability distribution, **you should describe benefits or costs under**

> **plausible scenarios and characterize the evidence and assumptions underlying each alternative scenario.**" [Emphasis added]

Consistent with the foregoing regulatory mandates, and in the absence of more sophisticated tools, we provide as background information estimates of the volumes of historical harvest, and the corresponding gross revenues, associated with areas variously under consideration for openings and closures under the different alternatives. These estimates of the historical volumes of fish and of the associated fishing gross revenues that came from those waters under consideration for closure are referred to as harvest, or gross revenues, "at-risk." Historical volumes of fish or associated fishing gross revenues that came from waters that would remain open to fishing under an alternative are referred to as "residual" harvest or revenue.

This calculation of volumes of fish that came from within the closed areas is based on estimates made using the Alaska Region's Catch in Area (CIA) Database. This, in turn is based on the Alaska Region's Catch Accounting System data, modified by algorithms developed to allocate catch to areas with a fine spatial scale. The Council's SSC has reviewed the methods underlying the CIA. Catches from closed areas were monetized using annual species price information derived from the Alaska Fisheries Information Network and converted into real, inflation-adjusted dollars.

These descriptions of historical catch and associated gross revenues are not statistical estimates of the impacts that would necessarily occur under each alternative. They are, however, representations of "plausible scenarios," based upon the best available data and information, as "characterized (by) the evidence and assumptions underlying each alternative scenario," described throughout this economic analysis. If these alternatives had been in place during the baseline years, actual residual harvests and revenues would likely have been substantially different than the harvest or revenues from the areas that would have remained open, as in reality fishing operations would redirect efforts to optimize economic returns under the new circumstances; decreasing, at least to some (unknown) degree, the potential loss of harvests and revenues that would have otherwise been associated with the areas closed, had the alternative been in place. Nevertheless, this empirically based information, if appropriately employed and sufficiently qualified, may be useful in defining "plausible scenarios" that allow discussion of the possible relative impacts across different fishery sectors, were these alternatives to be put in place in future years.

The specific baseline years chosen were selected based on a balance of considerations: (1) did NMFS have data for the year with a sufficiently fine spatial resolution that it was possible to estimate the species production that came from the, frequently complex, areas defined for protection; (2) was there production from within the critical habitat that would be closed by the alternatives; (3) did the years occur before the introduction of the interim final rule; (4) did the years capture important elements of the current regulatory structure; (5) was there a reasonable consistency of management structure during the years considered. Not all of these conditions could be met perfectly for any set of years, and the baseline years chosen represented a balancing of these considerations. The baseline years for Atka mackerel and Pacific cod alternatives are 2004 through 2010. The baseline years for pollock alternatives are 2005 through 2012 (although lack of fishing within critical habitat, and a consequent inability to make estimates of pollock production inside of critical habitat during these years, reduces the utility of the pollock baseline).

While the baseline is relevant for describing the changes in activity, revenues, and costs that plausibly may have been associated with the alternatives (with the limitations noted above), other information from non-baseline years has been used in the analysis where appropriate. For example, ABCs from 1991 through 2014 are used to create estimates of the potential range of Aleut Corporation pollock allocations under the alternatives, and observed harvests from 1991 through 1998 are used to estimate the potential for pollock production in critical habitat.

The selected baseline years do have several drawbacks. One is the inevitably limited range of environmental variability that can be observed over a 7-year period. A corollary of this is the relatively limited range of Council species specifications (ABCs and TACs) that can be included. Secondly, there were important regulatory changes, even during this 7-year period, so that the years do not provide a consistent regulatory background. Important regulatory changes during this period include Amendment 80, which restructured the important non-AFA groundfish fishery (and affected Atka mackerel and Pacific cod), and Amendment 85, which allocated BSAI Pacific cod among user groups. A third drawback is that the institutional framework for the baseline years will only imperfectly represent the future regulatory structure. For example, the freezer longline sector's cooperative became fully inclusive in August 2010, at the end of the baseline period. Thus, while the baseline years would not be affected by this measure, future non-trawl catcher/processor fishing will be. As another example, the Council has recommended separate Aleutian Island and Bering Sea Pacific cod ABCs in 2014 and 2015. This did not affect the baseline years, but may affect impacts of the alternatives in future years.

Given these considerations, it is clear that estimates of residual revenues and at-risk revenues contained in this analysis are not, and cannot be, projections of these values in the future if one or another of the alternatives were adopted. Even if these could be forecasted with pinpoint accuracy, the at-risk and residual estimates do not provide a complete picture of the catch and gross revenue impacts on the several fishing fleets active in this area. They do not capture price changes that may be associated with, and offset some of the revenue impact of, changes in harvest.

In addition, they do not capture behavioral changes by vessel operators. Operators will respond to the fishing area restrictions by redeploying their vessels, in an effort to offset the burden of the action, and minimize the costs of any new restrictions. It may be possible for them to redeploy from closed areas to open areas in the Aleutians, increasing harvest in those open areas to offset lost harvest in the closed areas. If so, the at-risk and residual harvest and gross revenue will be poor guides to the actual impacts in the Aleutians themselves, and actual harvests will be higher than the reported residual harvests. More broadly, fishing operations may redeploy to new fisheries in new areas of the Bering Sea, Gulf of Alaska, or the Pacific Northwest. This possibility is not captured in the residual revenue methodology. NMFS has supplemented the revenue-at-risk analysis with additional information and analysis, particularly with respect to the potential redeployment of fishing fleets as they seek to offset adverse impacts of the proposed alternatives by becoming more active in other fisheries.

These measures also have important limitations as measures of the welfare impacts of the alternatives. They are gross measures and do not take account of changes in variable costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues, minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). However, data with which to estimate these welfare measures are not available because necessary industry cost information is not available. Because the measures presented in this analysis assume no reaction by the regulated entities to minimize the costs to them of the action they represent, in a sense, a 'worst case' scenario.

Given these known limitations and potential short comings, the at-risk and residual catches and revenues from areas that would have been closed or open under a given alternative, had that alternative been in place during the baseline years, will be interpreted as a first approximation of the relative impact of the action on the directly regulated fleets during the baseline years. They have been supplemented by qualitative discussions of the redeployment alternatives available to the directly regulated fleets, and other factors which may cause the gross revenue measures to deviate from more appropriate welfare measures.

During the baseline years, vessels chose to fish in certain spatial patterns. Operators that fished inside open critical habitat, or outside of critical habitat, did so presumably because they believed this behavior

would maximize profits, *ceteris paribus*. Alternatives that leave open areas with relatively larger amounts of harvest during the baseline years, leave open areas that were relatively more attractive to fishermen during that time. Alternatives that would close areas that represented substantial proportions of total harvests and revenues for the baseline years are assumed, all things being equal, to result a lesser relative (but quantitatively unknown) ability of the fleet to fully offset the potential loss of whatever revenues would be otherwise associated with those same areas today.

To some extent, these fisheries may lend themselves to this approach more than some others, (abstracting from the ability of these fleets to redeploy outside the Aleutian Islands) because of the localized nature of the fisheries in time and/or space. Atka mackerel are habitat specific and aggregate in certain locations; non-trawl fisheries for Pacific cod are spread through the Aleutian Islands, but take place from three to ten miles from shore because of the depth strata they exploit; trawl fisheries for Pacific cod primarily take place over about 10 weeks in the late winter and early spring in specific locations; a new pollock fishery will be an A-season roe fishery, and the available observer data from the 1990s suggest that it was relatively concentrated at a few locations; protection of habitat areas of particular concern also limit potential redeployment of vessels using non-pelagic trawl gear to target Atka mackerel and Pacific cod within the Aleutian Islands. More details, including maps showing the locations of historical catches, can be found in Chapter 3.

Given these concerns, estimates of residual revenues under each alternative have been used as a rough index of the relative operational and gross economic burden each alternative would have placed on fleet sectors during the baseline years and, by implication, a "plausible scenario" of the relative burden that may accrue, if a particular alternative is adopted under this proposed action. It is worthy of note that, because there are so many factors that enter into an estimate of impacts under such uncertain circumstances, the resulting ordinal ranking of alternatives could possibly change, were that missing information available. That is, it's not necessarily true that the ranking of alternatives on the basis of gross revenue at risk corresponds to the "true" impact on industry or on net benefits. Furthermore, even if one agrees that the ordinal rankings are correct, an ordinal index does not provide insight into the relative scale of attributable impacts, That is, an ordinal ranking says nothing more than, for example, Alternative A appears to be preferred to (i.e., "better" than) Alternative B on the basis of the criteria selected. It tells one ***nothing*** about "how much better" Alternative A is than Alternative B (e.g., Alternative A has X percent fewer adverse economic impacts than Alternative B). This is an important caveat.

Notwithstanding this acknowledged shortcoming, NMFS and the Council have used "revenue-at-risk" analysis to evaluate proposals for spatial closures. This approach, or very similar approaches, have been used in the Alaska Region, including in the Supplemental Steller Sea Lion EIS in 2001 (Appendix C) (NMFS 2001), the Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska of 2005 (Appendix C) (NMFS 2005a), and the 2010 Steller sea lion protection measures EA (Chapter 10) (NMFS 2010b). The Council's SSC endorsed the proposed methodological approach to Chapter 8, including the use of revenue-at-risk analysis in October 2012, subject to the qualifications that have been discussed in this section (Section 8.20).

A difference-in-differences analysis was considered as an alternative to the revenue at risk analysis. A difference-in-differences analysis exploits natural experiments with two similarly situated groups, a control and a treatment group, where the treatment group was subjected to some external impact that was not felt by the control group. The treatment and control groups are then compared with respect to how outcomes of interest changed for each. The "differences" are the changes in the outcome of interest for each group, and the "difference" is the difference between these changes. Under the right circumstances both groups are subject to the same set of "background" conditions, and the difference in their differences may be interpreted as a result of the impact. In the Aleutian Islands, for example, if half of the hook-and-line catcher/processors had been subjected to the closures and half had not, one might compare average

gross revenues for the two groups in the year before and the year after the effective date of the interim final rule to look for the impact of the rule. A simpler analysis, proposed in public comments on the draft EIS, that simply looked at the changes from the period before the interim final rule, and the period after, a "before-after" methodology, lacked the control group element present in the difference-in-differences approach.

However, NMFS determined that this approach, and by implication the before and after methodology, did not lend itself to analysis of the interim final rule for several reasons: (a) the analysis addressed five alternatives, not simply the interim final rule and a return to 2010 (essentially Alternative 4); (b) control groups were not available: all Aleutian Island vessels of a certain class were subject to the same impact and vessels fishing outside of the Aleutians were not considered a suitable control group due to the possibility of selection bias (that is, there were reasons some vessels were active in the Aleutian Islands and some were not); and (c) a comparison of events in two years would focus on too few years of experience. Although the analysis was primarily based on the revenues-at-risk approach, supplemented with a qualitative analysis of redeployment, "before and after" analyses were occasionally used to supplement the revenue at risk analysis.

8.2.15 Gross revenue estimates

Gross revenue estimation methods differed between the background tables of Section 8.2, and the analytical tables included in Sections 8.3 through 8.12. The tables were prepared by different agencies, using somewhat different methodologies. The different methodologies reflected different purposes; the analytical tables had to be constructed to allow them to be manipulated to prepare different revenue estimates for the different levels of production associated with the different alternatives, the tables in Section 8.2 did not have to serve this function. The following paragraphs discuss the ways revenues were estimated for (a) catcher/processors, (b) catcher vessels at the ex-vessel level, and (c) processor first wholesale value of catcher vessel production.

Catcher/processor wholesale values. Wholesale catcher/processor gross revenue estimates in the Section 8.2 background tables are based on BSAI-wide prices derived from Commercial Operator's Annual Report (COAR) data, and on Aleutian Island product volumes derived from Weekly Processor Report (WPR)[59] data. Catcher/processor wholesale prices for different processor-species-product combinations are estimated as the COAR-based Product Price Index (PPI).[60] The COAR-based PPIs are matched to the WPR volumes using an algorithm that first attempts to match processors, species, and products, then progressively moves through coarser aggregations until all products in the WPR have an assigned price. Catcher/processor gross revenues, equal to the sum of the products of all matched prices and volumes, are estimated separately for catcher/processors using trawl gear, and catcher/processors using non-trawl gear. (Fey, personal communication, April 15, 2013) [61].

A different procedure was used to calculate wholesale catcher/processor gross revenues in Sections 8.3 to 8.12, where the value of production in the baseline years from open and closed fishing areas was also estimated for multiple alternatives. The prices, in these later sections, were at-sea round prices calculated from estimates of the COAR-WPR-based wholesale gross revenue estimates for different species and gear

[59] The WPR data are now submitted daily.

[60] The PPI was developed by the Gross Earnings Workgroup, a collaboration between the Alaska Fisheries Science Center (AFSC) and the Alaska Fisheries Information Network (AKFIN). The PPI was originally created by AFSC for use in the Economic Stock Assessment and Fishery Evaluation Report (SAFE) and had been used for many years. In 2011, the process was vetted by the workgroup and replicated by AKFIN with minor changes.

[61] Michael Fey. Data manager, Alaska Fisheries Information Network, Anchorage, Alaska.

types, and inferences from WPR product data and product recovery rates, on the round weight of total purchases of those species by vessels of the appropriate gear type. Thus, gross revenues for a particular species, as calculated above, would be summed across all catcher/processors and product types, and divided by the round weight of purchases of that species (also from the WPR). While the word "price" is used here for these "values per metric ton round weight," they do not represent specific prices paid for a product at the wholesale level, but are a wholesale value applied to round weight to reproduce an estimated wholesale gross revenue for all products produced by that round weight (Fey, personal communication, April 15, 2013). Total gross revenues in Sections 8.3 to 8.12 were then estimated as the sum of the products of these prices and of volumes of production from inside and outside Aleutian Islands closed critical habitat derived from the NMFS Alaska Region's Catch in Area (CIA)[62] database (Lewis, personal communication, April 15, 2013)[63].

While the background tables in Section 8.2 and the analytical tables in Sections 8.3 to 8.12 were based on the same estimates of wholesale prices, they are based on somewhat different measures of fishery production. Section 8.2 wholesale revenues apply the prices to production derived from WPR reports, while Sections 8.3 to 8.12 apply the prices to production derived from the CAS. WPR estimates of production can diverge from CAS estimates, thereby generating somewhat different estimates of total wholesale revenues. Several data inputs are used to generate the CAS estimates, including WPR information, observer information, and eLandings information. The CAS system estimates are NMFS's official record of catch.

To better understand the differences, NMFS examined differences between Aleutian Island total wholesale gross revenue estimates from the two sources, creating an index equal to the average of the absolute difference in gross revenues between the estimates, divided by each of the two estimates. Out of 21 observations on catcher/processors (seven baseline years, and three sectors – trawl Atka mackerel, trawl Pacific cod, and non-trawl Pacific cod), this index reached 10 percent three times, and reached 18 percent one time – for non-trawl catcher/processors in 2006. As noted above, however, the difference is due to production, not price estimates, and the analytical sections from 8.3 to 8.12 are based on the NMFS official record of catch.

Ex-vessel values. Ex-vessel gross revenue estimates in Section 8.2 are based on price data prepared by the Alaska Commercial Fisheries Entry Commission (CFEC) and on harvest data from the CAS. The CFEC prices are based on a mix of information on prices from the COAR, and from State of Alaska fish tickets. For this project, these are averaged at the species, target fishery, and Aleutian Islands or Bering Sea levels. Volumes of production of a species in a target fishery are aggregated across vessels and then priced using the most appropriate average prices. Gross revenues are aggregated across gear types to report revenues by trawl and non-trawl gears (Fey, personal communication, April 15, 2013).

Ex-vessel gross revenues in Sections 8.3 to 8.12 are estimated in a similar way. Prices are calculated for trawl and non-trawl vessel classes by dividing total gross revenues for trawl and non-trawl gear, by the total volume harvested by each sector (from the CAS). (Fey, personal communication, April 15, 2013) Gross revenue estimates are then made by summing the products of these prices (in dollars per metric ton round weight) and relevant estimates of metric tons round weight associated with open and closed critical habitat under different alternatives (Lewis, personal communication, April 15, 2013).

[62] The CIA data are a subset of NMFS Catch in Area data set, but one providing a finer spatial breakout of the data.
[63] Steve Lewis. Geographical Information Systems Coordinator, Alaska Regional Office, NMFS.

Because background summary tables in Section 8.2, and analytical tables in Sections 8.3 to 8.12 were calculated using the same CFEC prices, and the same catch information from the CAS, these tables show minor differences.

Wholesale value to processors of catcher vessel deliveries. A somewhat different approach was used to prepare estimates of the wholesale gross revenues received by processors for fish delivered by trawl and non-trawl catcher vessels.[64] For these deliveries, both the background tables in Section 8.2, and the analytical tables in Sections 8.3 to 8.12, were calculated in the same way.

The wholesale prices received by processors for these deliveries are based on values per metric ton round weight used by the Alaska Fisheries Science Center to prepare Table 27 in the Center's annual groundfish economic SAFE report. These are BSAI-wide prices, and are not differentiated by gear type. These prices have a long history of use in the Alaska Region. Total wholesale gross revenues were estimated by matching[65] these BSAI species or species-group specific prices with estimates of the metric tonnages in the Aleutian Islands subarea, multiplying prices and quantities, and summing across species. Prices are weighted averages of the processor wholesale prices for mothership and shoreside deliveries; the weights are the proportions of the species being delivered to each category of processor.

NMFS considered using an approach to estimating processor wholesale values for shoreside deliveries that paralleled that used for estimating catcher/processor wholesale values. In this instance, COAR prices and eLandings Production Report (ELPR) volumes would have been used to estimate total wholesale gross revenues. The ELPR product data, and product recovery rates, would then have been combined to estimate the associated round weight of production. Dividing the total gross revenues, by the total round weight of production, would have generated the processor first wholesale values per metric ton round weight. However, value estimates generated by this process differed considerably from other prices used in the analysis. Because of increased consistency among price series, because the AFSC prices have a long history of use in the groundfish economic SAFE document, and following expert advice from AKFIN, the current procedure was used. (Fey, Lewis, NMFS In-season management, personal communication, 2013)

Because of the approaches used here, there are no differences between baseline wholesale revenue estimates in the trawl catcher vessel background tables in Section 8.2, and trawl catcher vessel estimates in Sections 8.3 to 8.12.

Regional price variation

Industry sources report that there is regional price variation in Atka mackerel and Pacific cod prices. For example, there is a tendency to find larger and more valuable Atka mackerel in Area 541, with average size and value decreasing with a movement west through Areas 542 and 543. There can be other, more

[64] This applies to catcher vessels making deliveries of Pacific cod shoreside and to motherships. Catcher vessel deliveries of Atka mackerel to motherships are treated as discussed in the section on catcher/processor wholesale values.

[65] The "matching" work behind Sections 8.3 through 8.12 was not trivial. Here is a more detailed discussion of the procedure. For the analysis in Sections 8.2 through 8.12, prices were prepared at the ex-vessel level, and at the first wholesale level (separately for at-sea processors and for shoreside processors). Prices were obtained from AKFIN or the AFSC and were uploaded into the system by agency species code, subregion, and gear type. All retained groundfish species were covered in the price update process. After the first set of updates, fields with missing price\ton values were updated only by species group code, subregion, and gear type. A final iteration updated any missing price\ton values based on species group code and gear type only. Only ex-vessel and at-sea wholesale prices were categorized by gear type; gear breakouts were not available for shoreside wholesale prices. Ex-vessel prices were Aleutian Islands prices for trawl and fixed gear, reflecting the fact that most of the catcher vessel retained catches were made by trawl catcher vessels. At-sea wholesale prices were Aleutian Islands prices for trawl and fixed gears.

localized, price variations; for example, within Area 542 fish are said to be smaller and to bring a lower price on the Petrel Bank, outside critical habitat, than inside critical habitat (Gauvin, Swanson, Kercheval, personal communications).[66] Fishing industry sources in the trawl and in the non-trawl sectors also report that Aleutian Islands Pacific cod tend to be larger than the Pacific cod taken in the Bering Sea, and that they bring higher prices for this reason.[67] (Jacobs, Hosmer, Magnuson, personal communications, August and September 2010).[68]

Observer data on Atka mackerel weights confirm that fish in easterly catches tend to be larger than fish in westerly catches. The mean of the average weights from the years 2004 through 2012 in Area 543 is 0.52 kg; the average drops somewhat in Area 542 to 0.47 kg; however, the average weight then begins to increase, rising to 0.75 kg in Area 541, and to 1.14 kg in the Bering Sea subarea. (Observer data supplied by NMFS AKR In-season management staff).

Observer data also suggest that Aleutian Islands Pacific cod are larger than Bering Sea cod. Table 8-6 shows the average sizes of Pacific cod caught in the BSAI, as measured by observers, from 2004 through 2012, by management area and by gear type, and appears to show evidence of the size difference that industry sources indicate is associated with a price differential for hook-and-line and trawl gear. Size differences for pot gear are not as clearly defined. The size differential appears to be greater for trawl gear than for hook-and-line gear. The median average weight in a Bering Sea management area for hook-and-line caught Pacific cod was 3.27 kilograms, while the median size in the Aleutian Islands for this gear was 5.35 kg. The median average for pot gear in the Bering Sea was 3.79 kg., while the median in the Aleutian Islands was 4.03 kg. The median average for trawl gear in the Bering Sea was 2.37 kg., while the median in the Aleutian Islands was 7.92 kg.

Data on wholesale Pacific cod prices are only kept by NMFS at the FMP and at the annual-level. However, different vessels fish different amounts of their activity in different areas. For example, one vessel might fish 50 percent of its effort in the Aleutian Islands, another might fish only 10 percent in the Aleutian Islands, while another might only fish in the Bering Sea. Using variation in area-specific catch among these vessels, it is possible to econometrically test whether there is a price premium evident for vessels, based on how much they fish in the Aleutian Islands. However, an econometric analysis was unable to identify such a premium, for either the Amendment 80 or hook-and-line fisheries. In 2010, representatives of the trawl catcher/processor (and mothership) F/V *Katie Ann* indicated that she received a higher average price for her product in the Aleutian Islands than she would receive for Bering Sea Pacific cod (Jacobs 2010). The F/V *Katie Ann* was not included in the statistical analysis. Many different

[66] John Gauvin, Gauvin and Associates, Burien, Washington. Lori Swanson, Groundfish Forum, Seattle, Washington. Personal communications, August 9, 2010. Nancy Kercheval, President, Cascade Fishing, Inc. Personal communication, October 8, 2010.

[67] The value difference per pound round weight is reportedly created by a higher price for the products from the larger fish, and from improved product recovery from the larger fish. This can be illustrated with the following example, reported to be representative of prices in mid-September 2010. These fish are sold "headed and gutted" (H&G). Larger fish lend themselves to an H&G cut called "collar bone on" (CBO). Smaller cod are given a cut called a J-cut. CBO cut fish produce a 57 percent recovery rate, while a J-cut produces a 47 percent recovery rate. At the time the example was reported, the price FOB Unalaska for CBO cut Pacific cod was $1.80 per pound. Converting this into dollars/pound round weight ($1.80*.57) gives a price of $1.03. At that time, J-cut was selling for $1.50 headed and gutted. Converting this into dollars/pound round weight ($1.50*.47) gives a price of $0.70. The price differences reflect the different markets into which the Pacific cod of different sizes are directed. The larger fish is more likely to be shipped to Portugal and Norway for salting and then exported to Brazil to be rehydrated for use in a popular local salted fish dish called Bacalhau. Smaller J-cut fish are more likely to be sent for a different type of processing in Denmark, France, and Portugal, and then make their way to markets in Spain, Italy, and France. (Magnuson).

[68] Jan Jacobs, Director of Government Affairs, American Seafood Company, Seattle, Washington, personal communication, August 24, 2010, April 3, 2013; Chuck Hosmer, General Manager, M/V *Baranof* and M/V *Courageous*, personal communication, August 2010; Lance Magnuson, Blue North Fisheries, personal communication, September 16, 2010.

functional forms (e.g., with different starting years, with vessel and annual fixed effects) were evaluated. However, it should be noted that many factors that affect variation among vessels, and it is possible there is a premium for some vessels in some instances. The full regression results are confidential, because they are vessel-specific. (Dr. Alan Haynie, Economist, National Marine Fisheries Service, Alaska Fisheries Science Center, personal communication, October 15, 2010)

This EIS accepts, for the purposes of analysis, that the regional price variation, identified by industry sources, exists for Pacific cod and Atka mackerel. Industry sources tell a consistent story, with corroborating detail, and observer information about fish sizes appears to be broadly consistent with it. The statistical tests carried out in the case of Amendment 80 and hook-and-line Pacific cod did not confirm the existence of these variations, but these were not powerful tests. Regional variation in Atka mackerel and Pacific cod prices can have implications for the revenues associated with alternative actions to close different management areas, since the price of fish caught in different places may vary. Nevertheless, the existence, size, and variability of regional price differences for Atka mackerel and Pacific cod are not well understood and require further scientific investigation.

8.2.16 Aleutian Islands/Bering Sea Pacific cod split

In the three years before the effective date of the interim final rule (2008 through 2010) fishing firms harvested Pacific cod within limits set by BSAI sector allocations (for example, an allocation to the hook-and-line catcher/processor sector) that could be fished in either the Aleutian Islands or the Bering Sea.[69] A single set of Pacific cod harvest specifications (comprising an OFL, ABC, and TAC) applied to the Aleutian Islands and the Bering Sea jointly during these years. The sector allocations were percentage shares of the BSAI TAC, after modifications to account for CDQ allocations. Any part of a sector's Aleutian Islands Pacific cod harvest that might be precluded by SSL protection measures could be legally taken in the Bering Sea. This continued to be the case during the first three years the interim final rule was in effect (2011 through 2013).

A division of the BSAI Pacific cod harvest specifications into separate Bering Sea subarea and Aleutian Islands subarea harvest specifications had been under consideration for several years, when in December 2012, the Council's SSC announced that it would recommend separate harvest specifications starting with the 2014 fishing year (NPFMC SSC 2012, page 7). The SSC followed through in December 2013 and the Council adopted separate harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species.

While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Because sector allocations (except CDQ allocations) continue to be defined BSAI-wide, sectors remain free to redeploy from the Aleutian Islands to the Bering Sea to try and offset Aleutian Island production

[69] Amendment 85, which established this system of sector allocations, became effective in 2008 (72 FR 50788; September 4, 2007).

losses. However, not all sectors can do so fully if the Bering Sea TAC is fully utilized.[70] If the Bering Sea TAC would otherwise be fully harvested, a sector could harvest its entire BSAI Pacific cod allocation in the Bering Sea, only so long as it completed its harvest before other sectors harvested their entire BSAI Pacific cod allocation in the Bering Sea; if it did so, it would reduce the Bering Sea harvest available for other sectors. If the non-CDQ portion of the TAC in either sub-area is reached NMFS will close directed fishing for Pacific cod in that subarea. CDQ allocations are not transferable between the sub-areas.

Thus, vessels unable to harvest Pacific cod in the Aleutian Islands may not be able to offset Pacific cod harvest reductions with increased harvests in the Bering Sea, unless, through more intense competition, they are able to harvest Pacific cod that another vessel would have harvested. Rights-based management rules should provide opportunities to control intra-sectoral competition by Amendment 80, AFA, and freezer longline vessels. However, sector allocations may not control inter-sectoral competition.

Pacific cod trawl fisheries tend to take place in the winter and spring of the year (February to April are the key months), while fixed gear fishing is spread throughout the year. In general, trawl gear is unable to harvest its full allocation, leading to reallocations of unharvested Pacific cod allocations from trawl gear sectors to fixed gear sectors later in the year. If these patterns were to continue, trawl redeployment into the Bering Sea may reduce the size of reallocations to fixed gear.

Larger TACs in the Aleutian Islands, with larger potential foregone catches due to SSL protection measures, increase the possibility that one or both sectors would be unable to fully make up foregone Aleutian Islands harvest in the Bering Sea.

The Aleutian Islands and Bering Sea Pacific cod split may also reduce the impact of the SSL protection measures on Aleutian Islands Pacific cod production. The State of Alaska has authorized a GHL fishery for Pacific cod in the Aleutian Islands equal to 3 percent of the combined BSAI ABC. Prior to the split, this GHL was deducted from the entire BSAI ABC before sector allocations were calculated. Following the split, the entire GHL is now deducted from the Aleutian Islands ABC reducing the TAC of Pacific cod available for harvest in the Aleutians Islands.[71]

It is even possible that in some years an Aleutian Island-specific Pacific cod TAC, in combination with a deduction from the ABC for a GHL fishery, and a deduction for an ICA, may leave the Aleutian Islands TAC too small to permit a directed fishery. If an Aleutian Islands Pacific cod fishery were to be precluded by a combination of the Bering Sea-Aleutian Islands split, and the GHL and ICA, which are measures unconnected with the Steller sea lion action, the actual cost of the Steller sea lion measures in terms of foregone Pacific cod would be reduced.

In the short term, lost production may be limited by the low level of Aleutian Islands harvest specifications for 2014 and 2015. ABCs, set pursuant to a Tier 5 approach (75 percent of expected natural mortality) are 15,100 mt in each year. This ABC level is significantly smaller than the typical aggregate Federal plus state catch in any of the baseline years (2004 through 2010). The Aleutian Islands TACs in 2014 and 2015 (between about 6,500 mt and about 7,000 mt) are significantly less than Federal harvests during the years the interim final rule has been in effect (2011 through 2013). Trawl survey information suggests that Aleutian Islands Pacific cod stocks have been smaller recently than in prior

[70] It is possible that the Bering Sea TAC may not be fully harvested in a year. The BSAI TAC was not fully harvested in 2011, 2012, or 2013, years in which the BSAI TAC was large compared to TACs in other recent years. (Thompson 2013, page 272)

[71] In 2013, the Alaska Board of Fisheries also created a new Bering Sea Pacific cod GHL fishery, setting the GHL at 3 percent of the BSAI ABC. (Dischner 2013)

years (Thompson and Palsson 2013: Table 2A.6). It is not unreasonable to expect a reversion to the mean in the size of this stock. Moreover, as understanding of the stock improves, it is possible that the SSC will recommend ABCs based on a higher Tier, potentially producing less conservative ABC recommendations. In 2013, the analyst evaluated Tier 3 models, but these were not used for harvest specifications purposes. These factors may tend to increase the impact of the SSL protection measures on Aleutian Islands production.

The ultimate impact of the Pacific cod split will depend on policy decisions made by the Council and the Secretary. In the 10 years between the first year of the baseline period for this analysis (2004) and the last year prior to the Aleutian Islands-Bering Sea TAC split (2013), the BSAI Pacific cod TAC was only set equal to the ABC in two years (Thompson 2013, page 272). There may be scope for the Council to offset anticipated Aleutian Island production limits by setting the Aleutian Islands TAC less than the ABC, and the Bering Sea TAC equal to the ABC. The 2 million metric ton groundfish optimum yield is the sum of the BSAI TACs, so a decrease in the Aleutian Islands TAC, coupled with an equal increase in the Bering Sea TAC, would leave the aggregate BSAI Pacific cod TAC unchanged, and would not require reductions in TACs for other species so as to comply with the optimum yield requirement.

Currently, there are no provisions for the reallocation of Aleutian Islands Pacific cod TAC that would otherwise be unfished into the Bering Sea by in-season managers. Council and Secretarial action could create a framework in which such reallocations could occur in years in which the Bering Sea ABC was greater than the Bering Sea TAC.

8.2.17 Incidental catches[72]

Alternative 1, which prohibits the retention of Atka mackerel and Pacific cod in management area 543, regulates incidental catches as well as directed fisheries for those species in that area. Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock in management areas 541, 542, and 543 similarly regulates incidental catches. It is thus necessary to provide some description of incidental harvest of these three species during the baseline years. The other alternatives do not regulate incidental catches.

Incidental catches of Atka mackerel and Pacific cod in the trawl catcher/processor directed fisheries for those two species are included in the volumes of fish reported in Section 8.2.1, and this topic is not discussed here. This subsection focuses on non-trawl catcher/processors and catcher vessels, trawl catcher vessels, and trawl catcher/processors in directed fisheries for species other than Atka mackerel and Pacific cod.

Because Alternative 1 prohibits retention of Atka mackerel and Pacific cod only, while Alternative 6 prohibits retention of these species and pollock, the discussion is divided into three parts: (1) Atka mackerel and Pacific cod in Areas 541 and 542 together; (2) the same species in Area 543; (3) pollock in all three areas together.

In Areas 541 and 542, treated together, non-trawl catcher/processors and catcher vessels, and trawl catcher vessels targeting species other than Atka mackerel all took incidental catches (i.e., retained

[72] Under the MSA, incidental catch is defined as the unintended harvest and *retention* of a species that is not the target species. Under the BSAI and GOA Groundfish FMPs, bycatch is defined as the unintended harvest of groundfish species that are *discarded*.

catches) of either Atka mackerel and Pacific cod during the baseline years (2004 through 2010), and have continued to do so under the status quo.

- During the baseline years 17 separate fixed gear catcher/processors took incidental catches of either Atka mackerel or Pacific cod during 39 separate vessel-years of fishing activity. The vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest during the baseline years was about $19,000, about $3,000 per year, or about $500 per vessel-year of fishing.
- During these years, 62 separate fixed gear catcher vessels took incidental catches of these species during 169 separate vessel-years of fishing activity. These vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest was about $335,045, about $48,000 per year, and about $2,000 per vessel-year.
- During these years five separate trawl catcher vessels, owned by two separate companies, took incidental catches of these species during 17 separate vessel-years of activity. Because these vessels were operated by only two separate firms, data on fishing activity and revenues is confidential.

In Area 543, incidental catch activity was relatively limited. During the baseline years, one trawl catcher vessel, 14 non-trawl catcher vessels, and five non-trawl catcher/processors reported incidental catches of Atka mackerel and Pacific cod. Little can be reported about the single trawl catcher vessel because of confidentiality restrictions. The non-trawl catcher vessels made incidental catches in a total of 36 separate vessel-years, while the non-trawl catcher/processors made incidental catches in a total of nine separate vessel-years. Over all sectors and baseline years, incidental catches of these species totaled 154 metric tons, and had an estimated value of about $224,000, or about $32,900 per year, or $5,000 per vessel-year.

Pollock is taken as incidental catch by trawlers in the rockfish, and arrowtooth and Kamchatka flounder fisheries. Most of this, (94 percent) was taken by catcher/processors and very little was taken by other sectors. Incidental pollock harvests in all sectors averaged 644 metric tons a year from all three management areas from 2004-2013.

8.3 Trawl catcher/processors

This section evaluates Alternatives 1 and 4 with respect to the trawl catcher/processor sector. Alternatives 2 and 3, and their options, are evaluated in Section 8.8, which deals with Atka mackerel, and in Section 8.9, which deals with trawl catcher/processor Pacific cod harvests. Alternatives 5 and 6 are examined in Section 8.13.

8.3.1 Catches

Table 8-49 summarizes the historical volumes of retained Atka mackerel catches by trawl catcher/processors and of deliveries of Atka mackerel by catcher vessels to catcher/processors acting as motherships. The volumes are summarized by Aleutian Islands management area, and for all three management areas together, for the years 2004 through 2010. These are the baseline years for the analysis. In addition, the table provides estimates of the volume of retained catch taken from areas closed under Alternative 1, and from areas remaining open under Alternative 1. Finally, the table shows the estimated percentage of the total catch taken from areas remaining open.

Table 8-49 is based on the Alaska Regional Office's Catch-in-Area (CIA) database, which is, itself, an adaptation of the Alaska Regional Office's Catch Accounting System (CAS) database. The CIA database uses information from vessel monitoring system reports, and other sources, to allocate catches at smaller spatial scales than the CAS.

Table 8-49 summarizes baseline trawl catcher/processor and catcher vessel Atka mackerel retained catches. Catcher/processor retained catches and catcher vessel retained catches delivered to catcher/processors acting as motherships, have been aggregated for this analysis to protect the confidentiality of data on catcher vessel deliveries to motherships. Almost all of the information on this issue is confidential because of the small numbers of catcher vessels that harvest Atka mackerel, and the small number of catcher/processors that serve as motherships and accept the catcher vessel deliveries.

The catches at risk in Area 541 during the baseline years (2004 through 2010) are small, consistent with the minimal Atka mackerel regulatory changes made by the status quo in that area. Table 8-7 shows that actual harvests from Area 541 increase substantially during 2011 and 2012, while the interim final rule was in effect. This reflects the shift in the center of gravity of the biomass towards the east, as estimated from recent trawl surveys, which led to an increase in the proportion of the harvest taken from Area 541 (78 FR 13813, March 1, 2013).

Alternative 1 produces relatively large reductions in retained Atka mackerel catches in Area 542 and in Area 543 (where retention of Atka mackerel catches is prohibited). The aggregate Aleutian Islands catches at risk are large; the residual harvest percentages in the column on the far right of Table 8-49 indicate that the catch coming from open areas under this alternative would have ranged from 39 percent of retained catches of Atka mackerel in 2004 and 2005, to 67 percent in 2007.

Much of the difference between years is connected to the distribution of retained catches among the three areas. When the share of retained catches from Area 541 is relatively small (as in 2004 and 2005) the reduction in harvests is large, and the percent of the baseline estimated to have been retained is small. When the share of retained catches in Area 541 is relatively large (as in 2007, when, the retained catch in Area 543 was quite small), the residual catch as a percentage of the baseline is larger.

Table 8-49 Location of estimated aggregate trawl catcher/processor Atka mackerel harvest in the Aleutian Islands under Alternative 1, from 2004 through 2010

	Total catch (mt)				Catch from areas closed (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Open area catch as % of total
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	3,161	26,561	16,527	46,248	174	11,728	16,527	28,428	2,987	14,832	0	17,820	39%
2005	3,356	33,720	18,730	55,806	257	15,047	18,730	34,034	3,099	18,673	0	21,772	39%
2006	4,013	38,447	14,374	56,835	186	17,835	14,374	32,396	3,827	20,612	0	24,439	43%
2007	19,752	25,475	8,846	54,074	119	9,056	8,846	18,022	19,633	16,419	0	36,052	67%
2008	18,701	22,175	15,654	56,531	96	8,913	15,654	24,663	18,605	13,263	0	31,868	56%
2009	25,734	28,461	15,466	69,661	38	16,410	15,466	31,914	25,696	12,051	0	37,748	54%
2010	23,074	24,033	17,462	64,568	107	14,204	17,462	31,773	22,967	9,829	0	32,796	51%

Notes: Metric tons round weight retained Atka mackerel from targeted and incidental fishing (includes CDQ), and from deliveries of Atka mackerel by trawl catcher vessels to trawl catcher/processors acting as motherships.
Source: NMFS AKR estimates using CIA data. January 22, 2013.

Table 8-50 summarizes historical volumes of retained Pacific cod harvests by trawl catcher/processors, by management area, and for the three management areas in total, for the years 2004 through 2010.[73] In addition, the table provides estimates of the retained harvest coming from areas closed by Alternative 1 (catches at risk), and from areas left open by the alternative. Finally, the table shows the estimated percentage of the total harvest coming from areas left open by the alternative (residual catches).

The aggregate Aleutian Islands catches at risk are large; as shown in the column on the far right of the table, it is estimated that the catch coming from open areas under this alternative would have been from 35 percent of retained catches of Pacific cod in 2005, to 64 percent in 2007. The greatest reductions generally come from Area 543, where retained catches of Pacific cod are prohibited. Reductions are also relatively large in Area 542. In Area 541, where the interim final rule is less restrictive, the estimated reductions in retained catch are least. Reductions in retained catches from Area 542 drop during this period, and are at their lowest (less than 1,000 metric tons) from 2008 to 2010. Reductions in Area 541 retained catches are highest in 2004 and 2005, years with large baseline retained catches in this area.

Table 8-50 Location of estimated aggregate trawl catcher/processor Pacific cod harvests in the Aleutian Islands under Alternative 1, from 2004 through 2010

	Total catch (mt)				Catch from areas closed (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Open area catch as % of total
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	5,597	3,269	3,239	12,105	739	2,334	3,239	6,313	4,857	935	0	5,792	48%
2005	5,117	2,187	4,099	11,403	1,410	1,934	4,099	7,443	3,706	254	0	3,960	35%
2006	5,045	1,854	3,016	9,915	336	1,462	3,016	4,814	4,709	391	0	5,101	51%
2007	7,724	2,145	2,228	12,098	725	1,413	2,228	4,366	6,999	732	0	7,731	64%
2008	2,834	785	1,652	5,271	259	523	1,652	2,434	2,574	262	0	2,837	54%
2009	1,966	1,518	1,657	5,141	43	748	1,657	2,448	1,923	770	0	2,693	52%
2010	2,123	1,284	549	3,956	87	815	549	1,450	2,036	469	0	2,506	63%

Notes: Metric tons round weight retained Pacific cod from targeted and incidental fishing (includes CDQ) by trawl catcher/processors.
Source: NMFS AKR estimates using CIA data. Status quo data prepared January 25, 2013.

8.3.2 Gross revenues

Table 8-51 provides estimates of gross revenues from Atka mackerel, Table 8-52 provides estimates of gross revenues from Pacific cod, and Table 8-53 provides estimates of gross revenues for both species together. Each table has two parts, one reporting estimates of gross revenue in nominal dollars, and one reporting the gross revenue estimates in dollars adjusted for inflation, so that they are expressed in real, 2012, dollars.

Each table follows the organization of the preceding volume tables: a first block of columns shows estimated total gross revenue for the year, in the absence of the action; a second block shows the estimated gross revenues from harvests within critical habitat closed by the alternative; and the third block shows estimated gross revenues from within areas left open by the alternative. A final column shows the relationship between gross revenues from open areas and gross revenues in the absence of the action, expressed as a percentage. Gross revenues from areas closed by the alternative are described as gross revenues at risk, while gross revenues from areas left open, are described as residual revenues.

[73] As the fleets have been defined for this analysis, the wholesale value of the Pacific cod production associated with catcher vessels delivering to motherships has been grouped with that of catcher vessels delivering shoreside to create a trawl catcher vessel sector covering both types of catcher vessel activity.

Table 8-53 summarizes the results of this gross revenue analysis. Residual gross revenues range from 37 percent of total gross revenues, in 2005, to 65 percent of total gross revenues in 2007. The estimated gross revenues at risk range from about $27 million in 2007, up to about $48 million in 2010 (in 2012 dollars). The mean value was about $35 million.

Table 8-51 Estimated aggregate trawl catcher/processor Atka mackerel first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010

Nominal (millions of dollars)													
	Baseline gross revenue				Gross revenue in closed area (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	2.1	17.2	10.9	30.1	0.1	7.5	10.9	18.5	1.9	9.7	0.0	11.6	39%
2005	2.5	23.4	14.5	40.4	0.3	10.3	14.5	25.1	2.2	13.1	0.0	15.3	38%
2006	2.8	24.9	9.7	37.4	0.1	11.4	9.7	21.2	2.7	13.5	0.0	16.2	43%
2007	16.0	20.4	7.4	43.8	0.4	7.2	7.4	15.0	15.7	13.1	0.0	28.8	66%
2008	14.5	17.8	13.0	45.3	0.4	6.9	13.0	20.2	14.2	10.9	0.0	25.0	55%
2009	28.3	32.0	17.9	78.1	0.7	18.4	17.9	36.9	27.6	13.6	0.0	41.1	53%
2010	29.8	31.2	24.5	85.5	0.9	18.2	24.5	43.6	28.9	13.0	0.0	41.9	49%
Real (millions of "2102" dollars)													
	Baseline gross revenue				Gross revenue in closed area (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	2.4	20.4	12.9	35.8	0.1	8.9	12.9	22.0	2.3	11.5	0.0	13.8	39%
2005	3.0	27.2	16.8	47.0	0.4	12.0	16.8	29.2	2.6	15.2	0.0	17.8	38%
2006	3.2	28.0	10.9	42.1	0.1	12.8	10.9	23.8	3.1	15.2	0.0	18.2	43%
2007	17.6	22.3	8.1	48.0	0.4	7.9	8.1	16.4	17.2	14.4	0.0	31.5	66%
2008	15.3	18.7	13.7	47.7	0.4	7.3	13.7	21.3	14.9	11.5	0.0	26.4	55%
2009	29.9	33.9	18.9	82.7	0.7	19.5	18.9	39.1	29.2	14.4	0.0	43.6	53%
2010	31.1	32.5	25.5	89.1	0.9	19.0	25.5	45.4	30.1	13.5	0.0	43.6	49%

Notes: Includes retained catches of Atka mackerel from all sources in the Aleutian Islands. Virtually all of this catch is taken by trawl catcher/processors and by trawl catcher vessels delivering to catcher/processors acting as motherships. Values include the values of retained targeted and incidental catches of Atka mackerel, and of retained incidental catches of groundfish (other than Pacific cod) taken in Atka mackerel targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June of each year.
Source: NMFS AKR estimates using CIA database. January 22, 2013.

Table 8-52 Estimated aggregate changes in trawl catcher/processor Pacific cod first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010

Nominal (millions of dollars)													
	Baseline gross revenue				Gross revenue in closed area (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	6.7	3.9	3.8	14.4	0.9	2.8	3.8	7.5	5.9	1.1	0.0	6.9	48%
2005	6.3	2.7	5.1	14.1	1.8	2.4	5.1	9.3	4.5	0.3	0.0	4.8	34%
2006	8.6	3.2	5.2	17.0	0.6	2.5	5.2	8.2	8.1	0.7	0.0	8.7	52%
2007	16.5	4.6	4.7	25.8	1.5	3.0	4.7	9.3	15.0	1.6	0.0	16.6	64%
2008	6.4	1.8	3.7	11.9	0.6	1.2	3.7	5.5	5.8	0.6	0.0	6.4	54%
2009	2.5	1.8	2.1	6.3	0.1	0.9	2.1	3.0	2.4	0.9	0.0	3.3	53%
2010	3.4	2.0	0.8	6.2	0.1	1.3	0.8	2.2	3.2	0.7	0.0	4.0	64%
Real (millions of "2102" dollars)													
	Baseline gross revenue				Gross revenue in closed area (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	8.0	4.6	4.5	17.1	1.0	3.3	4.5	8.9	7.0	1.3	0.0	8.2	48%
2005	7.3	3.1	5.9	16.3	2.1	2.8	5.9	10.8	5.2	0.3	0.0	5.6	34%
2006	9.7	3.6	5.8	19.1	0.6	2.8	5.8	9.2	9.1	0.7	0.0	9.8	52%
2007	18.1	5.0	5.2	28.3	1.7	3.3	5.2	10.2	16.4	1.7	0.0	18.2	64%
2008	6.7	1.9	3.9	12.5	0.6	1.2	3.9	5.8	6.1	0.6	0.0	6.7	54%
2009	2.6	1.9	2.2	6.7	0.1	1.0	2.2	3.2	2.5	1.0	0.0	3.5	53%
2010	3.5	2.1	0.9	6.5	0.1	1.3	0.9	2.3	3.4	0.8	0.0	4.1	64%

Notes: Includes retained catches by trawl catcher/processors. Values include the values of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish (other than Atka mackerel) take in Atka mackerel targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June of each year.
Source: NMFS AKR estimates using CIA database. January 25, 2013.

Table 8-53 Estimated aggregate Atka mackerel and Pacific cod trawl catcher/processor first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010

Nominal (millions of dollars)													
	Baseline gross revenue				Gross revenue in closed area (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	8.8	21.1	14.7	44.5	1	10.3	14.7	26	7.8	10.8	0	18.5	42%
2005	8.8	26.1	19.6	54.5	2.1	12.7	19.6	34.4	6.7	13.4	0	20.1	37%
2006	11.4	28.1	14.9	54.4	0.7	13.9	14.9	29.4	10.8	14.2	0	24.9	46%
2007	32.5	25	12.1	69.6	1.9	10.2	12.1	24.3	30.7	14.7	0	45.4	65%
2008	20.9	19.6	16.7	57.2	1	8.1	16.7	25.7	20	11.5	0	31.4	55%
2009	30.8	33.8	20	84.4	0.8	19.3	20	39.9	30	14.5	0	44.4	53%
2010	33.2	33.2	25.3	91.7	1	19.5	25.3	45.8	32.1	13.7	0	45.9	50%
Real (millions of "2102" dollars)													
	Baseline gross revenue				Gross revenue in closed area (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	10.4	25	17.4	52.9	1.1	12.2	17.4	30.9	9.3	12.8	0	22	42%
2005	10.3	30.3	22.7	63.3	2.5	14.8	22.7	40	7.8	15.5	0	23.4	37%
2006	12.9	31.6	16.7	61.2	0.7	15.6	16.7	33	12.2	15.9	0	28	46%
2007	35.7	27.3	13.3	76.3	2.1	11.2	13.3	26.6	33.6	16.1	0	49.7	65%
2008	22	20.6	17.6	60.2	1	8.5	17.6	27.1	21	12.1	0	33.1	55%
2009	32.5	35.8	21.1	89.4	0.8	20.5	21.1	42.3	31.7	15.4	0	47.1	53%
2010	34.6	34.6	26.4	95.6	1	20.3	26.4	47.7	33.5	14.3	0	47.7	50%

Notes: Includes retained catches of Pacific cod by trawl catcher/processors, and deliveries of Atka mackerel to trawl catcher/processors acting as motherships by trawl catcher vessels. Values include the values of retained targeted and incidental catches of Atka mackerel and Pacific cod, and of retained incidental catches of groundfish take in these targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June of each year.
Source: Table 8-51 and Table 8-52

In addition to limits on catch in critical habitat, Alternative 1 also includes an overall limit on Area 542 TAC equal to 47 percent of the ABC. This was set to prevent fishing operations from increasing catch outside Area 542 critical habitat, once catches inside critical habitat were limited. This constraint would have limited Area 542 harvests in some years during the baseline period. Harvest would have been constrained by 215 metric tons in 2004, 2,507 metric tons in 2007, and 1,842 metric tons in 2008. In the remaining years, estimated residual harvests would have been smaller than the 47 percent limit, so the limit would not have been binding. The estimated revenue limits introduced by the constraint would have been $200,000 in 2004, $2 million in 2007, and $1.4 million in 2008 (all in real 2012 dollars). The average reduction over the seven baseline years would have been $500,000. These revenue reductions are in addition to those described in Table 8-53.

8.3.3 Fleet redeployment and impacts on other fisheries

Fishing vessels in the North Pacific typically participate in several fisheries each year.[74] The fisheries may change from year to year as relative costs, or relative product values, change. The status quo alternative restricts vessel access to preferred fishing grounds, changing the relative costs and productivity of different fishing areas. Vessel operators will respond by changing their fishing patterns as they seek to maximize their profits under the new constraints. The actual changes may vary from year to year, as circumstances change.

Formal programming or simulation models allowing NMFS to project vessel redeployment for different alternatives, under different environmental and economic conditions, are not available. NMFS has approached this issue qualitatively, by reviewing and explaining the options open to the fishing fleets. Where possible, the likelihood of redeployment is evaluated, given the qualitative nature of the discussion. NMFS is unable to estimate the extent to which redeployment may offset losses due to the measures in the Aleutian Island.

Trawl catcher/processors may shift their target species to compensate for restrictions on Aleutian Islands Atka mackerel and Pacific cod fishing. Potential alternative targets include (1) Bering Sea or Gulf of Alaska Atka mackerel and Pacific cod; (2) other Amendment 80 species; (3) targeted fishing for open access species; (4) mothership activity on behalf of trawl catcher vessels targeting open access species.

Amendment 80 species

Amendment 80 vessels whose Atka mackerel and Pacific cod fishing is restricted in the Aleutian Islands may try to increase harvests of Atka mackerel and Pacific cod elsewhere, or increase harvests of the four other Amendment 80 species. These additional species include Pacific ocean perch in the Aleutian Islands, rock sole, yellowfin sole, and flathead sole.

These species are all managed under Amendment 80 catch share quotas, and a vessel operator that wants to increase harvests of the other Amendment 80 species must either have unused quota for that species, or must be willing to lease quota, or acquire a vessel with those quota rights. Vessels may also access rights to fish these species by leasing CDQ quota.[75] Leasing or purchase of rights obviously involves costs to

[74] Multiple fisheries are defined as fisheries targeting different species, or the same species in different places or in different seasons or with a different gear-type.

[75] In addition to themselves acquiring rights to harvest, catcher/processors may act as motherships to access the BSAI trawl limited access sector's Atka mackerel, Pacific ocean perch, and trawl catcher vessel Pacific cod allocations. This possibility is discussed later in this section.

the firm acquiring the rights. Increased demand for certain types of quota by vessels redeploying out of the Aleutian Islands fisheries could tend to increase quota values.

The interim final rule eliminated the Harvest Limit Area (HLA) regulations under which the fleet fishing Atka mackerel had operated for several years. The HLA set season dates in which Amendment 80 vessels with Atka mackerel allocations in the Central (Area 542) and Western (Area 543) Aleutian Islands would be able to harvest Atka mackerel inside critical habitat. As a result, most vessels with Atka mackerel allocations participated in the fishery at this time. HLA regulations also restricted vessels' abilities to pursue other target fisheries. The HLA and the A-season dates of January 20 to April 15 were restrictive to the Amendment 80 fleet.

Elimination of the HLA regulations, along with a change in the ending date for the A-season from April 15 to June 10, provided the Amendment 80 fleet more flexibility to pursue Atka mackerel and other target species. While the HLA fishery for Atka mackerel was open, the directed fishing for Pacific cod was closed in the Aleutian Islands. In 2011 and 2012, the Amendment 80 fleet combined multiple targets in the Aleutian Islands; in particular, Pacific ocean perch and arrowtooth/Kamchatka flounder fishing were combined with Atka mackerel fishing.

Atka mackerel in the Aleutian Islands

The estimates of the impacts of the action on Atka mackerel retained catches, described in Table 8-49, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to fishing under the interim final rule, and assuming that this Atka mackerel could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled, "Open area catch as % of total," show the share of harvest coming out of areas that would remain open under the action. As shown in this table, depending on the year, from 39 percent to 67 percent of the volume of Atka mackerel retained by this sector in the Aleutian Islands came from areas that remained open under the status quo.

Each Aleutian Islands statistical area has its own TAC, and this limits the extent to which vessels fishing Atka mackerel can offset Atka mackerel harvest reductions in one area with increases in another. Under the status quo, trawl catcher/processors may no longer retain Atka mackerel in the Western Aleutian Islands (Area 543), and may collectively no longer retain more than 47 percent of the Central Aleutian Islands (Area 542) TAC. They cannot increase their overall harvests by shifting into Eastern Aleutian Islands/Bering Sea (Area 541/BS), unless the overall distribution of the TACs among the three areas has also changed.

As noted in Section 8.2, the distribution of TACs among the three areas did change in 2011, in such a way that the proportion of the TAC for Area 541/BS did increase. This new distribution reflected changes in the distribution of the biomass observed in biennial trawl surveys. If other surveys show the biomass shifting west, towards Areas 542 and 543, the distribution of TACs can change so as to reduce fishing opportunities in Area 541/BS. Prices are reported to be typically higher for Area 541/BS Atka mackerel than for Atka mackerel further west. To the extent this is the case, shifts of Atka mackerel harvests to the east would tend to increase the average price received per metric ton, independently of any overall price changes induced by changes in harvest.

Atka mackerel in the Bering Sea and Gulf of Alaska

Opportunities to increase Atka mackerel harvests outside of the Aleutian Islands are very limited. The Bering Sea harvest is counted against the Area 541/Bering Sea TAC for Amendment 80 and CDQ vessels. The rule may affect the location of some harvest, but is likely to have little impact on its overall level.

Trawl limited access vessels may have an incentive for a top-off fishery counted against the Bering Sea incidental catch allowance. Incidental catches of Atka mackerel taken in the Bering Sea may be retained up to the MRA, but this amount is counted against the Area 541\BS ICA. This fleet has not harvested much Atka mackerel from the Bering Sea in the past. It is possible that if Aleutian Islands harvest restrictions increase Atka mackerel prices, there will be increased incentives for topping-off behavior by these vessels.

Opportunities are also limited in the GOA. Atka mackerel occurs in the GOA, but the fishery is not currently open for directed fishing. There has been interest from the industry in opening this fishery, however, the stock assessment authors and plan team have not recommended that this fishery be opened to directed fishing (Lowe et al. 2011). Catch of Atka mackerel in the GOA has been limited to incidental catch.

Some active topping-off fishing for Atka mackerel in the GOA does occur, and incidental catches of Atka mackerel in the GOA have been increasing for several years. It is possible that incidental catch could increase more as vessels affected by more restrictive regulation in the Aleutian Islands try to mitigate those effects. However, this topping-off behavior is limited by the availability of basis species. The basis species used for this topping-off behavior is Western GOA rockfish, which tends to be open for only short periods of time in July, and flatfish species, which are limited by Amendment 80 sideboards of both the target species and halibut prohibited species catch (PSC) limits. Should a topping off fishery for Atka mackerel exceed the Atka mackerel TAC in the GOA, the Regional Administrator would prohibit retention of Atka mackerel in the GOA per regulations in 50 CFR 679.20. This action would eliminate any financial incentive to harvest Atka mackerel in the GOA, and would stop potential "top-off" fishing. This action would only limit retention of Atka mackerel and is unlikely to impact directed fisheries in the GOA.

Pacific cod in the Aleutian Islands

The estimates of the impacts of the status quo on Pacific cod retained catches, described in Table 8-50, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to directed fishing under the interim final rule, and assuming that this Pacific cod could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled, "Open area catch as % of total," show the share of harvest coming out of areas that would remain open under the action. That table shows that, depending on the year, from 35 percent to 64 percent of the volume of Pacific cod retained by this sector in the Aleutian Islands came from areas that were to remain open under the status quo.

Pacific cod harvests within the Aleutian Islands were not constrained by management area TACs during the baseline years, or under Alternatives 1 and 4. Vessels could thus, theoretically, make up lost harvest in one Aleutian Islands management area by shifting to another. However, under Alternative 1, other Pacific cod trawling opportunities in the Aleutian Islands are limited. The interim final rule prohibits the retention of Pacific cod in Area 543, and restricts the fishing areas considerably in Area 542. Greater opportunities remain in Area 541, but even these may be limited compared to the baseline period. Most trawlable depths for Pacific cod are close to shore and within the 20 nm critical habitat designations. As shown in Table 8-8, the sector's retained Pacific cod, which had been decreasing since 2007, continued to decline in 2011, and remained lower in 2012 than in 2010.[76]

[76] The reader is reminded that, by definition, this sector includes trawl catcher/processor harvests of Pacific cod, but does not include the processing of Pacific cod delivered to catcher/processors acting as motherships. The number of motherships

Pacific cod in the Bering Sea

Both Amendment 80 and AFA trawl catcher/processors receive sectoral allocations of Pacific cod that they may fish in either the Aleutian Islands or the Bering Sea. Therefore, if these fleets are unable to harvest as much Pacific cod from the Aleutian Islands as they have in the past, they may be able to make up part, or all, of the loss in the Bering Sea.

However, as explained in Section 8.2.16, whereas in earlier years there was a single Pacific cod TAC for the entire BSAI, from 2014 forward there will be separate Pacific cod TACs for the Aleutian Islands and for the Bering Sea. Because of this, if the Bering Sea TAC would otherwise have been fully harvested, a sectoral shift from the Aleutian Islands to the Bering Sea can only take place at the expense of another sector's ability to harvest Pacific cod in the Bering Sea.[77] Trawl catcher/processors may have an advantage with respect to this since their seasonal allocations of Pacific cod are received by June 10 and they receive nothing in the second half of the year (other than possible seasonal rollovers), while the trawl catcher vessel sector and the fixed gear sectors do not receive large proportions of their annual allocations until the summer and/or the fall.

From 2008 through 2010, trawl catcher/processors took between 15 percent and 25 percent of their retained Pacific cod catches from the Aleutian Islands. This declined each year, starting in 2008. The declines prior to 2011 occurred at the time of the introduction of Amendment 80 and Amendment 85 in 2008. In 2011, the share of Pacific cod taken in the Aleutian Islands declined to 5 percent, from 13 percent in 2010. Reductions in targeted harvest of Pacific cod in the Aleutian Islands after the introduction of Amendment 80, may be due to Amendment 80 vessels reserving Pacific cod quota to support their incidental catch of Pacific cod in flatfish fisheries. Also, Amendment 85 constrained the ability of American Fisheries Act trawl catcher/processors to directed fish for Pacific cod. (NMFS AKRO In-season management staff.)

Factors other than the Bering Sea and Aleutian Islands TAC split may prevent trawl catcher/processors from fully offsetting lost Aleutian Islands Pacific cod revenues in the Bering Sea. First, industry sources indicate that Pacific cod in the Bering Sea tend to be smaller than in the Aleutian Islands and, because smaller fish bring a lower price, they are a less attractive target, all else equal. Table 8-6 shows the average weights of trawl-caught Pacific cod, by management area, in the Bering Sea and the Aleutian Islands. A comparison of the average weights tends to confirm that trawl-caught Pacific cod are larger in the Aleutian Islands.

Second, the halibut PSC rate in the Bering Sea Pacific cod trawl fishery is high, compared to halibut PSC in the Aleutian Islands, as shown in Table 8-54. The estimated average halibut PSC rate in the Aleutian Islands Pacific cod fishery for 2008 through 2011 is 0.002 metric tons of halibut mortality per metric ton of groundfish (NMFS Catch Accounting System); however, it is 0.013 metric tons of halibut mortality per metric ton of groundfish in the Bering Sea.

involved is very small, and to protect the confidentiality of the participants, this production has been included with catcher vessel deliveries to shoreside processors.

[77] Section 8.2.16 provides a more detailed discussion of the Aleutian Islands/Bering Sea split in the BSAI Pacific cod specifications.

Table 8-54 Estimated prohibited species catch rates per ton of trawl catcher/processor groundfish harvest in the Bering Sea Pacific cod, rock sole, and yellowfin sole fisheries (averages for 2008–2011)

	Pacific cod BS	Pacific Cod AI	Rock Sole	Yellowfin Sole	Units
C. bairdi	1.428	0.010	1.211	2.393	Crab/mt
C. opilio	1.300	0.001	.264	4.344	Crab/mt
Red king crab	0.135	0.024	.519	.005	Crab/mt
Halibut	0.013	0.002	0.008	0.005	mt mortality/mt
Chinook salmon	0.005	.060	.002	.001	Salmon/mt
Other salmon	0.019	.004	.003	.001	Salmon/mt

Note: As discussed in the text, Amendment 80 changed the prosecution of non-pollock trawl catcher/processor fisheries in the BSAI. Therefore, the rates are limited to 2008 to 2011. Ratios and percentages were calculated to show the metric tonnage of the incidental or PSC species per metric ton of retained and discarded target species. PSC species subject to limits are included.
Source: NMFS AKR Catch Accounting System.

A shift by Aleutian Islands trawl catcher/processors into the Bering Sea Pacific cod fishery may increase congestion in some areas of the Bering Sea, and may interfere with the activities of other fishing operations already there. Most of the vessels affected by increased regulations in the Aleutian Islands also fish in the Bering Sea.

The vessels that targeted Pacific cod in the Aleutian Islands in 2010 managed to maintain their 2010 levels of Pacific cod harvests in 2011, by increasing Pacific cod production in the Bering Sea, despite declining Aleutian Islands production. Aggregate Aleutian Islands Pacific cod production for these vessels was 4,005 metric tons in 2010, and 1,549 metric tons in 2011.[78] Aggregate BSAI Pacific cod production for these vessels in 2010 was 11,692 metric tons, while aggregate BSAI production in 2011 was 11,973 metric tons.[79] These vessels, even in 2010, processed more Pacific cod caught outside of the Aleutian Islands area than within it, and, in aggregate, were able to compensate for the reduced Aleutian Islands production in 2011, by increasing production in the Bering Sea.

However, the performance of these vessels, in 2011, fell short of the performance of trawl catcher/processors that were active in the BSAI in 2010, but which had not fished in the Aleutian Islands that year. These vessels saw their Pacific cod harvests rise from 16,925 metric tons in 2010, to 21,328 metric tons in 2011, an increase of 26 percent compared to a 2 percent increase for the vessels that had fished in the Aleutian Islands in 2010.[80] This performance comparison does not take into account mothership activity by either group of catcher/processors.

While Amendment 80 vessels are no longer subject to the GRS rule, they are still required to report on their retention levels to the Council. Retention rates are relatively high in the Aleutian Islands Atka mackerel and Pacific cod fisheries, and industry sources have expressed concern that reductions in the level of fishing activity in these fisheries would make it more difficult for the industry to keep retention levels high. If the GRS were still in effect, the current required retention rate would have been 85 percent. In 2011, with the increased restrictions in the Aleutian Islands, the Amendment 80 fleet had an 86.6 percent retention rate overall, while in 2012 it had an 86.3 percent rate overall.[81]

[78] These estimates were prepared by NMFS AKR In-season management branch staff, and differ slightly from the estimates in Table 8-10, prepared by AKFIN.
[79] Estimates prepared by NMFS AKR In-season management branch staff, September 4, 2012.
[80] Estimates prepared by NMFS AKR In-season management branch staff, September 4, 2012.
[81] Estimates prepared by NMFS AKR In-season management branch staff, December 2012.

Rock sole and yellowfin sole

Amendment 80 vessels could increase fishing effort for rock sole or yellowfin sole in the Bering Sea. Recent TACs have not been fully harvested, leaving room for additional expansion in production. As with any other Amendment 80 species, the opportunities to increase production are limited by the vessel or firm's unfished Amendment 80 quota share holdings, its ability to lease quota share from other Amendment 80 firms, to lease CDQ from Community Development Groups, or to acquire vessels with Amendment 80 quota attached. Another limiting factor is the availability of other allocated species that may be caught incidentally, and the viability of a market for these species.

While halibut PSC is a concern, other allocated groundfish species have proven to be more limiting in recent years. From 2009 to the present, Pacific cod has been a limiting species in expanding production of rock sole and yellowfin sole. Rock sole has also become a limiting species for yellowfin sole.[82] In 2012, high incidental catch rates of rock sole for vessels targeting yellowfin sole prevented expansion in yellowfin sole catch later in the year. Amendment 80 vessels have the ability to control how much fish they allocate to incidental catch, with the consequence that a species may become limiting to their fishing operation should they not allocate sufficient amounts. Amendment 80 participants are still learning how to manage their fisheries. As this program matures, it is possible Pacific cod and rock sole may not be as limiting as they currently are.

Amendment 80 participants have been hesitant to lease quota to other members of their cooperative in the past. Because incidental catch rates of Amendment 80 species can be so variable from year to year, leasing quota early in the year may limit an operation later in the year. If leasing was to occur, it would likely be later in the year and may be outside the operational times of the vessels requesting a lease. It is also possible that Amendment 80 firms would deny their cooperative members flatfish quota in order to seize a competitive advantage. If leases do take place, a large part of the net revenues from such deals would accrue to firms providing the quota, and this could reduce the actual revenue offset to injured firms, all else equal.

Prior to 2008, CDQ yellowfin sole and rock sole were heavily used. From 2005 through 2006, between 89 percent and 99 percent of the CDQ for these species was harvested each year. These percentages decreased considerably to 32 percent in 2008 and 8 percent in 2009, and increased slightly to 13 percent in 2010. (NMFS AKR catch reports) This may have been connected with the introduction of Amendment 80. Prior to Amendment 80, vessels in the head-and-gut fleet were engaged in a race for fish as they sought to harvest available allocations of yellowfin sole and rock sole. CDQ fish provided a mechanism for extending the season. Amendment 80 mitigated the race for fish, and may have reduced the demand for access to the CDQ allocations by Amendment 80 operators.

Thus, it is possible that vessels impacted by increased restrictions in the Aleutian Islands could expand into CDQ flatfish. As mentioned above for non-CDQ species, prohibited species limits are a potential constraining factor, along with competition for access to CDQ fish. In 2011, CDQ catch of rock sole and yellowfin sole increased to 36 percent and 78 percent, respectively, and in 2012 they were 66 percent and 65 percent. (NMFS AKR catch reports).[83]

[82] The Council may take action to allow flexibility in flatfish use of TACs for yellowfin, rock sole, and flathead sole. If adopted, quota for any one of these species will be permitted to be traded for an equal amount of quota of any of the other of these species, up to the excess-ABC amount.

[83] Catch reports are available at the NMFS AKR website: http://alaskafisheries.noaa.gov/sustainablefisheries/catchstats.htm .

Increased demand for certain types of CDQ by vessels redeploying out of the Aleutian Islands fisheries could tend to increase quota values.

Crab PSC limits have been identified as a constraint to expanding fishing activity into yellowfin sole and rock sole fisheries. In most years, these PSC limits are well above actual catch. However, crab PSC is variable from year to year, and has been constraining in the past in some areas. The red king crab savings subarea and Zone 2 Bairdi have been a concern in recent years.

Multiple concerns were identified by the Amendment 80 fleet in 2010. The primary concern was that an increase in effort in the yellowfin sole and rock sole fishing by vessels impacted by increased Steller sea lion restrictions might impact other vessels that relied on those flatfish fisheries. Vessels impacted by the increased Steller sea lion restrictions might have participated in those fisheries at different times of the year than they had in the past, resulting in higher PSC. However, with Amendment 80, the fleet has the tools to respond to high PSC rates of crab and, in prior years, has shown the ability to adapt to high PSC rates to prevent a closure. Concerns were expressed, in 2010, that some of the vessels that might expand into this fishery might lack the skill to adapt as the non-Aleutian Islands vessels had. The Amendment 80 cooperatives provide a mechanism for dealing with this.

Amendment 80 vessels specializing in Atka mackerel in the Aleutian Islands received large amounts of Amendment 80 Atka mackerel quota, because of their fishing history. Amendment 80 PSC limits were also distributed within the fleet on the basis of fishing history. Thus, vessels that fished relatively more in the Aleutian Islands, where PSC rates were relatively low, received PSC limits that were relatively low, compared to those vessels that fished more in the Bering Sea. Though PSC rates in recent years have not been a huge concern, years with high PSC may leave these vessels at a disadvantage in pursuing fisheries in the Bering Sea, where PSC rates are relatively higher. These firms may be able to lease PSC limits from other firms, but this is likely to be costly, if it is possible, as, especially in the case of halibut, PSC may be in short supply.

Recent increases in incidental catch of rock sole by the directed pollock fishery have led to larger incidental catch allowances (ICA) being set in the harvest specifications. There are concerns that additional effort by non-Amendment 80 vessels impacted by restrictions in the Aleutian Islands in the BSAI trawl limited access yellowfin sole fishery may impact Amendment 80 vessels. The incidental catch rate of rock sole in the BSAI trawl limited access yellowfin sole fishery can be relatively high (25 percent to 35 percent). For non-Amendment 80 trawl vessels, this rock sole is funded by the ICA. This may cause an increase in the ICA to accommodate the extra rock sole harvest. Any increase to the ICA may decrease the amount available for the Amendment 80 directed fishery allocation of rock sole (Park 2010).

By statute, the sum of the BSAI TACs cannot exceed 2.0 million metric tons per year, and historically, the pollock TAC has been given a high priority. With increasing pollock TACs, it is possible that flatfish TACs could be set lower to accommodate the additional pollock. If this occurred, lower TACs could constrain movement into yellowfin sole and rock sole fisheries. This is an allocation decision that the Council chooses to make each year.

The F/V *Katie Ann* is an AFA, rather than an Amendment 80 trawl catcher/processor, but she has also redeployed, after reconfiguring her processing plant, into the BSAI yellowfin sole fishery. As noted earlier, this move was motivated in part by the loss of the Area 543 fishing grounds, and in part by increasing incidental catches of Pacific cod by other AFA vessels, which reduced the share of AFA Amendment 85 Pacific cod available for targeting by the *Katie Ann*. As an AFA catcher/processor, the Katie Ann is fishing against the trawl limited access sector yellowfin allocation and competing with other AFA catcher/processors and catcher vessels, non-AFA catcher vessels, and Amendment 80

catcher/processors accepting deliveries as motherships. Because there are no individual allocations of either yellowfin sole or halibut PSC, it can be shut down at any time due to high halibut PSC rates, or the race for fish. A source from American Seafood Company, the firm that owns the *Katie Ann*, indicates that because of this, this fishery, on which the *Katie Ann* is currently dependent in Alaska, is unpredictable and hard to plan for. (Jacobs, personal communication, April 6, 2013)

Should effort increase in yellowfin sole and rock sole fisheries there may be a reduction in prices that might adversely affect operations already in these fisheries.

Yellowfin sole and rock sole are not targeted in the Bristol Bay area. Most of Bristol Bay has been closed to flatfish trawling since 1997, by the Nearshore Bristol Bay Trawl Closure Area. The only exception is a relatively small area (the Nearshore Bristol Bay Trawl Area) that remains open to trawling from April 1 to June 15. This opening provides flatfish trawling opportunities in an area with high flatfish catch per unit of effort, and relatively low PSC. The timing was meant to close trawling activity in the area when halibut begin to move near shore in mid-June (Wilson and Evans 2009: 8). Local representatives remain concerned about halibut PSC, and about potential gear conflicts. In 2009 and 2010, most of the Amendment 80 fleet had a voluntary agreement with local fishermen in the Bristol Bay region to limit the location and time the trawl fleet fishes in this area more than regulation would have permitted. Local representatives have been concerned that, with pressure to offset revenue at risk in the Aleutian Islands, the voluntary agreement could be abandoned, leaving local, small-scale fishermen vulnerable to gear conflict and preemptive harvest of halibut taken by trawl vessels as their PSC limits (Samuelsen 2010).

Pacific Ocean Perch

As shown in Table 8-4, vessels and firms with larger amounts of Amendment 80 Atka mackerel quota also tend to have larger amounts of Amendment 80 Aleutian Islands Pacific ocean perch quota. Pacific ocean perch is allocated to the Amendment 80 program in the Aleutian Islands, but not in the Bering Sea. Aleutian Islands Pacific ocean perch is fully allocated and harvest rates have been relatively high under Amendment 80. Thus, Aleutian Islands Pacific ocean perch is not likely to provide increased opportunities for redeployment.

Bering Sea Pacific ocean perch is not an Amendment 80 species. However, in recent years agreements among Amendment 80 operations have made it possible for in-season managers to provide for directed Bering Sea Pacific ocean perch fishing later in the year. Since the advent of Amendment 80, the Bering Sea TAC (including CDQ) has varied between about 3,200 metric tons and about 8,100 metric tons. The percent of the Bering Sea TAC caught was in the teens in 2008 and 2009, but was between 98 percent and 100 percent from 2010 through 2012. The 2013 quota was relatively high, but the catch was only 62 percent of the quota, because of management measures to limit incidental harvests of shortraker rockfish. (NMFS AKR In-season managers; Alaska Region Catch and Production Reports, various issues). The quotas and catches in this fishery have been somewhat higher since 2010 than in the years just prior, but it is not clear that these would have gone unharvested in the absence of the interim final rule or that they have provided a significant opportunity for redeployment by the Amendment 80 sector.

Flathead sole

Flathead sole has not been targeted by Amendment 80 Atka mackerel vessels in the past. As shown in Table 8-4, vessels or firms with relatively large Atka mackerel holdings tend to have relatively small (1 percent to 3 percent) shares of the Amendment 80 flathead sole quota. The flathead sole taken by these vessels was usually taken as incidental catch in yellowfin sole and rock sole target fisheries. If halibut PSC is low enough, compared to the available PSC limits, and species such as Pacific cod are not limiting, it may be possible for these vessels to increase their flathead sole catch; however, history

suggests that it is more likely they would reserve their available halibut PSC and Pacific cod for use in the rock sole, yellowfin sole, and arrowtooth flounder fisheries.

Non-Amendment 80 species

Trawl catcher/processors may turn to fisheries that are not in a catch share program in the BSAI and GOA. These include fisheries in the BSAI for arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, and other flatfish, and fisheries in the GOA for arrowtooth flounder, rockfish, and rex sole.

Arrowtooth flounder and Kamchatka flounder are relatively new target fisheries, and some Amendment 80 Atka mackerel vessels have been targeting these species since the Amendment 80 program began in 2008. To some extent, increased activity in these fisheries has been a result of the Amendment 80 program. Before Amendment 80, halibut PSC allowances were provided separately for individual species or groups of species. The PSC allowance for the species group including turbot, Kamchatka flounder, and arrowtooth flounder was set equal to zero. This precluded directed fishing for these species by trawl vessels. Amendment 80 converted the individual species PSC limits to global cooperative limits that can be allocated by the cooperative among different target species as it chooses. This made it possible to target turbot, Kamchatka flounder, and arrowtooth flounder, and trawl harvests of these species began in 2008. The season opening date for both fisheries is May 1, thus, while arrowtooth flounder and Kamchatka flounder production may increase through time, this production may not be related to the closure of Atka mackerel fishing in Areas 542 and 543 during the first part of the year.

In recent years, trawl catcher/processor vessels have been increasing harvests of Greenland turbot. As described in the discussion of arrowtooth and Kamchatka flounders, this originated as a result of the Amendment 80 program. The interim final rule may intensify interest in this option. Competition for Greenland turbot between the freezer longline sector and the trawl catcher/processor sector has increased in some recent years and is discussed in more detail in the freezer longline section of this chapter. Greenland turbot fishing opportunities will depend on stock strength. Pursuant to an intersectoral agreement, Amendment 80 trawl catcher/processors were restricted to incidental catches of Greenland turbot in 2013 and 2014. (NMFS AKR in-season managers)

Alaska plaice was generally lightly harvested through 2010, but harvests have increased from 2011 to 2013. During the first years of the Amendment 80 program, the quota was 42,500 metric tons, and 33 percent to 41 percent of it was caught. From 2011 through 2013, the quota was reduced to 16,000 to about 22,000 metric tons. However, catches were higher during this later period; the average catch from 2008 to 2010 was about 16,000 metric tons, while the average catch from 2011 through 2013 was about 21,000 metric tons. The reduced quotas were exceeded in 2011 and 2013. Previously, Alaska plaice were primarily incidental catch in yellowfin sole fisheries, while more recently they have been the subject of directed fishing (Bering Sea Aleutian Islands Catch Report [includes CDQ] various issues).

The miscellaneous category of the “other flatfish” species group are generally not pursued as fishery targets, but are incidental catch in other fisheries. During the first years of the Amendment 80 program, quotas were about 14,700 metric tons to about 18,400 metric tons, and 15 percent to 20 percent of the quotas were caught. From 2011 to 2013 the quotas ranged from about 3,000 to 3,200 metric tons (Bering Sea Aleutian Islands Catch Report [includes CDQ] various issues).

Amendment 80 catcher/processors also could target the trawl allocation of sablefish, but there are high halibut PSC rates in this fishery. It has also been indicated by Amendment 80 catcher/processors that they cannot find sablefish in trawlable densities to support targeting (NMFS 2010b).

Under the Amendment 80 program, only 11 of the Amendment 80 vessels are authorized to fish for flatfish in the GOA (the vessels are listed in Table 39 of 50 CFR 679). Amendment 80 GOA flatfish participation is also limited by Amendment 80 halibut PSC sideboard limits, and a joint PSC limit the Amendment 80 vessels share with the catcher vessel trawl fleet. If the halibut PSC limit is reached, it could become difficult for the trawl catcher vessels to target deep-water and shallow-water flatfish. Increased participation in these fisheries, as a result of Steller sea lion measures in the Aleutian Islands, may, thus, impact trawl catcher vessels fishing for flatfish in the GOA.

Amendment 80 vessels also participate in Western GOA rockfish fisheries. This fishery starts on July 1 and most vessels impacted by increased restrictions in the Aleutian Islands participate in this fishery. Expansion by other Amendment 80 vessels in recent years will likely prevent any additional expansion in this fishery by vessels impacted by increased restrictions in the Aleutian Islands. The Pacific ocean perch TAC has been exceeded in recent years, and, in 2012, a 24-hour fishery caused the OFL to be exceeded. A combination of decreased rockfish TACs and management concerns may impact access to this fishery in the future.

Catcher/processors acting as motherships

Amendment 80 catcher/processors may obtain some species for processing by acting as motherships for trawl catcher vessels in the BSAI trawl limited access sector.

With the advent of the Amendment 80 program, Amendment 80 trawl catcher/processor harvests were limited by their quota share. One way for these vessels to increase production was for the trawl catcher/processors to act as motherships for trawl catcher vessels with access to allocations of these species. Table 8-2 and Table 8-3 show the number of catcher vessels delivering to motherships and the number of catcher/processors acting as motherships. In both cases, mothership activity preceded Amendment 80. Amendment 80 became effective at the same time there were increases in both Atka mackerel mothership activity and Pacific cod mothership activity.[84]

The number of catcher vessels delivering Pacific cod to motherships more than doubled between 2010 and 2011 (5 vessels in 2010, 11 in 2011, and 12 in 2012). A relationship between trawl catcher vessels delivering Atka mackerel and the interim final rule is harder to identify. If this increase is a response to the interim final rule, it may create competition with other potential buyers of Pacific cod, possibly including shoreside processors, such as Adak, and AFA trawl catcher/processors. Trawl catcher vessels will be affected positively or negatively, depending on their ability to contract with the Amendment 80 sector.

Catcher/processors acting as motherships affected by increased regulations could seek to increase deliveries of BSAI trawl limited access yellowfin sole. This could create conflicts with AFA catcher/processors, also seeking to access BSAI trawl limited access yellowfin allocations.

Other activities

Opportunities for these vessels to fish outside waters in or adjacent to Alaska are probably limited. Large catcher/processors are unusual in most U.S. fisheries, although trawl catcher/processors are used in the fishery for Pacific whiting, under the management jurisdiction of the Pacific Fishery Management Council. While some catcher/processors in the pollock fishery participate in the Pacific whiting fishery,

[84] Given the small numbers of catcher vessels and motherships, most volume and value data on this topic is confidential.

the Pacific whiting fishery is now under limited entry. Catcher/processors displaced from the Aleutian Islands could only enter the Pacific whiting fishery, either as a catcher/processor or mothership, by buying a limited entry permit. In general, this does not appear to be a source of offsetting revenues for the firms potentially adversely impacted by this alternative, nor does it appear to be a source of offsetting aggregate production for U.S. fisheries (J. Seger, personal communication).[85]

Vessels may remain in port during the period they would otherwise have been harvesting Atka mackerel and Pacific cod in the Aleutian Islands. If the vessels displaced from the Aleutian Islands remained in their home ports during the period when they had formerly been fishing, there would be no offsetting fish catches, although they would avoid most, if not all, variable costs associated with fishing. Vessels may remain in port only part of this period, fishing off Alaska for the remainder. For example, it is possible that vessels may remain in port for a week or so longer than they otherwise would have, before traveling to fishing grounds off Alaska. Each of these alternative strategies could reduce variable operating costs, to some degree.

Indirectly impacted sectors

Redeployment by trawl catcher/processors into the Bering Sea may affect fishing sectors not otherwise directly regulated by this action. The potential for adverse impacts on other Amendment 80 vessels appears limited by the operation of the Amendment 80 quota program and by the operation of the Amendment 80 cooperatives. Increases in harvests of some species, however, such as yellowfin sole or rock sole, may lead to lower prices for those species, and reduce revenues to vessels already fishing for these species. A shift into the Bering Seas Pacific cod fishing may increase competition with non-Amendment 80 vessels already fishing for those species. If trawl catcher/processors redeploy into the turbot fishery there could be increased resource competition with freezer longliners.

8.3.4 Alternative 1 summary

As the trawl catcher/processors redeploy to minimize the impact of the restrictions imposed by the interim final rule, their costs, as well as their revenues, will change. Revenue reductions associated with reduced fishing for Atka mackerel and Pacific cod in the Aleutian Islands will be accompanied by reductions in the variable costs (e.g., crew, vessel, skipper, and other revenue shares, fuel, food expenses) of fishing in the Aleutian Islands. Shifts to other fisheries, and new revenue streams from those fisheries, will be accompanied by increases in variable costs in those fisheries.

If vessels or gear must be reconfigured, there may be fixed costs with shifting between fisheries. To the extent that skippers and crew must become familiar with operations in new areas or for new species, or to the extent that vessels were better adapted to the old fisheries than the new ones, the operations will incur costs associated with learning to operate in the new fisheries. These may take the shape of lower catch per unit of effort in the new fisheries, and, thus, higher variable costs for any given volume of catch. NMFS does not have data that would allow it to estimate the size of these possible costs.

There may also be price impacts associated with the change. Large potential reductions in Atka mackerel harvests may be associated with offsetting changes in the prices received. Since industry can influence the TAC setting process in the Council, it is likely that it has exercised its influence to prevent production reaching levels that would actually reduce revenues. Thus, the industry may be operating on the elastic portion of its demand curve, where volume decreases are associated with revenue decreases (that is, the

[85] James Seger, Economist, Pacific Fisheries Management Council, personal communication, June 25, 2010.

price increase is not large enough to fully offset the volume reduction's impact on gross revenues). Industry indicates that larger Atka mackerel, which become more common with a move from Areas 543 and 542 to Area 541 and the Bering Sea, bring higher prices. If this is the case, an adverse revenue impact would be obscured by an increase in the proportion of higher priced Atka mackerel TAC taken in Area 541, which occurred at the time the interim final rule became effective. A shift in the biomass, and the proportion of the TAC, coming from Areas 542 and 543 may occur in the future.

Vessels shifting their Pacific cod harvests from the Aleutian Islands into the Bering Sea may receive a lower price for Pacific cod in the Bering Sea than they had been receiving in the Aleutian Islands, given the reported differences in fish size and price between the two areas. Reductions in the supply of Aleutian Islands Pacific cod may increase the price received for that supply segment, while increased supplies of smaller cod may lead to reduced prices in that market segment. To the extent that vessels must operate in new fisheries with new markets, firms may face a marketing learning curve as they develop new marketing channels. NMFS does not have data that would allow it to estimate the size of these possible costs.

Table 8-53 provides estimates of revenue at risk for Alternative 1. The mean value wholesale gross revenues at risk in the Aleutian Islands would have been about $35 million per year during the baseline years (2004 through 2010). The annual wholesale gross revenue at risk ranged from about $27 million, to about $48 million per year. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Adjust revenues for reduction in variable operating costs associated with reduced fishing in the Aleutian Islands;
- Adjust revenues to reflect possible increases in wholesale prices as Atka mackerel production drops;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Adjust revenues to reflect possible change in average annual Atka mackerel prices as the center of gravity of fishing is shifted to the east (all other things equal), and to reflect a possible decrease in Pacific cod prices as production shifts from the Aleutian Islands to the Bering Sea;
- Add costs that may be imposed on other fleets as trawl catcher/processors redeploy into their fisheries.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated.

8.3.5 Alternative 4

Alternative 4 partially recreates the regulations faced by the trawl catcher/processors in 2010, the year ***before*** the interim final rule became effective. The principal difference between Alternative 4 and the Steller sea lion protection rules in place during the baseline period is the season extension, and the elimination of the Harvest Limitation Area (HLA). Because of the methodology in use, this does not affect the estimates of gross revenues, although it would affect fishing costs.

Under Alternative 1, an average of about $35 million a year, during the baseline years, came from critical habitat closed under the alternative. Under Alternative 4, these areas would not be closed. Because of the elimination of the HLA rule, which allows the vessels in the sector more flexibility with respect to the harvest of Atka mackerel, this alternative probably reduces costs below those during the baseline years.

This revenue-at-risk comparison focuses on wholesale gross revenues from areas that would be closed under the two alternatives. As discussed above, this does not take account of associated changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

8.4 Non-trawl catcher/processors (Alternatives 1 and 4)

This section evaluates Alternatives 1 and 4 with respect to the non-trawl catcher/processor sector. Alternatives 2 and 3, and their options, are evaluated in Section 8.10. Alternatives 5 and 6 are examined in Section 8.13. The non-trawl catcher/processor sector includes both hook-and-line and pot catcher/processors, as described in Section 8.2.2.

8.4.1 Catches

Table 8-55 summarizes historical volumes of retained Pacific cod catches by non-trawl catcher/processors, by management area, and in total, for the years 2004 through 2010 (the baseline). In addition, the table provides estimates of the retained catch associated with areas that are closed by, or that remain open under, Alternative 1, had that alternative been in effect in the years shown. The final column shows the estimated percentage of the baseline catch that came from areas left open under the alternative.

As shown in the left-hand block of the table, baseline retained catches of Pacific cod by this fleet had increased in all but two years during the time period examined. Retained catches in the last two years were each more than twice the retained catches in the first two years. While retained catches were greatest in Area 541 in 2004, by 2008 retained catches in Area 542 and 543 tended to be similar to, or greater than, retained catches in Area 541.

The volumes of the fleet's retained baseline year catches that came from areas closed under Alternative 1 ranged between about 1,800 metric tons (in 2006) and about 6,200 metric tons (in 2010). The impact of Alternative 1 was relatively large; the catch coming from areas remaining open, as a percentage of the baseline retained catch, ranges from 25 percent (in 2010), to 41 percent (in 2006).

Table 8-55 Location of estimated aggregate non-trawl catcher/processor Pacific cod harvests in the Aleutian Islands, Alternative 1, from 2004 through 2010.

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Open area catch as % of total
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	1,568	C	S	2,937	961	C	S	1,885	607	C	S	1,052	36%
2005	S	C	C	2,794	S	C	C	1,856	S	C	C	938	34%
2006	S	C	C	3,054	S	C	C	1,799	S	C	C	1,256	41%
2007	1,770	751	1,639	4,160	958	288	1,639	2,885	812	463	0	1,275	31%
2008	1,898	2,495	2,330	6,723	1,334	841	2,330	4,505	565	1,654	0	2,219	33%
2009	1,226	1,997	2,866	6,090	618	824	2,866	4,309	608	1,173	0	1,780	29%
2010	2,659	2,426	3,146	8,231	1,710	1,324	3,146	6,180	949	1,102	0	2,051	25%

Notes: Metric tons round weight retained Pacific cod from targeted and incidental fishing (includes CDQ). "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, February 5, 2013.

8.4.2 Gross revenues

Table 8-56 summarizes estimates of the total gross revenues associated with the sector during the baseline years. In addition, it provides estimates of the gross revenues associated with areas that would be closed under Alternative 1, and estimates of the gross revenues associated with areas that would remain open under the alternative. Revenues include revenues from retained targeted Pacific cod, revenues from incidental catches of Pacific cod in non-Pacific cod target fisheries, and revenues from incidental catches of other groundfish species in Pacific cod target fisheries. The table is divided into two parts; the upper part provides estimates of actual gross revenues in the year earned, while the lower part translates these into "real" 2012 dollars, to eliminate the effect of inflation. This inflation adjustment has the effect of increasing the size of all earlier year revenues relative to later year revenues. The revenues for 2004 are increased about 19 percent (reflecting the influence of inflation in the general economy), and the revenues from later years increase by smaller percentages. The 2010 revenues are little changed**.**

Under this status quo alternative, 25 percent to 42 percent of baseline gross revenues, depending on the year, came from areas that would have remained open under the alternative, if it had been in effect during the years 2004 through 2010. In real terms, from $3.2 million to $13.6 million of the sector's revenues would have come from areas closed by the alternative, while this fleet would have earned from $1.7 million in 2005, up to $5.2 million in 2008, from areas remaining open, also in real terms.

Table 8-56 Estimated aggregate non-trawl catcher/processor Pacific cod first wholesale gross revenues in the Aleutian Islands, Alternative 1, from 2004 through 2010

Nominal (millions of dollars)													
	Baseline gross revenue				**Gross revenue in closed area (revenue at risk)**				**Gross revenue in areas remaining open (residual revenue)**				**Residual revenue as % of baseline**
	541	**542**	**543**	**Tot**	**541**	**542**	**543**	**Tot**	**541**	**542**	**543**	**Tot**	
2004	2.2	C	S	4.2	1.4	C	S	2.7	0.9	C	S	1.5	36%
2005	S	C	C	4.4	S	C	C	2.9	S	C	C	1.5	34%
2006	S	C	C	6.1	S	C	C	3.6	S	C	C	2.5	42%
2007	4.4	1.9	4.0	10.2	2.3	0.7	4.0	7.0	2.0	1.2	0.0	3.2	31%
2008	4.3	5.5	5.2	15.0	3.0	1.9	5.2	10.1	1.2	3.7	0.0	4.9	33%
2009	2.1	3.4	5.0	10.5	1.1	1.4	5.0	7.5	1.0	2.0	0.0	3.1	29%
2010	5.7	5.1	6.7	17.5	3.6	2.7	6.7	13.1	2.1	2.3	0.0	4.4	25%
Real (millions of "2102" dollars)													
	Baseline gross revenue				**Gross revenue in closed area (revenue at risk)**				**Gross revenue in areas remaining open (residual revenue)**				**Residual revenue as % of baseline**
	541	**542**	**543**	**Tot**	**541**	**542**	**543**	**Tot**	**541**	**542**	**543**	**Tot**	
2004	2.7	C	S	5.0	1.6	C	S	3.2	1.0	C	S	1.8	36%
2005	S	C	C	5.1	S	C	C	3.4	S	C	C	1.7	34%
2006	S	C	C	6.8	S	C	C	4.0	S	C	C	2.8	42%
2007	4.8	2.1	4.4	11.2	2.5	0.8	4.4	7.7	2.2	1.3	0.0	3.5	31%
2008	4.5	5.8	5.5	15.8	3.2	2.0	5.5	10.6	1.3	3.9	0.0	5.2	33%
2009	2.2	3.6	5.3	11.1	1.1	1.5	5.3	7.9	1.1	2.1	0.0	3.2	29%
2010	5.9	5.3	7.0	18.2	3.8	2.9	7.0	13.6	2.1	2.4	0.0	4.6	25%

Notes: Includes retained catches by non-trawl (hook-and-line and pot) catcher/processors. Values include the values of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish taken in Pacific cod targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June each year. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA database. February 5, 2013.

8.4.3 Fleet Redeployment and Impacts on Other Fisheries

Non-trawl catcher/processors may adapt to more restrictive regulations in the Aleutian Islands by shifting their Pacific cod fishing to (1) the remaining unrestricted waters in the Aleutian Islands, (2) the Bering Sea, (3) the Gulf of Alaska, or (4) by shifting their targets to other Bering Sea or Gulf of Alaska groundfish fisheries.

As shown in Table 8-23, the vessels in this category that are active in the Aleutian Islands in any year also do other things. In 2010, the last year before the interim final rule came into effect, these vessels earned about 39 percent of their revenues from Pacific cod in the Aleutian Islands.

Pacific cod in the Aleutian Islands

The estimates of the impacts of the action on Pacific cod retained catches, described in Table 8-55, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to fishing under the interim final rule, and by assuming that this Pacific cod could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled "Open area catch as % of total," show the share of harvest coming out of areas that would remain open under the action. As shown in that table, depending on the year, from 25 percent to 41 percent of the volume of Pacific cod retained by this sector in the Aleutian Islands came from areas that were to remain open under the status quo.

Non-trawl catcher/processors that formerly fished for Pacific cod in areas that have become restricted could conceivably shift their fishing effort into Aleutian Islands areas that remain open. Operations formerly active in Area 543 might shift their fishing into Areas 542 and 541, and operations that were active in parts of Areas 542 and 541 that are now closed might shift their operations to zones in those areas that remain open. However, in practice, opportunities for this are limited by the relatively large footprint that non-trawl catcher/processors require to effectively fish an area, in combination with the limited amount of Pacific cod habitat available in the Aleutian Islands.

The footprint is the area needed for gear deployment for effective fishing. For example, a longline can be several miles long and draw fish within a half a mile of each side of the gear. Placing two longlines immediately adjacent to each other is inefficient. Also the gear must be left in the water (soak time) from 6 hours to over 24 hours. Therefore, most freezer longliners will set multiple longlines to efficiently maximize catch. Multiple longlines are set and spaced over a mile apart making the footprint a block of several miles by several miles.

The prime Pacific cod fishing locations in the Aleutian Islands are found in depths less than 300 meters. Most of those locations fall within critical habitat and access has been heavily restricted.[86]

Table 8-20 summarizing non-trawl catcher/processor Pacific cod retained catches in the Aleutian Islands, shows a drop of about 86 percent in the retained catch in 2011, the year the interim final rule became effective. Retained catches were higher in 2012, but still much lower than they were in 2010. Retained catches were prohibited in Area 543, but they also dropped by large proportions in Area 542 and Area 541. The overall decline of 86 percent in 2011 exceeded the declines projected in Table 8-55 for the baseline years 2004 through 2010. Residual catch estimates for those years did not decline below 25 percent.

[86] The relationship between the location of prime Pacific cod habitat and the location of critical Steller sea lion habitat is discussed at greater length in Chapter 5.

Figure 3-15 and Figure 3-16 in Chapter 3 are charts showing the locations of Pacific cod harvests by non-trawl vessels from 2004 through 2010, and in 2011 and 2012. A comparison of the charts shows how the location of non-trawl Pacific trawl harvests changed following the implementation of the interim final rule. The charts show the elimination of retained harvests in Area 543, and the substantial reduction in Area 542. The charts also show the continuing importance of harvests in Area 541, including in an area outside of critical habitat, just south of Atka Island.

As explained above, Table 8-20 shows a large harvest decline in 2011, larger than would have been predicted by an examination of the impacts of the action in the baseline years 2004 through 2010, suggesting that other factors may have been operative in 2011, to cause shifts in the location of the fleet's Pacific cod harvest. The harvest rebounded somewhat in 2012, although not to the mean or median levels observed in the baseline years 2004 through 2010.

The Pacific cod restrictions may have implications for vessels fishing for other species in the Aleutian Islands. One operator has indicated that his fishing strategy in the Aleutian Islands depends on the availability of both Pacific cod and sablefish fishing opportunities. This operator finds that killer whale and sperm whale predation on his gear becomes a problem when he is targeting sablefish or Greenland turbot in the Aleutian Islands. When this becomes a problem, he stops fishing deep-water gear and shifts to targeting Pacific cod, until the whales disperse. He indicates that it is not uncommon for whales to follow his boat for a week or more, until they become discouraged (Lone 2010).

Pacific cod in the Bering Sea

Both freezer longline and pot catcher/processor sectors receive sectoral allocations of Pacific cod that they may fish in either the Aleutian Islands or the Bering Sea. Therefore, if these fleets are unable to harvest as much Pacific cod from the Aleutian Islands as they have in the past, they may be able to make up part, or all, of the loss in the Bering Sea.

However, as explained in Section 8.2.16, whereas in earlier years there was a single Pacific cod TAC for the entire BSAI, from 2014 forward there will be separate Pacific cod TACs for the Aleutian Islands and for the Bering Sea. Because of this, if the Bering Sea TAC would otherwise have been fully harvested, a sectoral shift from the Aleutian Islands to the Bering Sea can only take place at the expense of another sector's ability to harvest Pacific cod in the Bering Sea.[87] Freezer longline and pot catcher/processors may be at a disadvantage with respect to this, since a large proportion of their seasonal allocations of Pacific cod are received in the summer or fall, while the complete trawl catcher/processor seasonal allocations, and over four-fifths of the trawl catcher vessel allocation, are received by June 10. In a normal year, trawlers are unable to fully harvest their allocations, and some of the trawl gear allocations are reallocated to non-trawl sectors. If trawlers tended to harvest a larger proportion of their BSAI allocations in the Bering Sea because of restrictions in the Aleutian Islands, reallocations to non-trawl sectors may be reduced.

Non-trawl catcher/processors active in the Aleutian Islands also have a history of activity in the Bering Sea. Comparisons of vessels that fish in the Aleutian Islands indicate there are relatively small differences in weekly catch rates in the Aleutian Islands versus the Bering Sea by those same vessels and at those same time periods. Table 8-57 shows annual weekly average harvest in the Bering Sea, expressed as a percentage of annual weekly average harvest in the Aleutian Islands, for the vessels that

[87] Section 8.2.16 provides a more detailed discussion of the Aleutian Islands/Bering Sea split in the BSAI Pacific cod specifications.

were active in the Aleutian Islands B-season in each year. In the Aleutian Islands, most non-trawl catcher/processor effort occurs in the B-season and is spread out along the entire Aleutian chain.

Table 8-57 Comparison of average Pacific cod B-season weekly harvest rates in the Bering Sea and the Aleutian Islands for vessels active in the Aleutian Islands

Year	Number of vessels	Average Weekly Aleutian Islands Catch	Average Weekly Bering Sea Catch	Ratio of Bering Sea average weekly catch to that of Aleutian Islands
2004	*3*	39.66	54.80	1.38
2005	*2*	C	C	C
2006	*4*	42.31	65.80	1.56
2007	*5*	78.14	55.63	0.71
2008	*10*	52.28	66.62	1.27
2009	*8*	48.72	48.82	1.00
2010	*7*	40.21	55.33	1.38
2011	*4*	35.40	60.72	1.72
2012*	*2*	C	C	C

Notes: number of vessels is the number targeting Pacific cod in the Aleutian Islands in the year shown. "C" indicates confidential information. *Partial year
Source: NMFS AKR calculation from CAS, September 5, 2012.

As discussed in Section 8.3, in some years the trawl sectors may be unable to effectively harvest additional Pacific cod in the Bering Sea to make up for the loss of Pacific cod fishing opportunities in the Aleutian Islands. If that is the case, the unused trawl allocation may be reallocated to other fleets, and may find its way to the non-trawl catcher/processor fleet, towards the end of the year. The hook-and-line catcher/processor sector normally receives reallocations of BSAI Pacific cod TAC from other fishing sectors that are likely to be unable to take their full allocations. Between 2004 and 2009, these reallocations ranged between about 1,100 metric tons and about 22,200 metric tons. The fleet has shown the ability to harvest these reallocations in the Bering Sea. The annual Aleutian Islands harvest during this period, between about 2,600 metric tons and about 6,400 metric tons, is near the lower end of this range of reallocations. This suggests that the fleet will have the capacity to harvest the fish forgone in the Aleutian Islands, by shifting effort to the Bering Sea, if Bering Sea TAC levels made this possible.[88]

A shift in the location of Pacific cod harvests by this sector would be associated with changes in the incidental catch of other groundfish species, and of PSC species; however, changes in PSC amounts appear unlikely to constrain Bering Sea production by this fleet. The relevant incidental catch and PSC rates for the Aleutian Islands and the Bering Sea are summarized in Table 8-58.

[88] In 2011, the freezer longline fleet left about 2 percent of the available TAC in the water (1,975 mt). This was largely due to slower than expected summer harvest rates and the fleet not fishing as soon as they could. Some vessels expected harvest rates similar to those in earlier years, since the cooperative eliminated much of the competition for harvest shares, decided to stand down from fishing during part of the summer. However, with the slower rates that were actually experienced, they did not have enough time to fully harvest their quotas (NMFS AKR In-season management staff).

Table 8-58 Estimated PSC catch rates per metric ton of non-trawl catcher/processor groundfish harvest, and rates of prohibited species catch (averages for 2004 through 2011)

	PSC AI	PSC BS	Units
C. bairdi	2.688	.600	Crab/mt groundfish
C. opilio	3.234	1.321	Crab/mt groundfish
Red king crab	.011	.076	Crab/mt groundfish
Halibut	7.862	3.923	kg mortality/mt groundfish
Chinook salmon	0	0	Salmon/mt groundfish
Other salmon	.001	.002	Salmon/mt groundfish

Note: Ratios and percentages were calculated to show the metric tonnage of the incidental or PSC species per metric ton of retained and discarded target species.
Source: NMFS AKR Catch Accounting System, September 5, 2012.

A comparison of the average BSAI-wide Pacific cod retained catches in 2010 and 2011 for the vessels active in the Aleutian Islands with the vessels that only fished in the Bering Sea suggests that the vessels fishing in the Aleutian Islands in 2010 gained ground in terms of the volume of Pacific cod harvested, relative to the vessels that only fished in the Bering Sea. Vessels fishing in the Aleutian Islands in 2010 averaged 2,060 metric tons BSAI-wide, of which a large proportion, 829 metric tons, came from fishing in the Aleutian Islands. These vessels retained 2,706 metric tons from the BSAI in 2011, of which only 112 metric tons came from the Aleutian Islands. Thus, for these vessels, the large drop in Aleutian Islands harvests was offset by an increase in Bering Sea harvests.[89] (NMFS AKR In-season management data summary, August 30, 2012)

In volume terms, these vessels appear to have gained ground slightly in 2011, compared to vessels that only fished in the Bering Sea in 2010. Vessels that only fished in the Bering Sea averaged 2,509 metric tons in 2010, and averaged 3,203 metric tons in 2011. These vessels had a 28 percent increase in their average harvests in 2011, but the vessels that fished in both the Aleutian Islands and Bering Sea in 2010 had a 31 percent increase. (NMFS AKR In-season management data summary, August 30, 2012)

Conceivably, a shift of vessels out of the Aleutian Islands could create congestion on the fishing grounds and reduce harvest rates for vessels already operating in the Bering Sea. The potential for this may be limited by the large area in the Bering Sea within which non-trawl catcher/processors can fish productively. The extensive sea ice in the Bering Sea in 2012 provided a natural experiment on the extent to which sector production may be constrained by spatial limits. In 2012, the ice edge covered much of the area exploited by non-trawl catcher/processors in 2011. This compressed all fleets, including freezer longliners, into a much smaller area from January through March. Even with this, catch rates remained well above average and the entire A-season allocation of all gear groups was achieved. It is possible that ongoing license buyback and cooperative-driven fleet consolidation in the hook-and-line catcher/processor fleet may also mitigate potential congestion.

While the non-trawl catcher/processor vessels may be able to offset the volume loss of Pacific cod by redeploying into the Bering Sea, the shift will nevertheless have adverse implications for the fishing operations. These vessels had originally gone to the Aleutian Islands because they expected—given vessel configuration, captain's skills, and marketing networks—that the Aleutian Islands would be the most profitable destination. Restrictions that force redeployment to other fishing grounds, move the vessels towards what are likely to be less profitable fisheries.

[89] But only in volume, not necessarily in value, terms. This comparison focuses only on the volumes of fish, and does not take account of the potential differences in the value of fish caught in the Aleutian Islands and the Bering Sea.

Industry sources indicate that fishery conditions are different in the Aleutian Islands and the Bering Sea. For example, they indicate that the size distribution of fish in catches tends to be skewed toward larger fish in the Aleutian Islands, and that the larger fish have a distinct market niche that receives a higher price. Thus, a shift towards the smaller fish found in the Bering Sea may constrain the industry's ability to service certain markets, and reduce the overall value of the harvest to the industry. See Table 8-6 on the average size of Pacific cod.

Other information indicates that fishing operations are different in the Bering Sea. The Bering Sea fishery tends to be a higher volume fishery, depending on fishing more gear and fishing it more intensively. This may affect operations on the cost side. For example, the Bering Sea fishery may be more bait intensive (Hosmer, personal communication).[90] In addition to increasing this element of fishing costs, this may also affect demand for, and the price of, bait.

Incidental catch of skate and shark species is higher in the Bering Sea than the Aleutian Islands. It is possible that vessels displaced by increased regulation in the Aleutian Islands could increase incidental catch of sharks and skates. Some skate species have value to freezer longliners. Increasing incidental catch of skates by displaced vessels could cause the TAC to be reached in less time than normal which would trigger a prohibition on further retention for those skates they catch incidentally. Sharks are primarily discarded and there is not a management concern under the current management of sharks. However, sharks are managed as a group of species. If the shark group was ever broken out, and sharks began to be managed as individual species, increased shark catch could be a constraining factor for the freezer longline sector.

Pacific cod in the Gulf of Alaska

While, as described in Section 8.2.2, many freezer longliner licenses carry endorsements to fish in the western and central GOA, freezer longline harvests in the GOA are constrained by sector allocation limits. In December 2009, the Council adopted Amendment 83, which superseded the inshore/offshore processing allocation of Central and Western GOA Pacific cod. In its place, Pacific cod TACs were allocated among a number of gear sectors, including freezer longliners. Freezer longliners were given an allowance of about 5.1 percent of the Pacific cod TAC, net of a jig harvest allocation, in the Central Gulf and 19.8 percent of the TAC, net of a jig harvest allocation, in the Western Gulf. Allocations reflected historical harvest patterns and became effective on January 1, 2012 (76 FR 74670, 74688; December 1, 2011). Freezer longlines shifting to the GOA from the BSAI would be members of the fishing cooperative, and this is likely to take steps to control intra-cooperative competition in the GOA.

Pot catcher/processors received joint western and central GOA allocations with pot catcher vessels under Amendment 83. However, several factors will limit the ability of pot catcher/processors to redeploy into the GOA. Of the five pot catcher/processors licensed to fish for Pacific cod in the Aleutian Islands, only one was endorsed to fish with pot gear in the western GOA (see Section 8.2.2). Pot catcher/processors will be further limited in fishing for Pacific cod in the GOA by crab sideboard limits, and by the fact that BSAI and GOA pot fishing seasons take place at the same time, so that a vessel fishing less in the Aleutian Islands would forego fishing in the Bering Sea if it shifted to the GOA.

[90] Chuck Hosmer, General Manager M/V *Baranof* and M/V *Courageous*. Personal communication, August 2010.

Other groundfish species

Non-trawl vessels can fish for halibut and sablefish, but these are individual fishing quota (IFQ) species, and would create few issues as vessels shifting into these species will have to fish their own individual fishing quota.

Conceivably, the action may lead freezer longliners to increase fishing effort for Greenland turbot in the BSAI. This could increase conflicts with Amendment 80 trawl catcher/processors, which might similarly seek to increase Greenland turbot effort as a substitute for lost Atka mackerel and Pacific cod fishing opportunities. There has been some concern about conflicts between these gear groups over this resource in recent years. At its June 2012 meeting, the Council adopted a draft purpose and need statement, and advance alternative regulatory actions for analysis. In 2013 and 2014, in the face of relatively low Greenland turbot stocks, the Freezer Longline Coalition and the Amendment 80 cooperatives reached a non-regulatory agreement to manage Greenland turbot catch which preserved the opportunity for a Bering Sea fixed gear directed fishery in the fall. (In-season management, personal communication, January 13, 2014).

However, the increased interest in Greenland turbot by the Amendment 80 trawlers and freezer longliners may be a consequence of rationalization in the two fisheries as well as of efforts to find substitute species. Amendment 80 removed the allocation of halibut PSC limits to specific target species groups and instead gave the Amendment 80 cooperatives one halibut PSC limit that they could use for any target species. In 2008, with the advent of Amendment 80, and of specification of halibut PSC limit changes that opened Greenland turbot to directed fishing by Amendment 80 vessels in a cooperative, the trawl catcher/processor in the Amendment 80 cooperative fleet began increasing its participation in the Greenland turbot fishery. The freezer longline fleet has recently adopted a fishing cooperative that allocates quota shares and is leading to increased rationalization of that fishery. One apparent consequence is a change in freezer longline participation in the Pacific cod fishery over the course of the year. Pacific cod fishing is now spread more evenly over the whole year. Freezer longliners used to fish for Greenland turbot in summer, between early and late Pacific cod fishing. With Pacific cod fishing taking place all year, they also have more time for Greenland turbot at different seasons, however, Greenland turbot opens for directed fishing on May 1 each year.

Freezer-longline participation is prohibited in the Pacific Northwest sablefish fishery, so Pacific cod longline catcher/processors could not be used there (J. Seger, personal communication, 2010).

Indirectly impacted sectors

Non-trawl catcher/processors redeploying from the Aleutian Islands focus on Pacific cod. Impacts of redeployment into the Aleutian Islands and Bering Sea are likely to be mitigated by BSAI Pacific cod sector allocations, the large fishing areas available in the Bering Sea, and the existence of a fisheries cooperative allocating BSAI catches among freezer longliners. That said, if the Bering Sea Pacific cod quotas would otherwise have been fully harvested, new activity by freezer longliners in the Bering Sea would come at the expense of operations already there. Moreover, reallocations of Pacific cod from trawl operations to freezer longliners may be reduced.

8.4.4 Alternative 1 Summary

As the non-trawl catcher/processors redeploy to minimize the impact of the restrictions imposed by the interim final rule, their costs, as well as their revenues, will also change. Any revenue reductions associated with reduced fishing for Pacific cod in the Aleutian Islands may be accompanied by reductions

in the variable costs (e.g., crew, vessel, skipper, and other revenue shares, fuel, food expenses) of fishing in the Aleutian Islands. Shifts to other fisheries, and new revenue streams from those fisheries, will be accompanied by changes in variable costs from fishing in those areas. To the extent that skippers and crew must become familiar with fishing in new areas or for new species or that vessels were better adapted to the old fisheries than the new ones, the operations will incur costs associated with learning, or with reconfiguring vessels, to operate in the new fisheries. These may take the shape of lower catch per unit of effort in the new fisheries, and, thus, higher variable costs for any given volume of catch. NMFS does not have data that would allow it to estimate the size of these possible costs.

Vessels may receive a lower price for Pacific cod in the Bering Sea than they had been receiving in the Aleutian Islands, given the reported differences in fish size and price between the two areas. Reductions in the supply of Aleutian Islands Pacific cod may increase the prices received for that supply segment, while increased supplies of smaller cod may lead to reduced prices in that market segment. To the extent that vessels must operate in new fisheries with new markets, firms may face a marketing learning curve as they develop new marketing channels. As before, NMFS does not have data that would allow it to estimate the size of these possible costs.

The mean annual value of wholesale gross revenues at risk in the Aleutian Islands from Alternative 1 (Table 8-56) would have been about $7 million during the baseline years (2004 through 2010). The annual wholesale gross revenue at risk in this period ranged from about $3 million up to about $14 million. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Deduct costs to cover the reduction in variable operating costs associated with reduced fishing for Pacific cod in the Aleutian Islands;
- There may be an impact on prices, since this action may lead to higher prices (all other things equal) for larger sizes of Pacific cod, given the reduction in the production of reportedly larger sizes of Pacific cod typical of the Aleutian Islands fishery;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Adjust revenues if vessels receive lower prices from smaller Pacific cod in the Bering Sea;
- Fleet redeployment may lead to reduced Pacific cod availability for vessels already there if the quota would otherwise have been taken. This is more likely to affect non-trawl vessels already in the Bering Sea since trawlers tend target Pacific cod earlier in the year.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated.

8.4.5 Alternative 4

Alternative 4 recreates the regulatory environment faced by the non-trawl catcher/processors in 2010, the year before the interim final rule took effect. Thus, the analysis of the impact of Alternative 4 on Pacific cod harvests, and on gross revenues from these sources, can be carried out with information in the analysis of Alternative 1. Compared to the baseline, this alternative has no adverse impacts on gross revenues. Compared to Alternative 1, Alternative 4 would have avoided placing an average of about $7 million in wholesale gross revenues per year at risk during the baseline years.

These are not net outcomes, since as explained above they do not take account of changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

8.5 Trawl catcher vessels (Alternatives 1 and 4)

8.5.1 Catches

Table 8-59 summarizes the volumes of Pacific cod delivered to shoreside processors, and to catcher/processors acting as motherships, by trawl catcher vessels, from 2004 through 2010 (the baseline catch). The table provides estimates of the volumes of retained catch coming from critical habitat areas that are closed under Alternative 1 (catch at risk), as well as volumes coming from areas that remain open under the alternative (residual catch). Finally, the table shows the estimated percentage of the baseline catch that came from areas remaining open under the alternative.

Sector production data for Area 543 are confidential, in years when production took place, because of the small numbers of vessels and processors involved. For the Aleutian Islands, production is relatively consistent, in the range of about 12,700 metric tons to about 15,000 metric tons, except for the two years 2005 and 2006, when it was in the range of about 6,900 metric tons to about 8,000 metric tons. A comparison of counts of catcher vessels delivering shoreside, in Table 8-24, and of trawl catcher vessels delivering to motherships, in Table 8-3, indicates that the sector in Area 543 delivers to catcher/processors acting as motherships.

The estimates in the table indicate that the interim final rule would have closed areas from which relatively large amounts of baseline production were obtained, leaving a residual retained catch of 52 percent to 65 percent of the baseline, depending on the year.

Table 8-59 Location of estimated aggregate trawl catcher vessel Pacific cod harvests in the Aleutian Islands, Alternative 1, from 2004 through 2010

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	10,916	2,533	0	13,449	4,040	1,566	0	5,606	6,875	967	0	7,843	58%
2005	6,731	1,239	0	7,969	2,899	690	0	3,589	3,831	549	0	4,380	55%
2006	5,185	S	C	6,907	786	S	C	2,411	4,399	S	C	4,496	65%
2007	10,847	S	C	13,228	3,484	S	C	5,214	7,363	S	C	8,015	61%
2008	10,183	S	C	13,994	1,764	S	C	5,473	8,419	S	C	8,521	61%
2009	9,676	S	C	15,025	1,943	S	C	5,895	7,733	S	C	9,131	61%
2010	8,325	S	C	12,746	1,742	S	C	6,056	6,583	S	C	6,690	52%

Notes: Metric tons round weight retained Pacific cod from targeted and incidental fishing (includes CDQ) delivered shoreside and to catcher/processors acting as motherships. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data. Source: NMFS AKR estimates using CIA data. Status quo data from January 25, 2013.

8.5.2 Gross revenues

Table 8-60 and Table 8-61 summarize estimates of the sector gross revenues during the baseline years, if the interim final rule had been in effect during those years. Estimates are provided at the ex-vessel level, and for the first wholesale value, received by processors, of fish purchased from the sector. As with other sectors, these estimates are obtained by identifying fleet retained catches from areas and times in which fishing would have been prevented by the interim final rule in a given year. The volume estimates were

converted to dollar terms using estimates of prices prevailing in the year. These revenue estimates overstate the total likely change in operation gross revenues in the years shown, because operations would have redeployed in an effort to minimize adverse impacts. Possible redeployment options are discussed in the following section. All revenue changes have been estimated in real "2012" dollars, and it is those estimates that are discussed here.

It can be determined from Table 8-60, the sector's estimated real ex-vessel gross revenues placed at risk averaged about $4 million a year during the baseline years, with annual changes ranging from about $2 million to about $7 million, depending on the year. It can also be determined from Table 8-61, the first wholesale gross revenues associated with the sector (accruing to shoreside processors and to catcher/processors acting as motherships) placed at risk by the action averaged about $8 million a year in the baseline years, and ranged between about $4 million and about $12 million, depending on the year. As shown in Table 8-61, the residual real wholesale gross revenues ranged from a low of 52 percent of baseline gross revenues, to a high of 65 percent of baseline gross revenues.

Table 8-60 Estimated aggregate total Pacific cod trawl catcher vessel fishery ex-vessel gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010

Nominal (millions of dollars)													
	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue from areas remaining open (residual revenues)				Open area revenue as % of baseline
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	5.2	1.2	0.0	6.4	1.9	0.7	0.0	2.7	3.3	0.5	0.0	3.7	58%
2005	3.6	0.7	0.0	4.2	1.5	0.4	0.0	1.9	2.0	0.3	0.0	2.3	55%
2006	4.1	S	C	5.4	0.6	S	C	1.9	3.4	S	C	3.5	65%
2007	10.4	S	C	12.7	3.3	S	C	5.0	7.1	S	C	7.7	61%
2008	12.6	S	C	17.3	2.2	S	C	6.8	10.4	S	C	10.5	61%
2009	4.9	S	C	7.7	1.0	S	C	3.0	4.0	S	C	4.7	61%
2010	4.2	S	C	6.5	0.9	S	C	3.1	3.3	S	C	3.4	52%
Real (millions of "2102" dollars)													
	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue from areas remaining open (residual revenues)				Open area revenue as % of baseline
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	6.1	1.4	0.0	7.6	2.3	0.9	0.0	3.2	3.9	0.5	0.0	4.4	58%
2005	4.2	0.8	0.0	4.9	1.8	0.4	0.0	2.2	2.4	0.3	0.0	2.7	55%
2006	4.6	S	C	6.1	0.7	S	C	2.1	3.9	S	C	4.0	65%
2007	11.4	S	C	13.9	3.6	S	C	5.5	7.8	S	C	8.5	61%
2008	13.3	S	C	18.2	2.3	S	C	7.1	11.0	S	C	11.1	61%
2009	5.2	S	C	8.1	1.1	S	C	3.2	4.2	S	C	4.9	61%
2010	4.4	S	C	6.8	0.9	S	C	3.2	3.5	S	C	3.5	52%

Notes: Includes retained catches by trawl catcher vessels, whether delivered shoreside or to catcher/processors acting as motherships. Values include the value of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish taken in Pacific cod target fisheries. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June each year. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA database. February 3, 2013.

Table 8-61 Estimated aggregate total wholesale gross revenues to processors of harvests by trawl catcher vessels in the Aleutian Islands, for Alternative 1, from 2004 through 2010

Nominal (millions of dollars)													
	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue from areas remaining open (residual revenues)				Open area revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	12.4	2.9	0.0	15.3	4.6	1.8	0.0	6.4	7.8	1.1	0.0	8.9	12.4
2005	9.2	1.7	0.0	10.9	4.0	0.9	0.0	4.9	5.3	0.8	0.0	6.0	9.2
2006	8.3	S	C	11.0	1.3	S	C	3.8	7.0	S	C	7.2	8.3
2007	23.2	S	C	28.3	7.4	S	C	11.1	15.8	S	C	17.2	23.2
2008	20.8	S	C	28.6	3.6	S	C	11.2	17.2	S	C	17.4	20.8
2009	10.8	S	C	16.8	2.2	S	C	6.6	8.7	S	C	10.2	10.8
2010	12.0	S	C	18.4	2.5	S	C	8.8	9.5	S	C	9.7	12.0
Real (millions of "2102" dollars)													
	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue from areas remaining open (residual revenues)				Open area revenue as % of baseline
	541	542	543	Tot	541	542	543	Tot	541	542	543	Tot	
2004	14.8	3.4	0.0	18.2	5.5	2.1	0.0	7.6	9.3	1.3	0.0	10.6	58%
2005	10.7	2.0	0.0	12.7	4.6	1.1	0.0	5.7	6.1	0.9	0.0	7.0	55%
2006	9.3	S	C	12.4	1.4	S	C	4.3	7.9	S	C	8.1	65%
2007	25.5	S	C	31.0	8.1	S	C	12.2	17.3	S	C	18.9	61%
2008	21.9	S	C	30.1	3.8	S	C	11.8	18.1	S	C	18.3	61%
2009	11.5	S	C	17.8	2.3	S	C	7.0	9.2	S	C	10.8	61%
2010	12.5	S	C	19.2	2.6	S	C	9.1	9.9	S	C	10.1	52%

Notes: Includes retained catches by trawl gear catcher vessels, whether delivered shoreside or to catcher/processors acting as motherships. Values include the value of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish taken in Pacific cod target fisheries. Values are unweighted averages of the at-sea wholesale value of trawl catcher vessel retained catches, and the shoreside wholesale value of trawl catcher vessel retained catches. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June each year. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA database. March 30, 2013.

8.5.3 Fleet redeployment and impacts on other fisheries

As shown in Table 8-29, the vessels in this category that are active in the Aleutian Islands in any year, also participate in other fisheries. In 2010, the last year before the interim final rule came into effect, these vessels[91] earned about 16 percent of their revenues from Pacific cod in the Aleutian Islands. Other groundfish revenues in the Aleutian Islands, or elsewhere in the Bering Sea and Aleutian Islands (BSAI) or Gulf of Alaska (GOA), accounted for about 72 percent of the revenues, other Alaska revenues accounted for about 8 percent, and fishing in other West Coast fisheries accounted for about 5 percent. Trawl vessels operating on the West Coast may be involved in Pacific whiting, flatfish, or anchovy fisheries (Fraser, personal communication, September 5, 2012)[92].

Trawl catcher vessels may adjust to more restrictive regulations in the Aleutian Islands by shifting their Pacific cod fishing to trawling (1) the remaining unrestricted waters in the Aleutian Islands, (2) for Bering Sea Pacific cod, (3) for GOA Pacific cod, or (4) in other Bering Sea or GOA groundfish fisheries.

[91] It is worth noting that these vessels are the fleet of trawl catcher vessels that actually fish in the Aleutian Islands in any one year. Not all the trawl catcher vessels authorized to fish in the BSAI fish in the Aleutian Islands in any year, and there is some turnover from year to year in the vessels that do so.

[92] Dave Fraser. Adak Community Development Corporation.

Aleutian Islands Pacific cod trawl fishing

The estimates of the impacts of the action on Pacific cod retained catches, described in Table 8-59, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to fishing under the interim final rule, and assuming that this Pacific cod could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled, "Residual catch as % of historical," show the volumes coming out of areas of the Aleutian Islands that would remain open under the action. As shown in that table, depending on the year, from 52 percent, to 65 percent of the volume of Pacific cod retained by this sector in the Aleutian Islands came from areas that were to remain open under the status quo.

Alternative Pacific cod trawling opportunities in the Aleutian Islands are limited. The interim final rule prohibits the retention of Pacific cod in Area 543, and restricts the fishing areas considerably in Area 542. Opportunities remain in Area 541, but even these have been limited, compared to the baseline period. Most trawlable depths for Pacific cod are close to shore and within the 20 nm critical habitat designations.

Figure 3-11 and Figure 3-12 in Chapter 3, show the locations of harvest in 2004 through 2010 and 2011 and 2012 for trawl catcher vessels delivering to shoreside plants; Figure 3-13 and Figure 3-14 show the locations of harvest in these years for trawl catcher vessels delivering to motherships.

The figures with harvests by trawl catcher vessels making shoreside deliveries show the 2004 through 2010 concentration of harvest by these vessels in Area 541, in the area around Adak and to the east of Atka North Cape. The figures also show large reductions in harvests in both areas in 2011 and 2012. This may reflect the introduction of the interim final rule in 2011, however, it may also reflect the difficulties faced by the processing plant at Adak, which went bankrupt in 2009. The reopening of the plant in 2011 took place after the important March-April period for the trawl catcher vessel fishery.

The figures with the harvests by trawl catcher vessels delivering to catcher/processors acting as motherships show concentrations of harvest by these vessels in Area 541 just east of Atka North Cape, in Area 542 at the Petrel Banks, and in Area 543 in the Area of Shemya Island. A comparison of the figures shows the elimination of the Area 543 harvest in 2011 and 2012, a residual Area 542 harvest at the base of Petrel Banks, and an increased harvest to the east of Atka North Cape.

If numbers of trawl catcher vessels continued to operate in the Aleutian Islands, there could be increased congestion in the remaining fishing areas. As shown in Table 8-24, the number of trawl catcher vessels delivering to shore based plants dropped from 22 in 2009 and 2010, to six in 2011, then increased to 10 by mid-summer 2012. On the other hand, as shown in Table 8-3, the number of trawl catcher vessels delivering to catcher/processors operating as motherships increased from five in 2010, to 11 in 2011, and 12 in 2012. It is not clear how decreases in vessel activity on the scale implied by summing both classes of catcher vessels would affect grounds congestion.

Bering Sea Pacific cod trawl fishing

The trawl catcher vessel sector receives a sectoral allocation of Pacific cod that may be fished in either the Aleutian Islands or the Bering Sea. Therefore, if trawl catcher vessels are unable to harvest as much Pacific cod from the Aleutian Islands as they have in the past, they may be able to make up part, or all, of the loss in the Bering Sea.

However, as explained in Section 8.2.16, whereas in earlier years there was a single Pacific cod TAC for the entire BSAI, from 2014 forward there will be separate Pacific cod TACs for the Aleutian Islands and for the Bering Sea. Because of this, if the Bering Sea TAC would otherwise have been fully harvested, a

sectoral shift from the Aleutian Islands to the Bering Sea can only take place at the expense of another sector's ability to harvest Pacific cod in the Bering Sea.[93] Trawl catcher vessels may be at a relative advantage to fixed gear sectors with respect to this, since a large proportion of their seasonal allocations of Pacific cod are received in the winter and spring, while large proportions of fixed gear allocations are received in the summer and fall. Many trawlers are also AFA vessels, operating under a quota system that extends to Pacific cod, and this should provide a framework for structuring intra-sectoral harvesting and controlling competition.

From 2004 through 2010, the BSAI trawl catcher vessels fishing for Pacific cod took between 21 percent and 51 percent of their Pacific cod harvests from the Aleutian Islands, and this percentage increased each year between 2006 through 2009. The percentage decreased to about 45 percent in 2010, perhaps reflecting difficulties in processing at Adak that year. In 2011, when the interim final rule became effective, the percentage decreased to 19 percent (NMFS AKR In-season management staff).

Despite the reduction in retained catch coming from the Aleutian Islands in 2011, the first year in which the interim final rule was in effect, the BSAI trawl catcher vessel fleet took over 99 percent of it's A- and B-season BSAI Pacific cod allocations. This was slightly greater than the 96 percent of it's A- and B-season allocations it took in 2010, the year before the interim final rule became effective.[94] (Bering Sea Aleutian Islands Catch Report [includes CDQ])

Trawl halibut PSC rates are higher in the Bering Sea than in the Aleutian Islands. Table 8-62 summarizes PSC rates for this fishery. Halibut PSC limits could potentially prevent trawl catcher vessels that historically participated in the Aleutian Islands from catching as much Pacific cod in the Bering Sea. Halibut PSC was relatively low in 2011, when only 240 metric tons were taken out of the 453 metric ton PSC limit. The halibut PSC was higher in 2012, 430 metric tons out of 453 metric tons, but it was not, ultimately, necessary to close the fishery (NMFS AKR in-season managers).

Table 8-62 Estimated prohibited species catch rates per ton of catcher vessel groundfish harvest (averages for 2004 through 2012)

	PSC rate AI	PSC rate BS	Units
C. bairdi	.042	1.182	Crab/mt groundfish
C. opilio	.025	.398	Crab/mt groundfish
Red King crab	.092	.026	Crab/mt groundfish
Halibut	.0013	.014	mt mortality/mt groundfish
Chinook salmon	.041	.049	Salmon/mt groundfish
Other salmon	.014	.017	Salmon/mt groundfish

Note: Rates were calculated to show the metric tonnage of the PSC species per metric ton of retained and discarded groundfish species.
Source: NMFS AKR Catch Accounting System.

If an increase in halibut PSC, caused by a shift in Pacific cod production from the low PSC Aleutian Islands to the higher PSC Bering Sea, were to cause sector Pacific cod harvests to decline, unused amounts of B-season trawl catcher vessel Pacific cod allocation would be rolled into the trawl catcher vessel C-season. Since the C-season allocation is rarely fully used by the trawl catcher vessel fleet, a large amount of this may be reallocated to other sectors. Based on 2011 and 2012, it appears highly unlikely that there would be unused amounts of Pacific cod in the A- and B-season. In those years, the

[93] Section 8.2.16 provides a more detailed discussion of the Aleutian Islands/Bering Sea split in the BSAI Pacific cod specifications.

[94] The sector also has a C-season during the second half of the year, but the fleet does not normally target Pacific cod at this time of year, and much of its sectoral allocation is reallocated to another sector. Thus, quota and harvest are not compared for this season.

fleet, even with a limited operation in the Aleutian Islands in 2011 (because of the lack of a shore based processor at Adak during the key fishing season) and with extremely high Pacific cod TACs (see Table 3-5, Chapter 3) was still able to harvest almost its entire A- and B-season allocations. Trawl catcher vessels in the Pacific cod fishery take relatively little crab or salmon PSC.

Representatives of the trawl and non-trawl catcher/processor fleets have indicated that they tend to receive higher prices per pound for Pacific cod taken in the Aleutian Islands, since these fish tend to be larger than those found in the Bering Sea. If this is also the case for this fleet as well, a shift to the Bering Sea may be associated with a reduction in revenues, even if overall retained catch levels are maintained.

Pacific cod fishing by trawl catcher vessels in the Bering Sea during the A- and B-seasons primarily occurs in an area known as the "Slime Banks." This area, north of Unimak Island, supports most Bering Sea fishing fleets during that period. This is due to a combination of productive fishing for multiple species and an area that remains ice free from January through April. Additional congestion by vessels that are displaced by more restrictive regulations in the Aleutian Islands is possible. However, the likely impacts appear to be minimal. In 2012, the Bering Sea ice edge extended further than normal during the A- and B-season. The "Slime Banks" remained one of the only ice free areas of the Bering Sea. More vessels were fishing in this area than normal, yet the fleets were still able to harvest their allocations of Pacific cod in less time than normal. This suggests that additional congestion on the "Slime Banks" by displaced vessels may not have much impact.

Vessels fishing Pacific cod in the Aleutian Islands in 2010 averaged 596 metric tons of Pacific cod BSAI-wide, of which most, 484 metric tons, came from fishing in the Aleutian Islands. These vessels retained 589 metric tons from the BSAI in 2011, of which 235 metric tons came from the Aleutian Islands. Thus, while Aleutian Islands retained catches dropped by about half in 2011, overall BSAI retained catches for these vessels remained about the same, suggesting they made up most of their Pacific cod retained catches by increased activity in the Bering Sea (NMFS AKR In-season management data summary).

However, these vessels appear to have lost ground in 2011, relative to vessels that only fished in the Bering Sea. Vessels that only fished in the Bering Sea in 2010, averaged 464 metric tons that year. In 2011, they averaged 703 metric tons. This could be due to slower A-season pollock fishing in 2011. Many Aleutian Islands Pacific cod vessels also target Bering Sea pollock. These vessels typically join the Pacific cod fishery when they are finished with their AFA pollock. At this time, late March/early April, Pacific cod aggregations in the Aleutian Islands are starting to show up. In 2011, with slower fishing and relatively low Chinook salmon PSC, these vessels joined the Pacific cod fishery later than normal. This gave more opportunity to the Bering Sea Pacific cod only vessels to harvest more Pacific cod before NMFS closed the fishery. Thus, these vessels saw a substantial increase in their average harvests in 2011, which was not shared by the vessels that had been active in the Aleutian Islands in 2010. (NMFS AKR In-season management data summary)

GOA Pacific cod trawl fishing

There have been suggestions that trawl catcher vessels fishing for Pacific cod in the Aleutian Islands may shift their operations into GOA Pacific cod fisheries as a result of this action. It has been hypothesized that additional competition for Pacific cod could lead to shorter seasons, reduced revenues for vessels already active in those fisheries, and adverse economic impacts on GOA communities (Park, 2010).

While a shift to the GOA cannot be ruled out, there are several factors that will constrain it: (1) limitations imposed by the combinations of endorsements on LLP licenses, (2) the timing of Pacific cod fishing in the two areas, and (3) the restrictions placed on trawl catcher vessel fishing in the GOA by the new sector allocations. NMFS did not observe catcher vessels moving from the Bering Sea to the GOA as a result of

the interim final rule in 2011 or 2012. The BSAI trawl catcher vessel A- and B-season allocations were almost fully harvested in 2011 and 2012. (NMFS AKR In-season management staff)

Shifts in trawling activity will be constrained by differences in timing between fisheries in the two areas. The GOA Pacific cod fishery is largely complete before the Aleutian Islands fishery gets underway. Thus, the fleet participating in the Aleutian Islands Pacific cod fisheries has limited opportunities to shift to GOA Pacific cod during the period when Aleutian Islands fishing might be limited by regulation. This remains the case, even with the Pacific cod sector splits. This should limit the extent to which vessels shift between the fisheries (assuming these vessels are fully subscribed during the entire fishing year). As shown in Table 8-63, Western and Central GOA Pacific cod fisheries are open from late January until late February or early March, and, normally, the Aleutian Islands Pacific cod trawl catcher vessel fishery does not begin until mid- to late-February. Aleutian Islands Pacific cod are only aggregated enough to be efficiently fished with trawl gear between late February and April. As shown in Figure 8-4, most harvests of Pacific cod in the Aleutian Islands take place after the GOA fisheries close. Vessels that fish in the Aleutian Islands Pacific cod fishery are normally active in other fisheries prior to March, some of these vessels are in the GOA.

Table 8-63 Closure dates for the GOA Trawl Pacific cod A-season fishery compared to Aleutian Islands fishing periods

Year	Western Gulf	Central Gulf	Week ending date for first week contributing 10% or more to cumulative AI harvest
2004	February 24	January 31	February 28
2005	February 24	January 26	February 26
2006	February 23	February 23	February 18
2007	March 8	February 27	February 24
2008	February 29	February 20	February 16
2009	February 25	January 27	February 28
2010	February 19	January 31	February 27
2011	February 16	January 29	February 26
2012	February 22	March 26	February 18
2013	February 14	March 23	February 23

Notes: Pacific cod A-season inshore closures. The late closure in the Central Gulf in 2012 is due to the fleet response to the Pacific cod sector split and poor trawl catch rates in the Central GOA.
Source: AKR web site; NMFS AKR in-season management calculations.

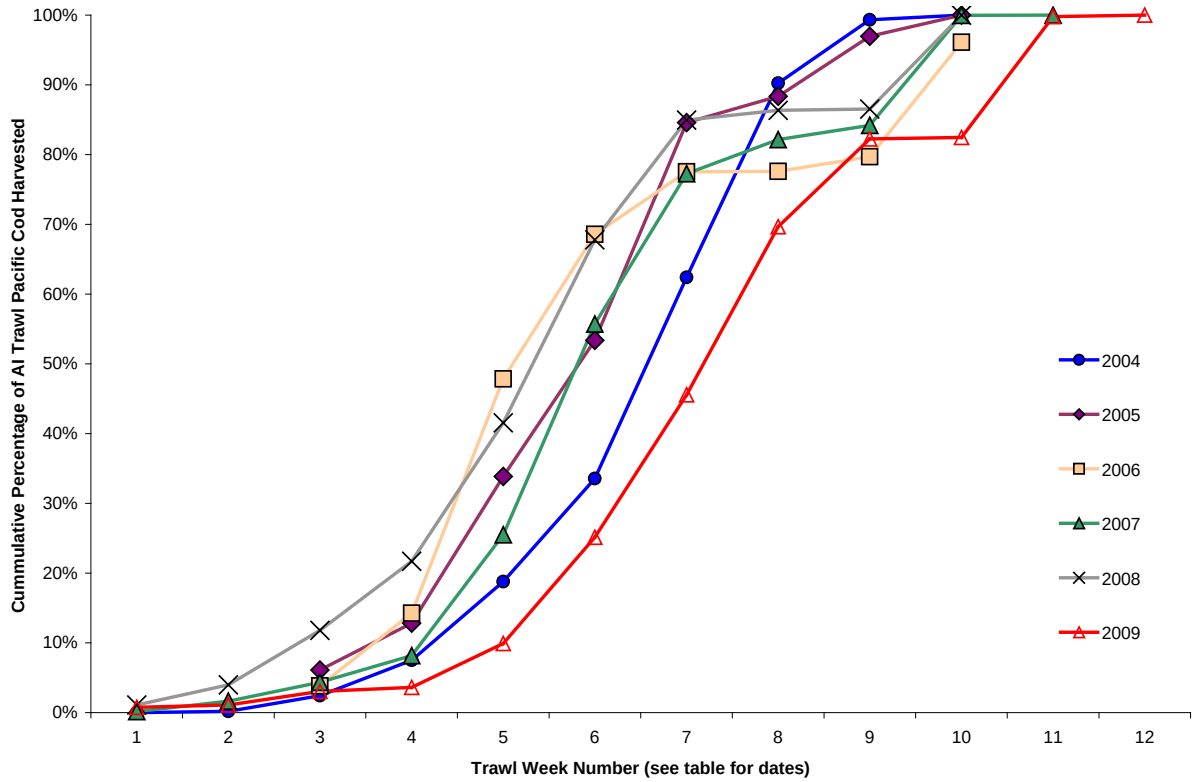


Figure 8-4 Cumulative percentage trawl catcher vessel Pacific cod harvests in the Aleutian Islands, prior to June 10 (by statistical week)

Starting in 2012, trawl catcher vessels have been subject to the provisions of Amendment 83 to the Fishery Management Plan for Groundfish of the Gulf of Alaska, which allocated Pacific cod total allowable catch in the Western and Central GOA areas among various gear and operational sectors. Trawl catcher vessels receive 38.4 percent of the TAC in the Western GOA, and about 41.6 percent in the Central GOA. These allocations were divided between the A- and B-seasons, with 60 percent for the A-season, and 40 percent for the B-season. (76 FR 74670, 74688; December 1, 2011) This will limit the scope for competition between trawl catcher vessels shifting to the GOA and catcher/processors using trawl gear; however, it does not eliminate the potential for competition with other catcher vessels that may be targeting GOA Pacific cod.

Other BSAI or GOA groundfish fisheries

These vessels have limited opportunities for redeployment into other BSAI or GOA groundfish fisheries. Access to most BSAI flatfish species is precluded as a result of Amendment 80 allocations, and pollock is fully allocated under the provisions of the AFA. Access to species such as arrowtooth, rex sole, and Kamchatka flounder are precluded, because there is no halibut PSC allowance for those fisheries. Only a few vessels rely solely on Pacific cod in the Bering Sea. While there are some flatfish allocations available for BSAI trawl limited access vessels in the Bering Sea, the fishery is small because of limited local markets (NMFS AKR in-season management). Although the data are confidential, there has been some activity by catcher vessels delivering yellowfin sole, Pacific ocean perch, and Atka mackerel to

motherships and catcher/processors acting as motherships; this process began with the introduction of Amendment 80 in 2008, and it is not clear it is related to the interim final rule.

The State of Alaska manages Guideline Harvest Level (GHL) fisheries for Pacific cod in the Prince William Sound, Cook Inlet, Kodiak, Chignik, and South Peninsula areas. These occur at times when the Federal/parallel fisheries in adjacent waters are closed. Legal gear-types include pot, jig, and (in the Prince William Sound area) longline. Thus, unless the Board of Fisheries takes action to allow the use of trawl gear, these GHL fisheries are not available to Aleutian Islands trawlers. (NPFMC 2011b)

Indirectly impacted sectors

There do not appear to be many fisheries that may be indirectly impacted by shifts in the fishing activity of the trawl catcher vessels operating in the Aleutian Islands. The sector fishes against a BSAI-wide Pacific cod allocation and vessels may shift into the Bering Sea. The principally affected fleet there is likely to be other trawl catcher vessels, which may be affected by increased competition for Pacific cod, and, possibly, crowding. The potential for this fleet to fish for Pacific cod in the GOA is limited. The potential to fish for other Federal groundfish is also limited.

8.5.4 Alternative 1 summary

As the trawl catcher vessels redeploy to minimize the impact of the restrictions imposed by the interim final rule, their costs, as well as their revenues, will change. Revenue reductions associated with reduced fishing for Pacific cod in the Aleutian Islands will be accompanied by reductions in the variable costs (e.g., crew, vessel, skipper, and other revenue shares, fuel, food expenses) of fishing in the Aleutian Islands. Shifts to other fisheries, and new revenue streams from those fisheries, will be accompanied by changes in variable costs from fishing in those areas.

To the extent that skippers and crew must become familiar with fishing in new areas or for new species or that vessels were better adapted to the old fisheries than the new ones, the operations will incur costs associated with learning to operate in the new fisheries. These may take the shape of lower catch per unit of effort in the new fisheries and, thus, higher variable costs for any given volume of catch. NMFS does not have data that would allow it to estimate the size of these possible costs. As previously discussed, changes in the size of cod and market niches could impact prices, even if total landings are unchanged.

The mean annual value of processor wholesale gross revenues from trawl catcher vessels at risk in the Aleutian Islands from Alternative 1 (Table 8-61) would have been about $8 million during the baseline years (2004 through 2010). The annual wholesale gross revenue at risk in this period ranged from about $4 million to about $12 million. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Deduct costs to cover the reduction in variable operating costs associated with reduced fishing in the Aleutian Islands;
- There may be an impact on prices, since this action may lead to higher prices (all other things equal) for larger sizes of Pacific cod, given the reduction in the production of reportedly larger sizes of Pacific cod typical of the Aleutian Islands fishery;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Adjust revenues if vessels receive lower prices from smaller Pacific cod in the Bering Sea;

- Fleet redeployment may lead to reduced Pacific cod availability for vessels already there if the quota would otherwise have been taken.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated.

8.5.5 Alternative 4

Alternative 4 recreates the regulatory environment faced by the trawl catcher vessels in 2010, the year before the interim final rule took effect. Thus, the analysis of the impact of Alternative 4 on Pacific cod harvests, and on gross revenues from these sources, can be carried out with the information in the discussion of Alternative 1. Compared to the baseline, this alternative has no adverse impacts on gross revenues. Compared to Alternative 1, Alternative 4 would have avoided placing an average of about $8 million in wholesale gross revenues per year at risk during the baseline years. As explained above, these are not net outcomes, since they do not take account of changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

8.6 Non-trawl catcher vessels (Alternatives 1 and 4)

Non-trawl catcher vessels fish with jig, pot, or hook-and-line gear and deliver to a processor (in a small number of cases, to a catcher/processor). These vessels participate primarily in Pacific cod fisheries and the individual fishing quota (IFQ) fisheries for sablefish and halibut. The Alternative 1 measures applicable to non-trawl catcher vessels were described in Section 8.1 of this chapter. This section describes the impact of the Alternative 1 and 4 measures in relation to the baseline for this fleet (2004 through 2010).

This is a small fleet, and much of the information about it is confidential. As defined, this fleet does not include non-trawl vessels that only fish in the State of Alaska's GHL fishery for Pacific cod, and it does not include vessels that make incidental harvests of Pacific cod or Atka mackerel while fishing halibut and sablefish quota shares in Federal waters around the Aleutian Islands. These incidental catches are not regulated by this action.

The Alternative 4 measures for this sector simply return the regulations to the way they were in 2010, the end of the baseline period. Thus, the impact of Alternative 4 is the reverse of the Alternative 1 impact. For this reason, these alternatives are discussed together here. The impacts of Alternatives 2 and 3, and their options, on this sector are discussed in Section 8.12 of this chapter.

8.6.1 Alternative 1

During the seven years from 2004 through 2010, twenty-six unique vessels made deliveries where the catch was predominantly Pacific cod (i.e., Pacific cod target). Of those vessels, ten used only hook-and line gear, seven used only jig gear, and six used only pot gear. Three other vessels used multiple gear types, all using jig and <u>either</u> hook-and-line <u>or</u> pot gear. Over this seven year period vessels made landings at four unique processors. Most vessels were less than 60 feet in length overall.

The small numbers of non-trawl catcher vessels retaining targeted Pacific cod, and the even smaller numbers of processors taking deliveries of Pacific cod from them, make it impossible to report the annual volumes and annual values of production from this sector, or estimates of the catch and revenues coming from critical habitat closed by the alternatives, even at the Aleutian Islands-wide area level. To address this confidentiality issue, Aleutian Islands production and value for the three management areas are reported in aggregate for the seven years 2004 through 2010.

These data suggest that about 554 metric tons of harvest came from areas that would have been in closed critical habitat over that period; this was about 56 percent of the baseline retained catch. Ex-vessel revenues associated with fish from closed areas are estimated to have been about $690,000 in aggregate (in real "2012" dollars), or about $99,000/year. Wholesale revenues received by processors associated with fish from closed areas are estimated to have been about $1.2 million, or about $171,000 a year. Residual ex-vessel revenues under Alternative 1 are estimated to be $490,000, or $70,000 a year, while residual wholesale revenues under Alternative 1 are estimated to be $850,000, or $121,000 a year.

Non-trawl catcher vessels affected by increased restrictions in the Aleutian Islands also participate in other fisheries. Of the 26 unique vessels from 2004 through 2010, 17 participated in other Federal or parallel GOA fisheries during those years. Most of those vessels participated in other Pacific cod fisheries in both the Bering Sea and the GOA between 2004 through 2010. This suggests that the majority of vessels that participated in the non-trawl catcher vessel Pacific cod fisheries in the Aleutian Islands are mobile and diversified. On average, Aleutian Islands directed Pacific cod catch represents less than 12 percent of total retained groundfish catch harvested by these vessels between 2004 and 2010.

The six vessels that show no other Federal groundfish activity range from 32 feet to 38 feet length overall. All of those vessels only participated in the Aleutian Islands Pacific cod fishery in one year, between 2004 and 2010.

Only five of the 26 vessels that participated in the Aleutian Islands non-trawl Pacific cod fishery participated in more than one year. This may mean that the majority of vessels that participated in this fishery participated in a way that was exploratory in nature, and that they did not rely on the fishery. The vessels with more than one year's participation may be impacted to a greater extent by more restrictive regulations in the Aleutian Islands.

Most vessels impacted by more restrictive regulations in the Aleutian Islands are likely to continue to participate in other Pacific cod fisheries, and in the GOA and Aleutian Island State GHL fisheries. They may continue to participate in the BSAI, less than 60-foot hook-and-line and pot fishery and the BSAI jig fishery, but by fishing in the Bering Sea rather than the Aleutian Islands. Some of these vessels have historical participation in the Bering Sea fisheries.

As discussed in Section 8.2.16, the Council has created separate Aleutian Islands and Bering Sea OFLs, ABCs, and TACs for Pacific cod. This split of the BSAI Pacific cod specifications into two separate specifications may mean that vessels shifting from the Aleutian Islands to the Bering Sea can only increase their Bering Sea production at the expense of vessels already active in the Bering Sea. Consult Section 8.2.16 for more details.

There could be movement of these vessels into GOA Pacific cod fisheries, if they have the proper license limitation program endorsements to participate. Some of these vessels already participate in those fisheries, and thus impacts on these fisheries may be small.

IFQ sablefish and halibut are available if the vessel operators wish to purchase or lease IFQ quota shares. However, that option is likely to be expensive for the vessels impacted. Opportunities, other than those listed, appear limited for the vessels in this sector.

The estimated mean annual value of ex-vessel gross revenues at risk in the Aleutian Islands from Alternative 1 would have been on the order of about $99,000 during the baseline period (2004 through 2010), while the estimated mean annual wholesale revenues at risk would have been about $171,000 a year. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Deduct costs to cover the reduction in variable operating costs associated with reduced fishing in the Aleutian Islands;
- The small amounts of Pacific cod involved, and the likelihood that the fleet would make it up in other areas, suggest that this would have negligible price impacts;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Vessels shifting from cod fishing in the Aleutian Islands to cod fishing in the Bering Sea may receive lower prices after making the shift;
- The small size of this fleet, as well as the size of vessels that comprise this fleet, and its apparent involvement in fisheries outside of the Aleutian Islands, suggest that a shift to other fisheries would have a negligible impact on participants in those fisheries.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated, except that they appear to be relatively small in an absolute sense.

8.6.2 Alternative 4

Alternative 4 partially recreates the regulatory environment faced by the non-trawl catcher vessels in 2010, the year before the interim final rule took effect. Thus, compared to the baseline, this alternative has no adverse impacts on gross revenues. Compared to Alternative 1, Alternative 4 avoids placing about $99,000 in annual ex-vessel gross revenues at risk each year during the baseline period. If this is evaluated at the processor first wholesale level, Alternative 4 avoids placing about $171,000 at risk each year during the baseline period. The ex-vessel and wholesale measures are alternative measures of impact, but they cannot be added together. To do so would double count the ex-vessel component, which is included in the wholesale measure (since the processors pay it to the catcher vessels out of their wholesale revenues). These are not net costs, since (as discussed above) they do not take account of changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

8.7 Pollock (Alternatives 1 through 4 and their options)

8.7.1 Introduction

Table 8-64, based on Table 2-22 in Chapter 2, summarizes and contrasts the main elements of the pollock alternatives. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

In addition to the measures described in Table 8-64, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 8.18.2.

The pollock alternatives originated during the 2012 meetings of the North Pacific Fishery Management Council's (Council's) Steller Sea Lion Mitigation Committee (SSLMC), and were modified by the Council at its December 2012 meeting. The Council's recommendations were reviewed by NMFS and altered where necessary to add precision, or address regulatory or management issues. In some instances measures may have been considered, but not further analyzed. Section 2.3 of Chapter 2 discusses these.

Chapter 3 describes the specification of the annual Aleutian Islands pollock fishery. In this fishery, the TAC, setting aside allocations for CDQ and an incidental catch allowance (ICA), is allocated to the Aleut Corporation as a directed fishing allocation (DFA).

Under Alternative 1, the status quo, there is limited directed pollock fishing in the Aleutian Islands. Directed fishing for pollock is prohibited in Steller sea lion critical habitat in the Aleutian Islands and pollock are found primarily in critical habitat. (Chapter 2 of this EIS) If the Bering Sea TAC is less than the ABC, the Aleutian Islands CDQ and DFA are normally reallocated to eastern Bering Sea fisheries early in the year.[95] Alternative 2 provides for pollock fishing opportunities in parts of Areas 541 and 542, and Alternatives 3 and 4 provide for more pollock fishing opportunities, and extend these into Area 543.

For Atka mackerel and Pacific cod, Alternative 4 is largely a return to the fishery as it was in 2010, before the interim final rule. However, there were limited pollock fishing opportunities in 2010, or at any time during the baseline years 2004 through 2010. For pollock, the Alternative 4 measures are the same as those for Alternative 3. Alternatives 2, 3, and 4 each have protective options (these are the same for each alternative). Alternatives 5 and 6 are described and evaluated in Section 8.13.

Figures in Chapter 2 show the pollock open areas proposed under Alternatives 2, 3, and 4, and their options. The figures for Alternatives 2, 3, and 4 have insets detailing open areas proposed for Amukta Pass, Atka North Cape, Kanaga Sound, the Rat Islands, and Shemya Island. Figure 3-18 in Chapter 3 shows the locations of pollock fishing in the 1990s (for reasons discussed later in this section, there has been no pollock fishing inside critical habitat in more recent years).

The appropriate baseline for this analysis is the years 2005 through 2012.[96] During these years, the CDQ groups and the Aleut Corporation were regulated by a consistent set of Steller sea lion protection measures and Aleut Corporation allocation rules. The baseline is relevant for describing the changes in activity, revenues, and costs caused by the alternatives. While the baseline is useful for measuring the changes caused by the alternatives, other information from non-baseline years is used in the analysis when appropriate. For example, ABCs from 1991 through 2012 are used below in Table 8-65 to create estimates of the possible range of Aleut Corporation pollock allocations under the alternatives. However, these allocations are compared to the baseline experience to determine whether the change in Aleut Corporation allocations under an alternative is large or small.

[95] If the Bering Sea TAC is equal to the ABC, it is not possible to reallocate the Aleutian Islands CDQ and DFA.

[96] In this, pollock differs from Atka mackerel and Pacific cod. For these species, as described earlier, the baseline years in this analysis are 2004 through 2010.

Table 8-64 Comparison of pollock elements of the alternatives

Alternative	Seasons	Area-wide Catch and Participation limits	Area 543	Area 542		Area 541
			Closures and catch limit	Closures and catch limit	Additional participation limits	Closures and catch limit
1	A season: 1/20–6/10.	Only CDQ and vessels registered with the Aleut Corporation in directed fishery.	Critical habitat closed to directed fishing.	Critical habitat closed to directed fishing.	None	Critical habitat closed to directed fishing.
		50% of Aleut Corp. directed fishery allocation to vessels ≤ 60 ft.				
	B season: 6/10–11/1.	When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ ABC.				
		Total A season apportionment no more than 40% of ABC.				
2	A season: 1/20–6/10.	Same as Alternative 1	No directed fishing in the area.	Critical habitat closed to directed fishing except for: - Rat Islands Area outside of 3 nm from Tanadak, Segula, and Krysi Point and 10 nm from Little Sitkin and Ayugudak, and -an area outside of 3 nm from Kanaga and Bobrof Island. Option: Kanaga area outside 10 nm closure at Kanaga/Ship rock. Option: Kanaga area outside 6 nm closure at Kanaga/Ship rock.	Option: prohibit directed fishing for pollock in Kanaga area by vessels ≥ 60 ft.	Critical habitat closed to directed fishing, except -an area at Atka North Cape outside of 3 nm from haulouts -an area at Amukta Pass outside of 3 nm from haulouts.
	B season: 6/10–11/1.			Protective Option: A season: close 0–10 nm from rookeries, close 0–20 nm from haulouts. B season: close 0–10 nm from rookeries and haulouts.		Protective Option: A season: close 0–10 nm from rookeries, close 0–20 nm from haulouts B season: close 0–10 nm from haulouts, close 0–20 nm from rookeries.
3 and 4	A season: 1/20–6/10.	Same as Alternative 1	Critical habitat closed except an area outside of 0–3 nm from Shemya, Alaid, and Chirikof haulouts.	Critical habitat closed 0–10 nm from rookeries and haulouts west of 178° W long., except open critical habitat in Rat Islands as under Alternative 2	None	Critical habitat closed to directed fishing 0–3 nm from haulouts and 0–10 nm from rookeries
				Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries east of 178° W long., except open critical habitat in Kanaga area as under Alternative 2.		Seguam Foraging Area closed to directed fishing.
	B season: 6/10–11/1.			Protective Option: Same as Alternative 2.		Protective Option: Same as Alternative 2.
5	Same as Alternatives 1, 2, 3, and 4	Same as Alternatives 1, 2, 3, and 4	Critical habitat closed except an area outside of 0–3 nm from Shemya, Alaid, and Chirikof haulouts and outside 20 nm of rookeries.	Critical habitat closed 0–20 nm from at rookeries and haulouts west of 178°W long. except open a portion of critical habitat at Rat Islands Area outside 3 nm from Tanadak, Segula, and Krysi Point, and 10 nm from Little Sitkin and Ayugudak	Same as Alternatives 1, 3, and 4	Critical habitat closed to directed fishing 0–3 nm from haulouts and 0–10 nm from rookeries
				Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries east of 178° W long., except open portions of critical habitat outside 3 nm from Kanaga and Bobrof Island.		Seguam Foraging Area closed to directed fishing.
			A season catch limit 5% of ABC.	A season catch limit 15% of ABC.		A season catch limit 30% of ABC.
6	Not applicable.	Not applicable.	No retention	No retention	Not applicable.	No retention

TAC=total allowable catch, ABC=acceptable biological catch, AI=Aleutian Islands

8.7.2 TAC based analysis

Table 8-65 provides estimates of the CDQ and Aleut Corporation allocations had the current allocation rules been in effect in the years from 1991 through 2014. As explained in Chapter 3 of this EIS, the Aleut Corporation and CDQ allocations have actually been in effect since 2005. This table goes back to 1991, however, to take advantage of the wider range of Aleutian Islands ABCs provided by this history, and to explain how these might affect CDQ and Aleut Corporation allocations. This table is driven by fluctuations in the ABC during this time; the incidental catch allowance (ICA) is assumed to be set at 1,600 mt, its level in 2013 and 2014. The table assumes the Aleut Corporation will seek to maximize the share of its allocation harvested during the relatively more lucrative A-season, and will not have A-season surplus to roll over to the B-season. Columns on the right hand-side show the amounts available to the American Fisheries Act (AFA), and dedicated small catcher vessel, sectors if (a) there is a 50/50 split as called for in regulations and all of the allocation is harvested, and (b) there is the same 50/50 split, but only the A-season harvest takes place, and the AFA sector harvests most of that.

Table 8-65 projects results for a range of ABCs from 23,800 mt to 101,460 mt. Higher ABCs would have no impact on the analysis, since the TAC would not change, and the Aleut Corporation A-season harvest would already be constrained to 40 percent of the TAC, minus the CDQ and ICA-seasonal allocations in any year. It is possible that ABCs could drop below 19,000 mt, in which case the TAC and Aleut Corporation allocations would also drop below the levels shown here. At ABCs below 19,000 mt, the Council could set a TAC below the ABC. While ABCs at these low levels cannot be ruled out, they have not been observed during this period. Over the period covered, the ABCs were large enough to allow a 19,000 metric ton TAC in every year. The Aleut Corporation would have been able to harvest from 7,960 mt to 15,500 mt (of its 15,500 mt annual DFA) in the A-season. This is important because, "Due to the low value of pollock carcasses ($0.09 per pound) and high value of roe ($1.10 per pound) and relatively low densities of pollock in other months, the fishery is thought to be only economically viable during March and April, shortly before spawning." (S. J. Barbeaux & Fraser, 2009: 1)[97]

The available information on pollock harvests within critical habitat make it impossible to estimate the volumes of catch that might have come from open and closed critical habitat if the alternatives had been in place during the baseline years. Likewise, it is not possible to project the revenues that would have been associated with those catches. The following revenue estimates are not predictions, but are meant to illustrate the potential magnitude of revenue flows.

Between 2007 and 2011, wholesale pollock prices received by catcher/processors in the Bering Sea and Aleutian Islands (BSAI) ranged between about $1,000 and $1,500 per mt round weight,[98] or between about $1,100 and $1,500 per mt round weight in inflation-adjusted 2012 dollars. During the same period, wholesale prices for shoreside processed pollock ranged from about $900 to about $1,300 per mt round weight, or between about $1,000 and $1,400 per mt in real 2012 dollars. Using this range of real prices, the gross revenues from the Aleut Corporation's allocation (assuming only the A-season was harvested, and that the catcher/processor fleet received its allocation with the balance allocated to the small vessel fleet)[99] would have ranged between about $9 million and about $23 million.[100]

[97] Barbeaux and Fraser cite a personal communication from Dave Fraser, Manager of Adak Fisheries, LLC.

[98] Prices as reported in Table 27 of the 2012 Groundfish Economic SAFE (Fissel et al. 2012).

[99] Since the catcher/processor wholesale price is higher, this tends to provide an upper limit on revenues. The Aleut Corporation may choose instead to prioritize access by the small vessel fleet. That is a policy decision it may have to make if both fleets can operate successfully in the region.

[100] The high prices have been used with the high volumes, on the assumption that the comparatively small share of BSAI pollock production coming from an Aleutian Islands fishery would have relatively small impacts on prices.

Table 8-65 Estimated Aleut Corporation directed fishing allowances, seasonal allocations, and sector splits, based on 1991 through 2014 ABCs (metric tons)

Year	ABC	TAC	CDQ	ICA	Aleut Corp	CDQ+ICA+DFA		DFA		50/50 split		A-season constraint	
						A-season	B-season	A-season	B-season	AFA	CV≤60	AFA	CV≤60
1991	101,460	19,000	1,900	1,600	15,500	19,000	0	15,500	0	7,750	7,750	7,750	7,750
1992	51,600	19,000	1,900	1,600	15,500	19,000	0	15,500	0	7,750	7,750	7,750	7,750
1993	58,700	19,000	1,900	1,600	15,500	19,000	0	15,500	0	7,750	7,750	7,750	7,750
1994	56,600	19,000	1,900	1,600	15,500	19,000	0	15,500	0	7,750	7,750	7,750	7,750
1995	56,600	19,000	1,900	1,600	15,500	19,000	0	15,500	0	7,750	7,750	7,750	7,750
1996	35,600	19,000	1,900	1,600	15,500	14,240	4,760	12,680	2,820	7,750	7,750	7,750	4,930
1997	28,000	19,000	1,900	1,600	15,500	11,200	7,800	9,640	5,860	7,750	7,750	7,750	1,890
1998	23,800	19,000	1,900	1,600	15,500	9,520	9,480	7,960	7,540	7,750	7,750	7,750	210
1999	23,800	19,000	1,900	1,600	15,500	9,520	9,480	7,960	7,540	7,750	7,750	7,750	210
2000	23,800	19,000	1,900	1,600	15,500	9,520	9,480	7,960	7,540	7,750	7,750	7,750	210
2001	23,800	19,000	1,900	1,600	15,500	9,520	9,480	7,960	7,540	7,750	7,750	7,750	210
2002	23,800	19,000	1,900	1,600	15,500	9,520	9,480	7,960	7,540	7,750	7,750	7,750	210
2003	39,400	19,000	1,900	1,600	15,500	15,760	3,240	14,200	1,300	7,750	7,750	7,750	6,450
2004	39,400	19,000	1,900	1,600	15,500	15,760	3,240	14,200	1,300	7,750	7,750	7,750	6,450
2005	29,400	19,000	1,900	1,600	15,500	11,760	7,240	10,200	5,300	7,750	7,750	7,750	2,450
2006	29,400	19,000	1,900	1,600	15,500	11,760	7,240	10,200	5,300	7,750	7,750	7,750	2,450
2007	44,500	19,000	1,900	1,600	15,500	17,800	1,200	15,500	0	7,750	7,750	7,750	7,750
2008	28,160	19,000	1,900	1,600	15,500	11,264	7,736	9,704	5,796	7,750	7,750	7,750	1,954
2009	26,873	19,000	1,900	1,600	15,500	10,749	8,251	9,189	6,311	7,750	7,750	7,750	1,439
2010	33,100	19,000	1,900	1,600	15,500	13,240	5,760	11,680	3,820	7,750	7,750	7,750	3,930
2011	36,700	19,000	1,900	1,600	15,500	14,680	4,320	13,120	2,380	7,750	7,750	7,750	5,370
2012	35,200	19,000	1,900	1,600	15,500	14,080	4,920	12,520	2,980	7,750	7,750	7,750	4,770
2013	37,300	19,000	1,900	1,600	15,500	14,920	4,080	13,360	2,140	7,750	7,750	7,750	5,610
2014	39,800	19,000	1,900	1,600	15,500	15,920	3,080	14,360	1,140	7,750	7,750	7,750	6,610

Source: ABCs are from the 2012 AI pollock SAFE chapter (Barbeaux, Ianelli, and Palsson 2012) with modifications for 2012–2014 from annual specifications; the ICA is assumed to be 1,600 metric tons based on the 2013–2014 specifications. However, this can vary and has been smaller in the past. Changes in the ICA would modify calculations somewhat, as illustrated in Table 8-65 above. Seasonal sector splits assume the 2013–2014 A/B splits of 40%/60% for CDQ and 50%/50% for ICA. Seasonal sector splits between small CVs and other trawlers assume that the Aleut Corporation would allocate as much A-season allocation to the catcher/processors and large trawl catcher vessels as possible.

These ranges are based on the high and low prices from the time period, and these extreme prices may be less common than a more central measure of price. The median catcher/processor wholesale value in 2012 dollars was about $1,389 per metric ton round weight, and the median shoreside wholesale value was about $1,276. Assuming a median A-season DFA of about 12,600 mt, divided between the two sectors with A-season harvest priority given to harvesting by AFA, revenues would be about $17 million.

This gross revenue is greater than the income that would be received by the Aleut Corporation, which would have received royalties from catcher/processors and catcher vessels bidding for the right to earn these gross revenues. The revenues will be smaller if the authorized Aleut Corporation fishing operations are not able to fully harvest the DFA or the Aleut Corporation forgoes revenues in exchange for commitments by vessel operators to visit and do business in Adak.

As an A-season fishery, the fishery will be targeting roe bearing pollock. This suggests another way to estimate revenues. Assuming, as above, a median A-season DFA of 12,600 mt, that only A-season pollock is harvested, that the catcher/processors harvest their full share and the residual is left for the catcher vessels, using information on median prices and available DFA, and assuming there will be a 10 percent roe content, the value for at-sea processed BSAI pollock roe might be (7,750 metric tons)*(0.1)*($11,133/metric ton) = $8.6 million, while the value of the shoreside processed pollock roe might be (4,850 metric tons)*(0.1)*($7,363/metric ton) = $3.6 million, for a total of $12.2 million.[101] This does not include potential revenues from producing pollock fillets for market. Again, the actual revenues received by the Aleut Corporation would be smaller, because its income would be in the form of royalties paid by fishing operations for the right to harvest its pollock allocation.

However, the most meaningful way to estimate the potential value of the pollock DFA to the Aleut Corporation is to estimate the value of the potential royalties it might receive if it leased out the allocation. Industry sources indicate that, in early 2013, reasonable royalty payments for pollock allocation might range from $400 to $600 a metric ton. The upper end of the range reflects a subjective appraisal of the potential value of Aleutian Islands pollock fishing rights given the higher roe content that many anticipate for the region. (Fraser, Cotter, personal communication, March 22, 2013)[102] The potential royalty payments are estimated here assuming that only the A-season pollock will be harvested, and that it will be economically viable to harvest the entire A-season DFA. It is not clear at this time that the full DFA would be harvested under the measures under consideration here. From Table 8-65, the median estimated A-season DFA for the Aleut Corporation would have been 12,600 metric tons over the period 1991 through 2014 (the period used since these years provide a range of historical TACs and a sense of the potential range in DFAs). At $400/mt, the average royalties would have been about $5.0 million, and at $600/mt the average gross royalties would have been $7.6 million.

Given the limited pollock fishing that has taken place in the Aleutian Islands since the DFA was allocated to the Aleut Corporation, NMFS cannot predict the volume of production that will be associated with opening the different areas identified in the four alternatives and the protective options discussed in this section. Assuming that this is primarily an A-season fishery, the Aleut Corporation might enter into

[101] This estimate is lower than the total revenue estimate made earlier using the annual BSAI-wide pollock wholesale prices. All estimates are based on pollock roe prices from Table 26 of the 2012 Groundfish Economic SAFE report (Fissel et al. 2012a). The median prices for the years 2007 through 2011 was converted to 2012 dollars, and converted from dollars per pound to dollars per metric ton. The lower roe-based price was unexpected, and points to the rough approximations behind all these estimates. It is not possible to do more than point to a plausible "ballpark" for future revenues given all the uncertainties in the available information.

[102] Dave Fraser (Adak Community Development Corporation) and Larry Cotter (Chief Executive Officer of the Aleutian Pribilof Islands Community Development Corporation). Estimates were provided during a meeting of the Council's Steller Sea Lion Mitigation Committee (SSLMC).

contracts resulting in harvest of an amount from 7,960 mt to 13,940 mt (depending on the ABC in a year). Development of B-season fisheries could increase annual harvests from 1,560 mt to 7,540 mt, depending on the year. Lower ABCs tend to push more of the TAC to the B-season, as the A-season total harvest cannot be more than 40 percent of the ABC. It is not possible to determine quantitatively how harvests would change as more areas are opened for pollock fishing, except to speculate that the possibility of larger harvests increases as more areas become available for fishing.

Table 8-65 shows that the CDQ allocation would have been 1,900 metric tons, under each of the ABCs from 1991 through 2014. The CDQ allocation would drop below 1,900 mt, if the ABC fell below 19,000 mt, but would not rise above it. The CDQ portion is further subdivided among the six CDQ groups, each of which holds a share of the Aleutian Islands CDQ[103]:

- APICDA (14 percent of the TAC), 266 metric tons
- BBEDC (21 percent), 399 metric tons
- CBSFA (5 percent), 95 metric tons
- CVRF (24 percent), 456 metric tons
- NSEDC (22 percent), 418 metric tons
- YDFDA (14 percent), 266 metric tons

Finally, the CDQ would be divided between A- and B-season allocations.

No Aleutian Island management area CDQ allocation has been fished in recent years. When the BSAI TAC has been far enough below the ABC, the CDQ allocation has been reallocated to the CDQ groups for fishing in the Bering Sea. CDQ groups may be reluctant to send a vessel to the Aleutian Islands to fish the relatively small allocations available there. However, this will also depend on the quality of roe that may be harvested, if relaxation of the restrictions makes it possible to harvest pollock in the area. CDQ groups may also form joint ventures with each other, or with the Aleut Corporation, to allow a single vessel to harvest CDQ pollock from multiple groups. (AKR in-season managers)

8.7.3 Spatial/temporal analysis

Critical habitat in the Aleutian Islands was closed to pollock directed fishing before the Aleut Corporation received and began trying to fish its allocations in 2005. Thus, there is little recent experience with pollock fishing in this region in the areas proposed to be opened under Alternatives 2 through 4. However, fishing did take place in this area from 1991 through 1998, and NMFS has examined observer data from this period to determine if fishing took place in areas that might be opened by this action. Summary information from these years may be found in Table 8-66.

Observer data collected for this fishery during the years 1991 to 1998 provides an incomplete picture of the location of harvests and a weak basis for projecting the volumes of harvest coming from the areas that may be opened: (1) The data are dated; pollock populations and distribution may have changed a great deal since that time; (2) Some of the data may have come from vessels with 30 percent observer coverage, and observer sampling on these vessels was not statistically random; (3) Observers provided information on the location of the starting point and ending point of an observed tow, but the tow itself may not have been a straight line, making it difficult to infer the exact location of catch.

[103] From the Annual Quota Allocation Matrix for 2012, retrieved on January 13, 2013, from the http://www.alaskafisheries.noaa.gov/cdq/allocations/annualmatrix2012.pdf.

Moreover, information from the 1990s was collected before many measures were adopted that would affect fishing activity in the region, including the AFA, the allocation of the Aleutian Islands directed fishing allowance to the Aleut Corporation, and measures to restrict trawling to protect fisheries habitat.

Dynamic changes in pollock stocks in the region are described in Chapter 3 of this EIS. "The most recent surveys show that the Aleutian Islands pollock population is predominantly concentrated in the eastern portion of the Aleutian Islands chain, closer to the Eastern Bering Sea shelf. Surveys from the 1980s and 1990s estimated higher proportions of pollock biomass in the central and western Aleutian Islands. This recent spatial imbalance in population abundance may reflect a spatial contraction of the stock in the Eastern Bering Sea after the collapse of the Central Bering Sea population in the early 1990s, low Aleutian Islands pollock recruitments since the mid-1980s, documented high exploitation rate of the Aleutian Islands pollock in the mid to late 1990s, and possibly a high undocumented exploitation rate in the late 1980s, by foreign fish[ing operations]." The changing pattern of harvest through time indicates that the location of pollock stocks is not stable.

A key element in Alternatives 2, 3, and 4 is the opening of four to five carefully defined zones within critical habitat.[104] Table 8-66 shows the number of vessels, volume of pollock, and number of calendar years with activity, for observed activity in the Aleutian Islands in total, within each of these five zones, and in areas outside of these five zones. The column labeled "0–3 nm" is labeled "n.a." for each zone, since none of the proposals open critical habitat within three miles of shore. The column labeled "Outside CH" is also labeled "n.a." for each zone, since some zones include areas outside of critical habitat that are currently open to fishing. The totals at the bottom of each column include information from within the different zones, as well as from areas outside the five pollock zones. The only critical habitat not included from 0 to 20 nautical miles, lies in the Sequam Pass area; therefore, a column for Sequam Pass is included, but is not relevant to consideration of the five zones themselves.

The information for the zones as presented in the alternatives can be read from the final "Row total" column. This sums the information for each zone described in the alternatives for the areas falling in critical habitat within 3 nautical miles to 20 nautical miles, and within 10 nautical miles to 20 nautical miles. The row labeled "Areas not proposed for opening" shows the numbers of vessels, volumes of pollock, or years of activity, in that range that fall outside the five pollock zones. Amukta Pass and Atka are in Area 541, Kanaga and Hawadax Islands are in Area 542, and Shemya is in Area 543. The lower right hand cell shows the totals across Areas 541 to 543, both inside and outside the zones defined in the alternatives.

The table shows that fishing operations from 1991 through 1998 harvested pollock in each of the five zones. In the Kanaga Sound and Rat Islands zones the catches appear to have come from the parts of the zones from 3 nautical miles to 10 nautical miles, but not from the parts of the zones from 10 nautical miles to 20 nautical miles. In the three other areas, there was production in both the 3-nautical-mile to 10-nautical-mile and 10-nautical-mile to 20-nautical-mile parts of the zones. To the extent that the volumes of pollock from each area provide a weak signal for the potential productivity of each area, Kanaga Sound stands out, with more observed production than from any of the other four areas.

The 1991 through 1998 observer data do not provide information about the sizes of the vessels used in the fishery. However, two of the open zones under consideration in this analysis, the Kanaga Sound and Atka North Cape zones, may be relatively more attractive to small trawlers (60 feet and under) than other areas, due to their proximity to ports at Adak and Atka, and to the relatively protected waters within Kanaga Sound.

[104] Tables in Chapter 2 show these areas: Amukta Pass, Kanaga Sound, Atka North Cape, the Rat Islands, and Shemya.

Table 8-66 Fishing activity in areas proposed for opening under Alternatives 2 through 4, from observer data collected from 1991 to 1998

Number of vessels						
	Inside Critical Habitat (CH)				Outside CH	Row total
Zones	0–3 nm	3–10 nm	10–20nm	Sequam		
Amukta Pass	n.a.	11	31	0	n.a.	42
Atka	n.a.	31	37	0	n.a.	68
Kanaga	n.a.	36	0	0	n.a.	36
Rat Islands	n.a.	5	0	0	n.a.	5
Shemya	n.a.	6	3	0	n.a.	59
Areas not proposed for opening	31	54	57	12	59	213
Total vessels-years	31	143	128	0	59	373
Volume of pollock (metric tons)						
	Inside Critical Habitat (CH)				Outside CH	Row total
Zones	0–3 nm	3–10 nm	10–20nm	Sequam		
Amukta Pass	n.a.	8,149	17,807	0	n.a.	25,957
Atka	n.a.	17,063	13,323	0	n.a.	30,386
Kanaga	n.a.	59,808	0	0	n.a.	59,808
Rat Islands	n.a.	2,449	0	0	n.a.	2,449
Shemya	n.a.	9,005	2,593	0	n.a.	11,598
Areas not proposed for opening	8,887	8,910	63,122	4,521	94,853	180,294
Total tonnage	8,887	105,385	96,845	4,521	94,853	310,492
Number of separate calendar years with production						
	Inside Critical Habitat (CH)				Outside CH	Row total
Zones	0–3 nm	3–10 nm	10–20nm	Sequam		
Amukta Pass	n.a.	3	5	0	n.a.	8
Atka	n.a.	7	8	0	n.a.	15
Kanaga	n.a.	5	0	0	n.a.	5
Rat Islands	n.a.	4	0	0	n.a.	4
Shemya	n.a.	2	1	0	n.a.	3
Areas not proposed for opening	9	23	18	3	14	67

Notes: Listed zones only include critical habitat inside described bounds. Areas marked "n.a." are not covered by the proposed action, either because they are in critical habitat, but not opened (0–3 nm), or because they fall inside the dimensions of the area defined by the alternative, but are outside critical habitat and, so, already open to fishing.
Source: AKR analysis of observer data, January 4, 2012.

Alternative 2

Alternative 2 opens the pollock fishing zones in critical habitat at Amukta Pass, Atka North Cape, Kanaga Sound, and the Rat Islands. These areas are shown in Figure 2-12 in Chapter 2. Amukta Pass and Atka North Cape are in Area 541, while Kanaga Sound and the Rat Islands zones are in Area 542. No areas in Area 543 are opened under this alternative. As shown in Table 8-66 above, these areas account for most of the observed harvest in the five zones from 1991 to 1998. While the potential pollock production from these zones is uncertain, it is possible that the Aleut Corporation and CDQ groups could harvest their entire allocations from these four zones and in these two management areas, with the implications for revenues discussed earlier.

Alternative 2 includes three options that may be applied to the Kanaga Sound zone. One option prohibits directed fishing for pollock in the Kanaga Sound zone by vessels greater than or equal to 60 feet length overall (LOA). The other two options exclude the areas within (a) 10 nautical miles and (b) 6 nautical miles of the Ship Rock rookery in Kanaga Sound from the area within the open zone.

Prohibiting vessels over 60 feet LOA from the Kanaga area would prevent AFA catcher vessels and catcher/processors from fishing in the area. It would not prevent small vessels from delivering to AFA catcher/processors or to fish plants in Adak, so long as these were authorized to process fish from this area by the Aleut Corporation. The estimates of observed catch in Table 8-66 suggest that in the period 1991 to 1998, more observed production of pollock came from Kanaga Sound than from any of the other four zones proposed for opening under Alternatives 2 and 3. This option could restrict the ability of the AFA component of the fleet to harvest its 50 percent share of the Aleut Corporation allocation. Conversely, it would have the effect of reserving the Kanaga Sound pollock for the smaller vessels.

While this would presumably reduce the value of the action for the AFA fleet, and increase it for potential participants in the small vessel fleet, it could also adversely impact the Aleut Corporation stockholders, and the town of Adak. If reserving this area for vessels under 60 feet were advantageous to the Aleut Corporation and Adak, Aleut Corporate managers would be able to reserve the Kanaga Sound pollock for small vessels, through the conditions imposed when it authorizes vessels to fish. It may be, for example, that the Aleut Corporation thinks that Adak would be best served if the Kanaga Sound pollock were harvested by larger AFA trawlers for some years. This option, if it were adopted, would prevent that economic and operational flexibility.

Figure 2-12 in Chapter 2 shows the spatial impact of excluding the area within 10 nautical miles of Ship Rock from the Kanaga Sound open zone. Much of the area within the Kanaga Sound to the south of Bobrof Island would no longer be open. A review of observer data from 1991 through 1998 indicates that this would remove the area where most of the zone's pollock harvests occurred. As shown in Table 8-66 above, from 1991 through 1998 there were about 59,800 mt of observed pollock harvest in the whole Kanaga Sound zone. A review of the observer records indicates that only about 12,500 mt were taken in the truncated zone. This tonnage was taken by 27 vessels in four separate years. (AKR review of observer data, January 8, 2013) Moreover, much of the area remaining in the zone is to the north of Kanaga and Bobrof Islands, outside of the more protected waters of the Kanaga Sound. Smaller vessels may have a more difficult time operating in these more exposed waters than they would in the Kanaga Sound. (Fraser, personal communication, January 7, 2013)

Figure 2-12 in Chapter 2 shows the impact of excluding the area within 6 nautical miles of Ship Rock from the Kanaga Sound open zone. This has less impact on the area and on the volume of observed harvest than the 10-nautical-mile option. Observer records indicate that about 34,637 mt of observed harvest came from the remaining open area in the Kanaga Sound zone from 1991 through 1998. These were taken by 33 unique vessels, in 5 different years. Thus, the "Kanaga 6" option appears to be less restrictive than the "Kanaga 10" option.

This option is, thus, likely to have an adverse impact on potential harvests from Kanaga Sound, and because of the Kanaga Sound's proximity to the port of Adak, may have a proportionately greater impact on vessels less than 60 feet LOA, than on the AFA fleet. Since Kanaga Sound is relatively close to Adak, the restriction on harvest from this area, and the more exposed waters remaining open to small vessels, may adversely affect possible pollock processing at Adak, or the market for support and logistical services at Adak.

Alternatives 3 and 4

Alternatives 3 and 4 open the Shemya zone in Area 543 to pollock fishing (see Figure 2-20 in Chapter 2). Observed harvests from this area were about 11,600 mt, from 1991 to 1998 (Table 8-66). The four zones open in Areas 541 and 542 under Alternative 2 are also open under Alternatives 3 and 4.

In addition, Alternatives 3 and 4 open large additional swaths of critical habitat in Areas 541 and 542. In Area 542 west of 178° W longitude (west of Tanaga Island on the west side of Kanaga Sound), critical habitat is open for fishing outside of 10 nautical miles of rookeries and haulouts. In Area 542 to the east of that line, critical habitat is open for pollock fishing in waters that are both (a) outside 3 nautical miles of haulouts, and (b) outside 10 nautical miles of rookeries. In Area 541, critical habitat is open to pollock fishing in waters that are outside both (a) three nautical miles of haulouts and (b) 10 nautical miles of rookeries.

The opening of these areas would provide the Aleut Corporation with access to additional locations for harvesting its Aleutian Islands allocation. While the Aleut Corporation may be able to harvest its allocations under Alternative 2, this additional area may increase the probability it will do so. The additional area may make it easier to accommodate more authorized fishing vessels, and, if pollock spawning aggregation locations are variable from year to year, it opens more of those locations to potential fishing effort.

Protective options for Alternatives 2, 3, and 4

The areas opened to fishing under the protective options for each alternative are the same, and are shown in Figures 2-13 and 2-14 (for Alternative 2), and in Figures 2-21 and 2-22 (for Alternatives 3 and 4) in Chapter 2. Table 8-66 summarizes the information on fishing activity collected from observers from 1991 through 1998.

This information can be used carefully, to provide a rough index of the impacts of the protective options. A review of the table shows that under the basic elements of Alternative 2, the areas where 69 percent of the observed harvest was taken would be open to fishing,[105] while under the Alternative 2 protective option, about 61 percent would be open.[106] This is an overestimate of the volume of fish that may be taken under the protective option, because available data do not currently differentiate between haulouts and rookeries on a seasonal basis. It is not possible to estimate the size of this overestimate. Closing the waters from 0 to 20 nautical miles around haulouts in the A-season, when the majority of the pollock fishery is likely to take place, will be more restrictive. The amount cannot be quantified with available information.

Under Alternatives 3 and 4, 72 percent of the observed volume would be in open areas; under the Alternative 3 and 4 protective options, this volume would be about 62 percent, or about the same as under

[105] This is the percentage of the total tonnage outside critical habitat and the row totals for Amutka Pass, Atka, Kanaga, Rat Islands, and Shemya, divided by the total tonnage row total (all numbers from Table 8-66).

[106] For the purposes of making these rough estimates, it is assumed that the production described in Table 8-66 came in the A-season. The 69 percent figure is the sum of the volume of production outside critical habitat and the production from 3nm to 20 nm in the Amukta, Atka, Kanaga, and Rat Islands zones, divided by total production. The 61 percent estimate is equal to the sum of the volume of production outside critical habitat, the production from 10 nm to 20 nm in the Amukta and Atka zones, and the production from 10 nm to 20 nm from area not proposed for opening under the alternative, divided by total production.

the Alternative 2 protective option.[107] As noted earlier, these are overestimates of the volume and it is not possible to know the size of the overestimate.

Thus, the observer data from 1991 to 1998, summarized in Table 8-66, suggest that the protective options will likely be more restrictive to the fishery than the alternatives without the option. Protective options under Alternatives 3 and 4 have similar impacts to the protective option in Alternative 2. (The only substantive change is that Area 543 fishing is allowed in Alternatives 3 and 4, without restrictions in critical habitat, except 0 to 3 nm.) Therefore, the protective options in each alternative should be viewed as being less restrictive than Alternative 1, but more restrictive than Alternative 2.

8.7.4 Incidental catch of Groundfish and PSC

Incidental catch of groundfish

Despite the constraints on the Aleutian Islands directed pollock fishery from 2005 through 2010, some targeted pollock fishing occurred. This fishery, outside critical habitat, provided some data on the incidental catch rates of other groundfish species and on prohibited species catch (PSC). The majority of this fishing activity occurred in Area 541. Therefore, there is little information on differences in incidental catch and PSC rates between management areas, or inside/outside of critical habitat within an area.

As seen in Table 8-67, from 2005 through 2010, about 88 percent of the groundfish catch in trips targeting pollock with pelagic trawl gear (directed pollock fishery) in the Aleutian Islands was pollock. Since the corresponding figure in the Bering Sea directed pollock fishery is about 98 percent, incidental catches are higher in the Aleutian Islands pollock fishery than in the Bering Sea pollock fishery.

In the Aleutian Islands the groundfish species assemblage that makes up the incidental catch is predominately Pacific ocean perch (POP). This information is consistent with the Aleutian Islands Cooperative Acoustic Survey studies in 2006 and 2007 (Barbeaux and Fraser 2009). POP accounted for about 96 percent of the incidental catch of groundfish in the pollock directed fishery in the Aleutian Islands. Other incidental catch species include sculpins and miscellaneous flatfish species.

Table 8-67 Average catch of groundfish species in the pollock directed fishery in the BSAI from 2005-2010

	Pollock	Pacific ocean perch	Other species
Aleutian Islands Average 2005–2010	88.32%	11.47%	0.20%
Average 2005–2010, minus high and low years	93.45%	6.45%	0.10%
Bering Sea Average 2005–2010	98.16%	0.04%	1.80%
Source: AKR analysis of CAS, January 4, 2013.			

As discussed in Chapter 3, POP are pelagic. Fishermen have indicated that POP mix with pollock at certain depths and are sometimes hard to distinguish from pollock on sonar. It is expected that an

[107] The 96 percent estimate is created by adding the production from the Shemya, and areas not proposed for opening, zones to the numerator in the Alternative 2 calculation.

Aleutian Islands pollock fishery will encounter POP. Based on data on pollock directed fishing in the Aleutian Islands from 2005 through 2010, the average rate of POP incidental catch is 11.47 percent. A trimmed mean, created by dropping the highest and lowest incidental catch rates, is 6.45 percent. This incidental catch rate varies by year and area. As the pollock fishery in the Aleutian Islands develops, and participants develop experience at avoiding POP, this incidental catch rate may decrease.

There are separate POP ABCs and TACs in Areas 541, 542, and 543. POP TACs are usually set equal to ABCs, and the TACs are fully allocated to the CDQ, incidental catch allowance, Amendment 80, and BSAI trawl limited access sectors. The incidental catch of POP accrues to an incidental catch allowance (ICA) in each area. The ICA is published in the harvest specifications. In 2013, the ICAs were set at 200 mt in Area 541, 75 mt in Area 542, and 10 mt in Area 543.

Because POP TACs are normally set equal to ABCs, the ICAs must be set conservatively to ensure that the ABCs are not exceeded. Also, because it is not clear in which management area the pollock fishery may occur (it could occur entirely in one area), the ICA must be set high in each area. Due to the limitations of recent data, the POP ICA will likely be set conservatively in each area for the first few years. The ICAs may be set as high as 12 percent of the Aleutian Islands pollock TAC in each area. However, as more information on the incidental catch rate of POP is collected, the rate will be adjusted to reflect the most current data. Table 8-68 shows the potential ICA and the potential impact to the Amendment 80 and BSAI trawl limited access sectors if the entire pollock allocations are expected to be harvested. Because the CDQ allocation is deducted from the TAC prior to the ICA deduction under § 679.20, there is no impact to CDQ allocations as a result of an increased POP ICA.

Table 8-68 Potential Incidental Catch Allowance, Amendment 80, and BSAI trawl limited access allocations of Pacific ocean perch if the entire Aleutian Islands pollock allocation is harvested (metric tons)

	2013 Allocation	POP Rate	POP Rate
		11.47%	6.45%
Incidental Catch Allowance			
541	200	2,035	1,232
542	75	1,910	1,107
543	10	1,845	1,042
Amendment 80			
541	7,688	6,037	6,759
542	5,542	3,891	4,614
543	8,917	7,118	7,905
BSAI Trawl Limited Access			
541	854	671	751
542	616	432	513
543	182	145	161

According to § 679.20(a)(10)(iii)(B), if, during a fishing year, the Regional Administrator determines that a portion of the incidental catch allowance for each Amendment 80 species, other than Pacific cod, is unlikely to be harvested, the Regional Administrator may issue inseason notification in the *Federal Register* that reallocates that remaining amount to Amendment 80 cooperatives. Because it is likely that the pollock directed fishery in the Aleutian Islands would occur primarily in the A-season, and because Amendment 80 POP are usually harvested after the A-season pollock directed fishery, unused amounts of the POP ICA could be reallocated to the Amendment 80 sector before it actively participates in the POP directed fishery. This would be more difficult if a B-season pollock directed fishery were to emerge.

Incidental catch of Prohibited Species

Table 8-69 summarizes information on potential PSC rates in the Aleutian Islands pollock directed fishery from the 2005 Environmental Assessment for Amendment 82 (NMFS 2005b), The table also summarizes more recent information on PSC rates in the Aleutian Islands and Bering Sea pollock fisheries, from 2005 through 2010.

Table 8-69 Average Aleutian Islands pollock directed fishery PSC rates from 1993 through 1998 and Aleutian Islands (AI) and Bering Sea (BS) pollock directed fishery PSC rates 2005 through 2010

	1993–1998 AI Average	2005–2010 AI Average	2005–2010 BS Average
Halibut (kg/mt of pollock)	.02	.80	.23
Chinook Salmon (# of animals/mt)	.03	.14	.04
Other Salmon (# of animals/mt)	.03	.013	.17
Bairdi (# of animals/mt)	< .01	.01	< .01

Notes: The fishery in the Aleutian Islands is limited, and the Aleutian Island rates are based on small samples.
Source: 1993–1998 from 2005 EA on Amendment 82 (NMFS 2005b); 2005–2010 from AKR analysis of CAS, January 4, 2013

The 1993 through 1998 averages indicate that PSC rates in the Aleutian Islands are less than the Bering Sea PSC rates from recent years (although the fishery occurred at a different time, and under different regulations, than pollock directed fisheries currently operate). More recent data, from 2005 through 2010, indicates that the PSC rates in pollock directed fishing in the Aleutian Islands are higher than in the Bering Sea. However, these data are limited and the PSC rates may not represent what would occur, in a fully developed Aleutian Islands directed pollock fishery. These data provide a range.

There is a seasonal component to PSC rates, particularly for salmon. It is known that higher Chinook salmon PSC rates occur in the A-season and higher non-Chinook salmon PSC rates in the B-season. A pollock directed fishery in the Aleutian Islands is expected to largely take place in the A-season, implying that Chinook PSC rates may be higher than shown in Table 8-69, while non-Chinook rates may be lower.. Origin of these salmon is unknown at this time, so the effect on particular in-river salmon runs cannot be quantified. If salmon were encountered in the Aleutian Islands pollock directed fishery, observers would collect genetic samples that may make it possible to determine origin in the future.

As currently managed, the Aleutian Islands pollock directed fishery is not subject to PSC limits that would close that entire fishery. Amendment 91 did not address Chinook salmon PSC in the Aleutian Islands; therefore, Chinook salmon PSC is not counted against any hard cap. However, § 679.21(e)(1)(viii) specifies 700 Chinook salmon as the PSC limit for the Aleutian Islands pollock directed fishery. NMFS, by notification in the *Federal Register*, will close the Aleutian Islands Chinook Salmon Savings Area, as defined in Figure 8 part 679, to directed fishing for pollock with trawl gear on

the following dates: "from the effective date of the closure until April 15, and from September 1 through December 31, if the Regional Administrator determines that the annual limit of Aleutian Island Chinook salmon will be attained before April 15" (§ 679.21(e)(7)(viii)(A)). NMFS allots 7.5 percent of the PSC limit, or 53 Chinook salmon, to the CDQ program, and the remaining 647 Chinook salmon PSC limit to the non-CDQ pollock directed fishery. Though there are halibut PSC limits for pollock, Atka mackerel, and other target species, in pollock targets, only directed fishing for pollock with non-pelagic gear closes when a halibut limit is reached. However, non-pelagic trawl gear is prohibited when directed fishing for pollock in the Aleutian Islands, so this closure would not affect the Aleutian Islands pollock directed fishery. Neither the *C. bairdi* crab closure areas nor the chum salmon savings area include the Aleutian Islands, so even if PSC limits were reached, these closures would not affect the Aleutian Islands pollock directed fishery. Overall, even with higher pollock catch, the total PSC in the Aleutian Islands pollock directed fishery is expected to be low.

8.7.5 Rollover implications

If areas opened to pollock directed fishing under these alternatives and options turn out to be productive, some or all of the Aleut Corporation DFA and the CDQ may be taken. However, these areas may not be productive, in which case DFA and CDQ would normally be rolled over to the Bering Sea fisheries. This can occur in years in which the Council sets the Bering Sea pollock TAC below the ABC. No reallocation is possible when Bering Sea ABC is set equal to TAC. The Aleut Corporation does not benefit from pollock rolled over in this way.

To the extent that the Aleut Corporation is able to harvest a large proportion of its allocation in a year, reallocations from the Aleut Corporation to the directed pollock fisheries in the eastern Bering Sea would be reduced. This reduction in reallocations would affect the AFA fisheries in years in which the Bering Sea pollock TAC has been set below the Bering Sea pollock ABC (if they are equal, reallocations are not possible).[108] Reallocations may be smaller, and take place later in the year, than they otherwise would have. While the amounts involved will be small in proportion to typical AFA allocations in the eastern Bering Sea, considering the values estimated earlier in this section, they could still amount to millions of dollars.

8.7.6 Fleet and community impacts

Impact on the Aleut Corporation and its shareholders

If an action alternative is adopted, the impact on the Aleut Corporation will depend on policy decisions the Aleut Corporation makes with respect to organizing the fishery, and the success of its fishermen in harvesting pollock under new management measures.

The key policy decision concerns the objectives the Aleut Corporation chooses to pursue with its allocation. The legislation passed by Congress states that the allocation to the Aleut Corporation is for the purpose of development in Adak.[109] The Aleut Corporation could (a) seek to maximize its revenues from its pollock allocation and invest these in Adak; (b) seek to maximize the direct impacts of new pollock fishing on Adak, by requiring firms leasing its allocations to interact with the port at Adak in

[108] The net effect would depend on the extent to which AFA operations would have cooperated with the Aleut Corporation in harvesting its Aleutian Islands pollock.

[109] Public Law 108-199, Section 803(d).

some way (perhaps requiring deliveries of pollock or other fish products in Adak, purchases of fuel or other goods or services in Adak, or local hire); or (c) some mixture of these objectives. A second key policy decision follows from the collection of revenues for development of Adak: the Aleut Corporation must decide how to use the revenues. The revenues might be spent on fisheries related infrastructure, for other fisheries related purposes, or for purposes unrelated to fisheries. It is also possible that the Aleut Corporation would substitute the pollock royalties for monies from other sources currently being invested in Adak, using those monies for other purposes. In this event, the impact on Adak of this management action could be small.

In a typical corporation, and in the absence of corporate governance problems preventing stockholders from exercising complete control over the corporation's executives, an unexpected increase in the value of corporate assets would be reflected in an increase in share prices. To the extent that corporate governance problems allow corporate executives to secure a share of the increased value for themselves, the increase would not be fully reflected in the share prices. Conversely, an unexpected decrease in asset values would have the opposite effect on stock prices and executive compensation. In these cases, an increase in the value of corporate assets would benefit current stockholders and executives, and provide relatively less benefit to those in the future. Future shareholders would have to pay more for shares; future executives may invest in "rent seeking" behavior to access a share of rents enjoyed by managers, thereby reducing the value of those rents.

However, the Aleut Corporation, and Alaska Native Claims Settlement Act (ANCSA) regional corporations more generally, are atypical in this regard. The structure of ANCSA and the bylaws of the Aleut Corporation suppress the market in corporate stock. Shares are not supposed to be bought and sold, and there are important restrictions on who may receive corporate stock. Moreover, the shares are focal points of ethnic identify and pride, which may contribute to a bequest motive for transfers. The requirement that transfers be uncompensated, and consequently governed by bequest motives, may mean that benefits from the increase in corporate asset values will flow to future shareholders, as well as to current shareholders.

However, this transfer to future shareholders could be offset somewhat, to the extent that prohibitions on compensated transfers are evaded, either legally (through non-market transfers and compensation) or illegally, through side payments, perhaps hidden in apparently unrelated transfers.

Impact on AFA trawlers

Fifty percent of the Aleut Corporation's allocation is set aside for AFA trawl catcher/processors and AFA catcher vessels (§ 679.7(l)(1)(iii) and § 679.20(a)(5)(iii)). To the extent that the Aleut Corporation is seeking to maximize its profits from its allocation, in order to use the funds for the development of Adak, AFA vessel owners will have to bid for, or compensate the Aleut Corporation for the use of the Aleut Corporation's allocation. If the Aleut Corporation tries to balance profit maximization with direct Adak development activity, AFA vessel owners may have to incorporate port visits and port-related activity into regional activity. Contracts made with the Aleut Corporation incorporating port requirements likely also would involve smaller royalty payments than otherwise, depending upon the relative negotiating success of the parties.

Impact on trawlers less than or equal to 60 feet LOA

Fifty percent of the Aleut Corporation allocation must be fished by vessels less than or equal to 60 feet LOA. No LLPs are required by trawl vessels directed fishing for pollock in the Aleutian Islands (§ 679.2, definition of License limitation groundfish). The increased access to pollock grounds in the Aleutian Islands may provide a new fishing opportunity for owners and operators of small trawlers.

An examination of all vessels in this size class using trawl gear off Alaska from 2005 through 2012 identified as many as 38 unique vessels (this may be an overestimate if vessels were renamed, or obtained new Federal fishery permits). There was an average of about 26 vessels involved in each year. These vessels fished for pollock in the Gulf of Alaska, predominately (92 percent) in Area 610, but also in Areas 620 and 630. These vessels did not fish pollock in the Bering Sea. The potential volumes of pollock available to these vessels in the Aleutian Islands (up to 7,750 metric tons a year) could be meaningful in comparison with the harvests of pollock in the Gulf from 2005 through 2012 (which averaged 17,300 metric tons a year).

Vessels with home ports in the Western and Central Gulf of Alaska were an especially important part of this fleet. There was an average of ten vessels a year from Sand Point, four vessels a year from King Cove, and two vessels a year from Kodiak. The remaining vessels reported Girdwood, Juneau, Petersburg, and Seattle home ports. There are questions about the reliability of home port information on vessel license files; however, as a rough index, this points to the importance of Western and Central Gulf ports for this fleet. Almost all of the vessels involved were 58 feet LOA, pointing to the importance of the 58-foot salmon limit seiner class of vessels in this fleet.

The Aleut Corporation only authorized participation in their Aleutian Islands fishery by as many as seven catcher vessels (under 60 feet LOA) in the 2007 fishery. Although vessels were authorized, no landings were reported by this fleet segment. Of the seven vessels in 2007, six appear on the 2007 list of small vessels operating trawl gear. Only one of these reported a Western and Central Gulf homeport (Sand Point); five of them reported homeports at Girdwood, Juneau, or Seattle.

From 2005 through 2012, nine vessels less than 60 feet LOA trawled in the Aleutian Islands. These vessels were in the Aleutian Islands a total of 36 separate vessel-years during this eight year period. Only three of these vessels fished six years or more. These vessels primarily participated in the Aleutian Islands trawl Pacific cod fishery and the Aleutian Islands State-water GHL Pacific cod fishery. Activity in these fisheries was largely restricted to the period from late February to the first week of April. There appears to be some correlation between the vessels' activity in the Aleutian Islands and the closure of the Western GOA fisheries, suggesting that these vessels participate in Western GOA fisheries before leaving the Western GOA to join the Aleutian Islands Pacific cod fishery.

Depending on Aleut Corporation policies with respect to Adak development, fishing operations may pay royalties for the use of the Aleut Corporation allocation, may make commitments to deliver or buy supplies at the Port of Adak, or some combination of these. Since no vessel operator would voluntarily make these payments, unless it expected to enjoy a net benefit, the alternatives under consideration in this analysis should benefit operators of small trawlers.

Impact on Adak, or other communities

Increases in Aleut Corporation pollock harvests in the Aleutian Islands could benefit people who live in Adak in three ways: (1) revenues from the program could be used for investment in Adak infrastructure; (2) contracts with fishermen could require Adak deliveries, Adak port visits, or purchases (perhaps of fuel) at Adak; (3) tax revenues from fisheries or sales taxes. These alternatives could provide benefits to people in Adak if they created new business opportunities and jobs. Jobs filled by persons from outside of Adak would not benefit Adak residents to the same extent as jobs they fill themselves, but may do so indirectly.

The other region with the potential for systematic and positive impacts from the development of a small vessel pollock fishery in the Aleutian Islands is the Western and Central Gulf of Alaska, including Sand Point, King Cove, and Kodiak. Pollock deliveries from the Aleutian Islands appear unlikely, but the

increased access to pollock grounds may provide a new opportunity for these fishermen. However, there are large uncertainties associated with this. These vessels have not been entering the Bering Sea to fish for pollock, and this area does not appear to have been the primary source of authorized small trawlers in 2007. The Aleutian Islands are remote and operations are costly, the fishery would conflict with other seasonal fisheries for the Gulf trawlers, and the firms may have to bid for shares of the Aleut Corporation's directed fishing allocation (either paying for the allocation with a share of the revenues, or making concessions involving activity at Adak). To some extent, the attractiveness of an Aleutian Islands pollock directed fishery to these operations would depend on policy decisions made by the Aleut Corporation.

While the alternatives would tend to benefit people who live in Adak or other communities, the size and nature of the benefit cannot be predicted, because of (a) the uncertainty about future pollock harvests under the relaxed Steller sea lion restrictions, (b) the uncertainty about how the policy decisions the Aleut Corporation would make with respect to its use of the allocation, and (c) uncertainty about the regional economic impact pathways associated with increased fishing activity.

Impact on CDQ groups

As noted, CDQ groups have been receiving 1,900 metric tons of Aleutian Islands pollock CDQ each year; this is divided unequally among the CDQ groups in amounts ranging from 95 mt to 456 mt. If opening new areas to pollock directed fishing in the Aleutian Islands made it possible for the CDQ groups to harvest their allocations, less of the CDQ pollock might be reallocated to the eastern Bering Sea each year. If CDQ groups chose to fish pollock in the Aleutian Islands to maximize their incomes from pollock (especially if they take advantage of larger pollock and higher roe content reputed to be in the Aleutian Islands), they would only do so because it was more profitable for them. Thus, the actions under consideration may have some potential to benefit CDQ groups.

Impact on pollock consumers

This action is unlikely to have large impacts on U.S. pollock consumers. This is likely to be a roe fishery and the primary markets for pollock roe are outside of the United States. Moreover, the volumes of pollock under consideration are small, and, in some years, increased production from the Aleutian Islands may be offset by reductions in pollock reallocations to the Bering Sea. Thus, U.S. consumers are unlikely to see any change in the volume of pollock available, or in its price, as a result of this action.

Impact on persons valuing Steller sea lion population health

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this RIR analysis.

8.7.7 Summary

Table 8-70 summarizes the preceding discussion, organizing the impacts so as to highlight a comparison of the alternatives.

Table 8-70 Comparison of pollock alternatives

	Alternative 1:	Alternative 2:			Alternatives 3 and 4	Protective Option
Description	**Status quo**	**SSLMC some additional fishing**	**Kanaga closure Options (6 miles and 10 miles around Ship Rock**	**Kanaga vessel size option**	**SSLMC more additional fishing**	**Option to Alternatives 2, 3, and 4**
Aleut Corporation stockholders	No change from baseline (in which pollock fishing is prohibited in critical habitat) so no impacts on these sectors.	Potential additional revenues for the corporation. Benefit to corporation and stockholders will depend on policy decisions made to exploit the revenues. While fishery production may have a gross value exceeding $10 million under reasonable assumptions, income to Corporation will be royalties for right to fish, which will be less by an unknown amount.	Reduces the potential for income compared to Alternative 2 without these options. The reduction in the potential for income is greater for the 10-mile alternative than for the 6-mile alternative.	No impact because the Corporation can already control fishing behavior.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 1, but less than those under Alternative 2.
American Fisheries Act trawlers		Some operations may benefit from access to Aleutian Islands; others may face small reductions in pollock rollovers from the Aleutian Islands.	This would close waters in the southern portion of the proposed open zone and to that extent, limit waters available for fishing and potential harvests. Given the proximity of this area to Adak, this may have a greater effect on smaller vessels.	Lose the opportunity to fish Kanaga Sound	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.
Trawlers under 60 feet LOA		Some operations may benefit from access to Aleutian Islands.		Face reduced competition for pollock in Kanaga Sound	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.
Other fishing sectors		Increased pollock fishing and associated Pacific ocean perch incidental catch may adversely affect Amendment 80 vessels.			The impact of increased Pacific ocean perch incidental catch may be greater than under Alternative 2.	The impact of increased Pacific ocean perch may be less than under Alternative 2.
Adak		Adak may benefit from port visits by catcher/processors, processing deliveries for catcher vessels. Adak may also benefit from pollock-related development expenditures by Aleut Corporation; this benefit will depend on policy decision to be made by the Corporation. Adak could benefit from additional tax revenues.	This would tend to reduce the benefits to Adak compared to those for Alternative 2 without these options.	Potential for increased deliveries to Adak for processing.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.

	Alternative 1:	Alternative 2:			Alternatives 3 and 4	Protective Option
Description	**Status quo**	**SSLMC some additional fishing**	**Kanaga closure Options (6 miles and 10 miles around Ship Rock**	**Kanaga vessel size option**	**SSLMC more additional fishing**	**Option to Alternatives 2, 3, and 4**
Other communities		Fishing operations in the western and central Gulf of Alaska may have new fishing opportunities in the Aleutian Islands.	These options would make the important Kanaga Sound zone less attractive to small fishing operations, and this would reduce the potential value of these options to these communities.	If small vessels do face reduced competition in Kanaga Sound, this option may benefit western and central Gulf communities.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.
CDQ		CDQ groups may benefit if they are able to harvest pollock more profitably in the Aleutian Islands than in the Bering Sea.	This would tend to reduce the potential benefits of Alternative 2 to CDQ groups.	Unless CDQ operations chose to fish the Aleutian Islands with small boats, they would be adversely impacted by this measure.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.
PSC		This could increase PSC in comparison with Alternative 1, but overall, total PSC in an Aleutian Islands pollock fishery is expected to be low.	If these options reduce fishing opportunities and pollock volumes they may reduce the possibility of PSC. However total PSC in an Aleutian Islands pollock fishery is expected to be low.	NMFS does not have information on the relative PSC of large and small trawling vessels. The net impact of this option is unclear.	In general, these alternatives could generate PSC somewhat greater than Alternative 2. However, total PSC in the Aleutian Islands pollock fishery is expected to be low.	In general, this option could generate PSC somewhat greater than Alternative 1, but less than Alternative 2. However, total PSC in the Aleutian Islands pollock fishery is expected to be low.
Incidental catch		Incidental catches of Pacific ocean perch may adversely affect fishing opportunities for Amendment 80 and BSAI trawl limited access vessels targeting that species.	If these options reduce fishing opportunities and pollock volumes, they may reduce the possibility of costs for Amendment 80 vessels.	NMFS does not have information on the relative incidental catches of large and small trawling vessels. The net impact of this option is unclear.	In general, these alternatives could create costs for Amendment 80 vessels that are somewhat greater than those under Alternative 2.	In general, this option could create costs for Amendment 80 vessels that are greater than Alternative 1, but less than those under Alternative 2.
Steller sea lion stock		This may be less attractive for the Steller sea lion stock, and for people who value the health of the stock than Alternative 1. However, there are considerable uncertainties associated with this conclusion.	Both of these options close fishing area near the Ship Rock rookery and, thus, both of these should benefit the Steller sea lion stock. There are considerable uncertainties about the size of the impact.	This option primarily affects the fishermen that may access Kanaga Sound, and may not affect the Steller sea lion population.	In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.	In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2.
Sum of producers and consumers surpluses		The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of pollock products, and consumers' surpluses accruing to persons who value SSL population health. Producers' surpluses increase by an undetermined amount, and surpluses accruing to pollock U.S. consumers may not change much given the importance of export markets to the roe fishery and the relatively small amounts of pollock involved. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts, makes this source of surplus impossible to determine for this action. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion.				

8.8 Atka mackerel analysis (Alternatives 2 and 3)

8.8.1 Introduction

Of the six alternatives, Alternatives 1 and 4 are to some extent mirror images of each other, and were discussed in Section 8.3. Alternative 5, which was adopted as the preferred alternative by the Council in October 2013, and Alternative 6 are discussed in Section 8.13. This section discusses Alternatives 2 and 3, introduced by the Council in December 2012.

These alternatives originated during the 2012 meetings of the Steller Sea Lion Mitigation Committee. The recommended alternatives were reviewed by NMFS and altered where necessary to add precision, or address regulatory or management issues.

Alternatives 2 and 3 include a variety of measures, including TAC limits, limits on catches in critical habitat, actual closures of critical habitat, changes in maximum retainable amounts, seasons, and rules governing rollovers. Table 8-71, based on Table 2-19 in Chapter 2, summarizes and contrasts the Atka mackerel alternatives. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

The analysis in this chapter is organized so that actual critical habitat closure areas are discussed first, TAC and critical habitat catch limits are discussed second, and the range of other measures such as season and rollover changes are discussed third. TAC and critical habitat limits may interact with critical habitat closures, and these interactions are discussed when the TAC and critical habitat limits are introduced. Other sections discuss the implications for redeployment, incidental catches, PSC, and fleet and community impacts. An appendix with tables summarizing data on the harvest and revenue implications of critical habitat closures closes out the section.

Table 8-71 describes the elements of the alternatives as they apply to Atka mackerel. In addition to the measures described in Table 8-71, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 8.18.2.

Table 8-71 Comparison of Alternatives for Atka mackerel

Alternative	Seasons	Area 543		Area 542		Area 541/Bering Sea	
		closures	Catch and participation limits	closures	Catch and participation limits	closures	Catch and participation limits
1	Trawl: A season: 1/20–6/10 B season: 6/10–11/1.	No retention.	Not applicable.	Critical habitat closed except between 178°W and 179° W long., critical habitat closed 0–10 nm	Must be in a cooperative or CDQ fishing to fish inside critical habitat.	Critical habitat closed to directed fishing.	TAC for combined Area 541/BS subarea.
	50:50 seasonal apportionment including CDQ.				No more than 10% of the group's allocation harvested from critical habitat, distribute evenly between seasons.		
	Rollover from A to B season.				TAC ≤ 47% of ABC.	BS subarea closed to directed fishing.	
2	Trawl: A season: 1/20–6/10 B season: 6/10–12/31.	Critical habitat closed. W of 174.5 E long. closed.	TAC set 65% of ABC. Option 1: TAC 50% of ABC. Option 2: TAC 40 % of ABC.	Critical habitat closed between 178°E long. to 180° and between 178°W to 177°W. long. Option: prohibit BS trawl limited access vessels inside critical habitat.	TAC 65% of ABC.	Critical habitat closed except 12–20 nm portion southeast of Seguam Island.	Prohibit BS trawl limited access inside critical habitat. Critical habitat catch limit 50% of TAC, distribute evenly between seasons.
	50:50 seasonal apportionment including CDQ.				Critical habitat harvest limit 50% of TAC, distribute evenly between seasons.		TAC specified for combined Area 541 and BS.
	Rollover from A to B season fished outside of critical habitat.			In remaining critical habitat, close 0–3 nm from haulouts and 0–10 nm from rookeries.		BS subarea closed to directed fishing.	Amend. 80 coop and CDQ in BS: Revise MRA calculation for Atka mackerel as an incidental species.
3	Trawl: A season: 1/20–6/10 B season: 6/10–12/31 Option: B season June 10–Nov. 1.	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries. Option: Close all critical habitat.	Critical habitat harvest limit 60% of TAC, distribute evenly between seasons.	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries except close critical habitat between 178°E long. to 180° and east of 178°W long.	Critical habitat harvest limit 60% of TAC west of 178° W long, distribute evenly between seasons.	Same as Alternative 2	Amend. 80 coop and CDQ in BS: Revise MRA calculation for Atka mackerel as an incidental species.
	50:50 seasonal apportionment including CDQ.	Close Buldir Island 0–15 nm except portions in 10–15 nm zone. Option: Close west of 174.5° E long.					
	Rollover from A to B season, fished outside critical habitat.						
4	Trawl: A season: 1/20–6/10 B season: 6/10–12/31.	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries. Close Buldir Island 0–15 nm.	Same as Alternative 3	West of 178°W, critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.	Same as Alternative 3	Same as Alternative 1	Same as Alternative 3
	50:50 seasonal apportionment including CDQ.			Critical habitat closed east of 178°W. long.			
	Rollover from A to B season.						
5	Same as Alternative 2 and 3 without the option	Critical habitat closed 0–3 from haulouts and 0–10 from rookeries.	Critical habitat harvest limit 60% of TAC, distribute evenly between seasons.	Same as Alternative 3	Same as Alternatives 3 and 4	Same as Alternatives 2 and 3	Same as Alternatives 3 and 4
			TAC ≤ 65% ABC.				
6	Not applicable.	No retention	Not applicable.	No retention	Not applicable.	No retention BS subarea closed to directed fishing.	TAC for combined Area 541/BS subarea.

CDQ=Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, MRA=maximum retainable amount, BS=Bering Sea

8.8.2 Critical habitat area closures

Impacts of closed area restrictions

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing. These have been evaluated using the revenue-at-risk and residual revenue analysis described in Section 8.2.14, and used to evaluate Alternatives 1 and 4 in earlier sections.

The results of the revenues-at-risk analyses for Alternatives 2 and 3, and their principal options, have been summarized in a set of tables in an appendix to this section (Sub-section 8.8.9). For each alternative or option, these tables summarize (1) the harvest or associated gross revenues in the baseline years 2004 through 2010; (2) the harvest or associated gross revenues coming from the areas that are closed to fishing under the alternative or option, described as the harvest or revenue placed at risk by the action; (3) the harvest or associated gross revenues coming from the areas that remain open under the alternative, described as the residual harvest or gross revenue associated with the action; and (4) the residual harvest expressed as a percentage of the baseline harvest.

Figure 8-5 and Figure 8-6 summarize the results in these tables. Figure 8-5 shows the wholesale gross revenues from areas remaining open under the alternative after closing critical habitat in each alternative, and Figure 8-6 shows these wholesale gross revenues as a percentage of the actual historical gross revenues during the baseline years. As explained in the discussion of methodology, in Section 8.2.14, these are not predictions of future revenues or of the revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

In addition to Alternatives 1, 2, 3, and 4, the figures summarize revenue impacts for two options to Alternative 3. One option (referred to as “3a” in this section) would close all critical habitat except the 10 nm to15 nm portion at Buldir Island, providing a protective option that allows for more fishing area than Alternative 2, while protecting nearly all critical habitat in Area 543 (see Figure 2-16 in Chapter 2). The second option (referred to as “3b” in this section) would allow an area at Buldir to be open outside of 10 nm, as with other rookeries in Area 543, but close all of Area 543 west of 174.5° E longitude to directed fishing for Atka mackerel. This would allow fishing in a location that does not appear to be used much by Steller sea lions, based on survey data, while protecting the far western portion of Area 543 where some Steller sea lions still occur in larger numbers.

Treating the estimates of the baseline revenues as a rough index of the relative restrictiveness of the different alternatives, Alternative 4 approximates the revenues associated with the baseline period 2004-2010, while Alternative 1, the interim final rule, has the greatest adverse impact on gross revenues. Alternatives 2 and 3a have very similar impacts on revenues, as do Alternatives 3 and 3b. In 2004, Alternative 2, and the three variants of Alternative 3, had very similar impacts; however, these gradually diverged through time. In most years, Alternatives 2 and 3a have greater adverse impacts than Alternatives 3 and 3b. Note that these considerations only take account of the impact of area closures on revenues. The TAC and critical habitat analyses in Sub-section 8.8.3 of this section show that, for Alternative 2 in Areas 543 and 542, and Alternative 3 in Area 543, the TACs may restrict catch below the levels associated with the area closures in some years, while in other years they may allow fishermen, if they can redeploy successfully, to increase their revenues above the levels shown in these figures.

Industry sources indicate that fishing took place near Buldir Island in Area 543, prior to the baseline years, and industry believes recent survey information indicates the presence of Atka mackerel stocks there. However, the data from the baseline years do not show much fish harvest near Buldir. If these industry perceptions are correct, the gross revenues analysis based on fish harvest during the baseline

years could be understating the potential gross revenues associated with opening the area around Buldir. (Gauvin, personal communication, April 13, 2013; Loomis, personal communication, April 12, 2013).[110]

While residual revenue estimates may be useful indices of relative impacts, they are not, as just noted, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in variable costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues, minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). Data to estimate the effects of the alternatives with this welfare measure, however, are not available, because the cost information needed is not available. In addition, the wholesale gross revenues measure focuses attention on the remaining revenues from Atka mackerel fishing, and does not take account of the ability of fishing operations to take actions in response to the alternatives that would minimize the impact of the alternatives on their profits, most importantly in this instance, their ability to substitute into other fisheries.

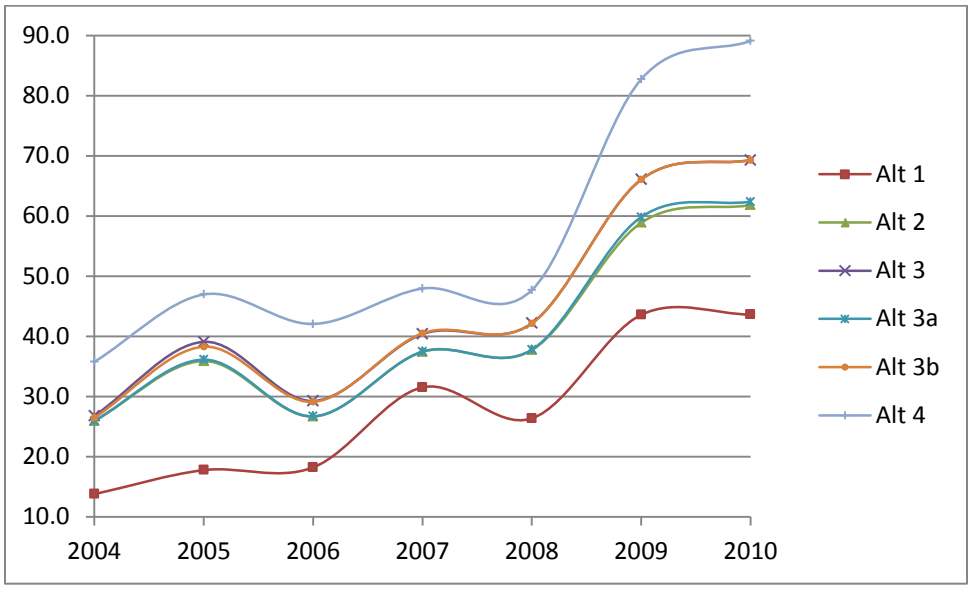


Figure 8-5 Residual Atka Mackerel Wholesale Gross Revenues, by Alternative, Baseline Years 2004 through 2010 (millions of 2012 dollars)

[110] John Gauvin. Gauvin and Associates, LLC, Burien Washington; Todd Loomis. Government Affairs, Ocean Peace, Inc.

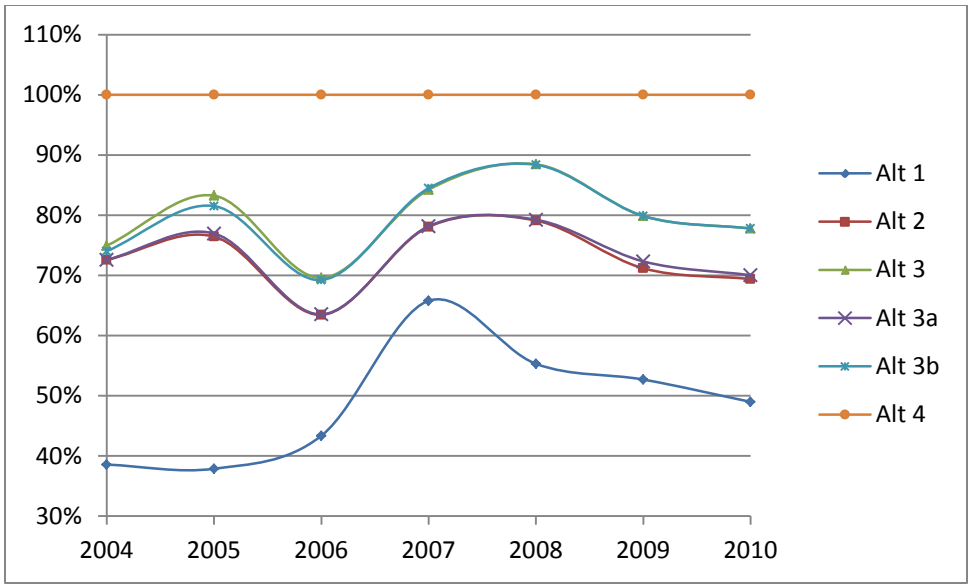


Figure 8-6 Residual Atka Mackerel Wholesale Gross Revenues as a Percentage of Baseline Revenues, by Alternative, Baseline Years 2004 through 2010

These estimated gross revenue changes do not take account of the TAC and critical habitat limits that are also part of these alternatives. These limits are an additional constraint on vessel activity. In some of the baseline years and management areas, these additional constraints were not binding, but in other years they were. These constraints, and their interaction with the critical habitat area closures, are discussed in the following sub-section.

8.8.3 TAC and critical habitat limits

Elements of these alternatives and options define area TACs as percentages of area ABCs, and limit harvests from open critical habitat to percentages of TACs.[111] As shown in Table 8-71 these elements include:

1. A provision in Alternative 1 setting the Area 542 TAC no greater than 47 percent of the ABC and limiting a cooperative or CDQ group from harvesting more than 10 percent of its allocation in critical habitat;
2. A provision in Alternative 2 setting the Area 543 TAC equal to 65 percent of the ABC, with additional options to set it equal to 50 percent of the ABC and 40 percent of the ABC;
3. A provision in Alternative 2 setting the Area 542 TAC equal to 65 percent of the ABC, and setting a critical habitat limit equal to 50 percent of the ABC;
4. A provision in Alternative 2 setting an Area 541 critical habitat limit equal to 50 percent of the TAC;
5. A provision in Alternative 3 setting an Area 543 critical habitat limit equal to 60 percent of the TAC;

[111] The alternatives and options also affect Atka mackerel production by opening or closing critical habitat to directed fishing. These alternatives and options are dealt with later in the analysis, but they may interact with the TAC and critical habitat limits.

6. A provision in Alternative 3 setting a critical habitat limit (west of 178° W longitude) equal to 60 percent of the TAC.

The first of these measures, the Alternative 1 limit in Area 542, was discussed at the end of Section 8.3.2. The remainder of this section discusses each of the other measures in turn, for each of the management areas. Thus, the next sub-section examines the operation of the Alternative 2 measures in Area 543.

Alternative 2, Area 543 TAC determination

Alternative 2 sets the Area 543 TAC equal to 65 percent of the ABC (with options to set the TAC equal to 50 percent or to 40 percent of the ABC).[112] This is meant to protect Steller sea lions in this sensitive region, by limiting the potential harvest associated with renewed fishing activity. Table 8-72 shows the actual Area 543 ABCs, TACs, and catches from 1994 through 2014, and compares these to the TACs that would be associated with each of the ABC percentages discussed above.

The TAC determination options under consideration in Alternatives 2 and 3 remove the Council's policy discretion to set TACs in Area 543 (and in Areas 542 and 541.)[113] Once the ABC for Area 543 was determined, the TACs for Area 543 would be set by the percentage limit chosen. This eliminates the Council's ability to set TACs at other levels in response to socio-economic criteria, or to use Aleutian Islands Atka mackerel as a tool to keep the sum of all BSAI TACs within the 2 million mt BSAI optimum yield limit.

The ABC-percentage based TACs may be compared with (a) historical TACs, (b) historical catches, and (c) historical catches from areas remaining open under the different alternatives. Each of these comparisons is carried out in the next few paragraphs. The most important is the comparison of the ABC percentage-based TACs with catch from areas remaining open (c), since this may affect the conclusions of a purely open-and-closed-area-based analysis. Figure 8-7, Figure 8-8, and Figure 8-9 show these relationships for each of the TAC options for the baseline years, from 2004 through 2010, and add information from Table 8-72 on the residual harvest from Area 543, given the critical habitat closures in this area (this is equivalent to the harvest from outside closed critical habitat during those years).[114]

The alternative and its options require that TAC be set equal to a percentage of ABC, but as Table 8-72 shows, in some years the Council made policy decisions to set TACs below the levels implied by some of the percentages. TACs were below the percentages in 2011 to 2014, because of the interim final rule, rather than Council policy, but the Council did choose to set TACs below all of the three percentage thresholds in 1994 and 1995, and, perhaps more relevant given changes in the fisheries since then, it set TACs below the 50 percent and 65 percent thresholds in 2005, 2006, and 2007, and below the 40 percent threshold in 2006.

As discussed in Chapter 3, the Council has set TAC in this fishery below the ABC, and was more likely to do so for higher ABCs. This may be associated with efforts by the Council to keep the sum of all

[112] By comparison, Alternative 1, the status quo, prohibits retention of Atka mackerel in Area 543. TACs of 1,500 mt have been set in harvest specifications to take account of Atka mackerel taken as bycatch and discarded.

[113] This is not the case with the Area 542 47 percent limit in Alternative 1, which requires the TAC be set at a level "no more than" 47 percent of the ABC.

[114] There are three classes of areas under consideration here: (1) non-critical habitat, (2) closed critical habitat, and (3) open critical habitat. Fishing can take place in non-critical habitat and open critical habitat. Volumes of fish and revenues lost under the different alternatives and options are based on estimates of the volumes of fish and revenues from closed critical habitat under that alternative or option.

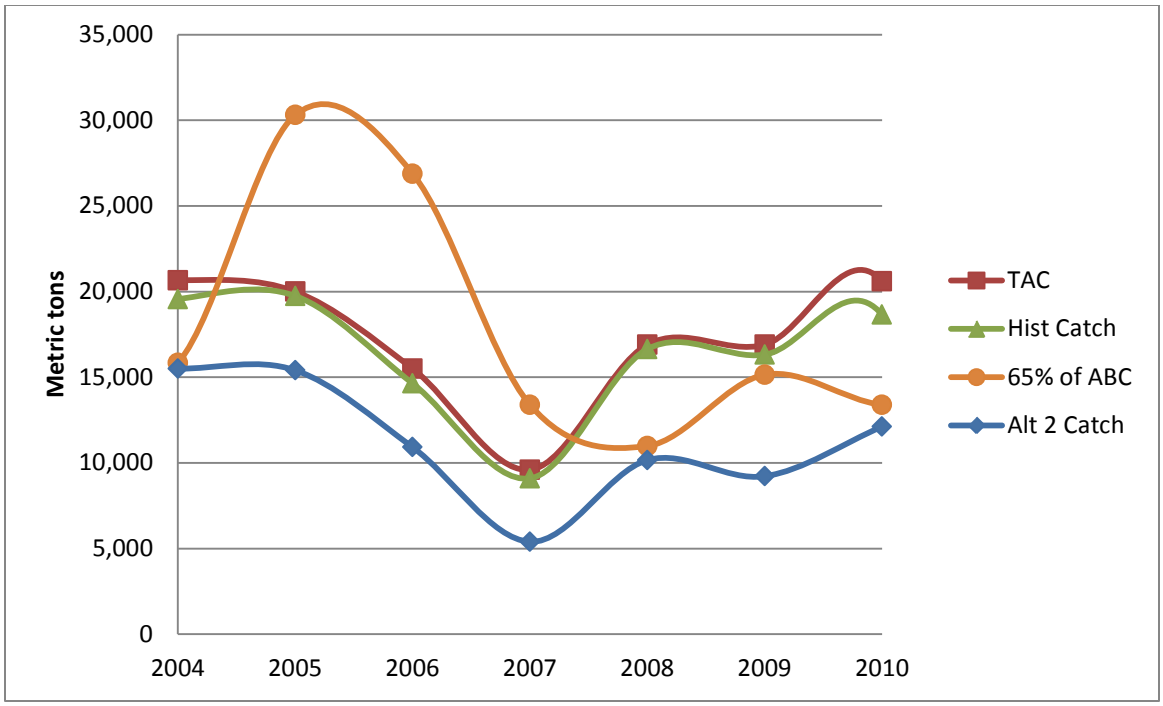
groundfish TACs below the BSAI 2 million mt optimum yield limit, because of industry concerns about price effects at high TACs or for other reasons.

Table 8-72 Area 543 Atka mackerel ABCs, TACs, catches, and TACs under options to Alternative 2 (1994 through 2014)

Year	543 ABC	543 TAC	543 catch	TAC = 40% of ABC	TAC = 50% of ABC	TAC = 65% of ABC
1994	53,900	10,000	8,923	21,560	26,950	35,035
1995	55,600	16,500	16,967	22,240	27,800	36,140
1996	55,700	45,857	42,246	22,280	27,850	36,205
1997	32,200	32,200	29,537	12,880	16,100	20,930
1998	27,000	27,000	24,617	10,800	13,500	17,550
1999	30,700	27,000	16,366	12,280	15,350	19,955
2000	29,700	29,700	10,503	11,880	14,850	19,305
2001	27,900	27,900	20,309	11,160	13,950	18,135
2002	19,700	19,700	18,077	7,880	9,850	12,805
2003	22,990	19,990	17,885	9,196	11,495	14,944
2004	24,360	20,660	19,554	9,744	12,180	15,834
2005	46,620	20,000	19,743	18,648	23,310	30,303
2006	41,360	15,500	14,637	16,544	20,680	26,884
2007	20,600	9,600	9,097	8,240	10,300	13,390
2008	16,900	16,900	16,643	6,760	8,450	10,985
2009	23,300	16,900	16,319	9,320	11,650	15,145
2010	20,600	20,600	18,650	8,240	10,300	13,390
2011	21,000	1,500	205	8,400	10,500	13,650
2012	20,000	1,500	227	8,000	10,000	13,000
2013	17,100	1,500		6,840	8,550	11,115
2014	16,700	1,500		6,680	8,350	10,855

Notes: The baseline years have been shaded.
Source: ABCs, TACs, and historical catches from 2012 Atka mackerel SAFE chapter (Table 17.2) (Lowe, Ianelli, and Palsson 2012a) and Council 2013–2014 harvest specifications retrieved on January 15, 2013, from the Council web site.

As shown in Table 8-72 and in Figure 8-7, Figure 8-8, and Figure 8-9, during the baseline years (2004 through 2010), a TAC set equal to 65 percent of the ABC would have exceeded the historical TAC levels authorized by the Council in three years, and would have been less than the Council's authorized TACs in four years. A TAC set at 50 percent of ABC would have exceeded the Council's TACs in three years and fallen below in four years, and a TAC set at 40 percent would have exceeded the Council's authorized TAC in one year and fallen below in six years.

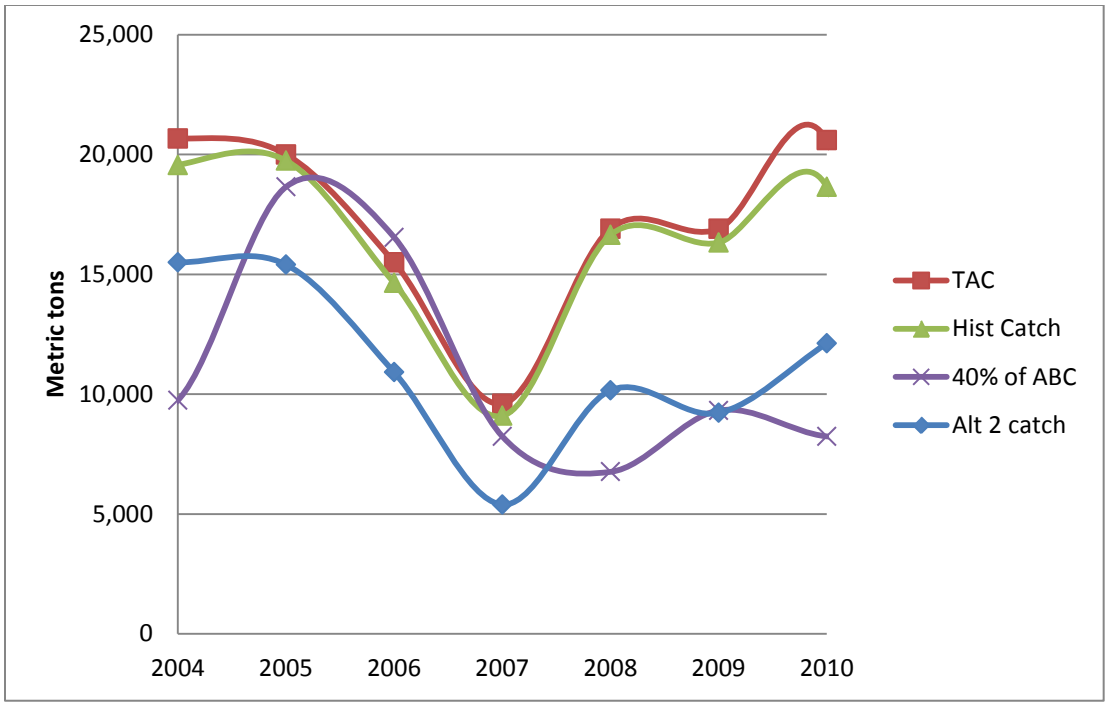


Source: Table 8-72

Figure 8-7 **Area 543 actual TACs, TACs at a hypothetical TAC equal to 65 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 (metric tons)**

Source: Table 8-72

Figure 8-8 **Area 543 actual TACs, TACs at a hypothetical TAC equal to 50 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 (metric tons)**



Source: Table 8-72

Figure 8-9 Area 543 actual TACs, TACs at a hypothetical TAC equal to 40 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 (metric tons)

Figure 8-7, Figure 8-8, and Figure 8-9 also show that in some years, ABC-percentage based TAC options would have restricted harvests by the Amendment 80 fleet more than would be expected by considering the Alternative 2 critical habitat closures alone.

Table 8-73 makes this clearer, by comparing the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) with the TACs associated with the ABC-percentage based TAC options under Alternative 2. The table shows the additional catch restrictions, over and above those associated with the critical habitat closure that might be imposed by the ABC-based TAC limits.[115] The 65 percent ABC based TAC does not restrict harvests, but the 50 percent and 40 percent ABC based TACs do restrict harvests in three of the seven years.

[115] Residual catch includes only retained catch. However, in the analysis in this section the proposed limits apply to retained and discarded catch. Atka mackerel discards averaged about 4 percent per year from 2008 to 2010. These are the years in which the Amendment 80 rules were in force. The rate averaged about 5 percent per year over the full 2004 through 2010 baseline period, and was unusually high (13 percent) in 2004. However, discard behavior under the Amendment 80 rules is believed to be more relevant for this analysis. Thus, while use of retained catch may cause the analysis to understate the extent to which the constraints bind, the amount of understatement is relatively small.

Table 8-73 Harvest limits in addition to Area 543 critical habitat closure limits associated with the ABC-percentage based TAC options (metric tons)

Year	Alternative 2 residual harvest	TACs by ABC-percentage options			Additional catch constraint associated with TAC by ABC-percentage options		
		40%	50%	65%	40%	50%	65%
2004	15,501	9,744	12,180	15,834	5,757	3,321	0
2005	15,403	18,648	23,310	30,303	0	0	0
2006	10,914	16,544	20,680	26,884	0	0	0
2007	5,397	8,240	10,300	13,390	0	0	0
2008	10,162	6,760	8,450	10,985	3,402	1,712	0
2009	9,221	9,320	11,650	15,145	0	0	0
2010	12,117	8,240	10,300	13,390	3,877	1,817	0

Table 8-74 provides estimates of the revenues associated with these production shortfalls (using real 2012 dollar estimates).[116] In most years, the limits would not impose costs. The 65 percent ABC based TAC never imposes costs. In three years, the 50 percent ABC based TAC imposes costs of $1.3 million to $2.4 million in forgone gross revenues, and in three years the 40 percent ABC TAC imposes costs of $2.6 million to $4.7 million in forgone gross revenues. Potential gross revenue decreases would be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

Table 8-74 Estimates of revenues associated with production shortfalls in Area 543 associated with ABC-percentage based TACs

Year	Real price per ton (2012 $/metric ton round weight)	40% of ABC (millions of 2012 $)	50% of ABC (millions of 2012 $)	65% of ABC (millions of 2012 $)
2004	733	4.2	2.4	0.0
2005	772	0.0	0.0	0.0
2006	675	0.0	0.0	0.0
2007	815	0.0	0.0	0.0
2008	759	2.6	1.3	0.0
2009	1,094	0.0	0.0	0.0
2010	1,202	4.7	2.2	0.0

In some baseline years, ABC-percentage based TACs exceeded the harvests coming from areas outside of critical habitat. If the Amendment 80 fleet is successfully able to redeploy from fishing in closed critical habitat to areas that remain open, these TAC increases could make possible increased fishing production. Table 8-75 compares the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) with the TACs associated with the ABC-percentage based TAC options under Alternative 2, and calculates the additional catch that might be possible if the fleet could successfully redeploy into Atka mackerel within Area 543 (in a sense, this table is the "inverse" of Table 8-74).

[116] This is an approximation of the revenue shortfall, based solely on a consideration of the forgone Atka mackerel revenues, but not considering the potential for revenue impacts of lost incidental catches.

Table 8-75 Potential additional production in Area 543 if the Amendment 80 fleet can redeploy into open areas from closed areas (metric tons)

Year	Alternative 2 residual harvest	TACs by ABC-percentage options			Additional catch constraint associated with TAC ABC-percentage option		
		40%	50%	65%	40%	50%	65%
2004	15,501	9,744	12,180	15,834	0	0	333
2005	15,403	18,648	23,310	30,303	3,245	7,907	14,900
2006	10,914	16,544	20,680	26,884	5,630	9,766	15,970
2007	5,397	8,240	10,300	13,390	2,843	4,903	7,993
2008	10,162	6,760	8,450	10,985	0	0	823
2009	9,221	9,320	11,650	15,145	99	2,429	5,924
2010	12,117	8,240	10,300	13,390	0	0	1,273

Table 8-76 provides estimates of the value of this potential production increase (using real 2012 dollar estimates). [117] Potential gross revenues associated with the 65 percent ABC based TAC range from $200,000 to $11.5 million, potential gross revenues associated with the 50 percent ABC based TAC range from zero to $6.6 million, and potential gross revenues associated with the 40 percent ABC based TAC range from zero to $3.8 million. Potential gross revenue increases could be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these revenue estimates. In particular, they depend on the Amendment 80 fleet's ability to redeploy from closed critical habitat and to fish for Atka mackerel successfully in parts of Area 543 that remain open.

Table 8-76 Estimates of potential revenue increases (over estimates based solely on critical habitat closures) of in Area 543 associated with ABC-percentage based TACs

Year	Real price per ton (2012 $/metric ton round weight)	40% of ABC (Millions of 2012 $)	50% of ABC (Millions of 2012 $)	65% of ABC Millions of 2012 $)
2004	733	0.0	0.0	0.2
2005	772	2.5	6.1	11.5
2006	675	3.8	6.6	10.8
2007	815	2.3	4.0	6.5
2008	759	0.0	0.0	0.6
2009	1,094	0.1	2.7	6.5
2010	1,202	0.0	0.0	1.5

Alternative 2, Area 542 TAC determination and critical habitat limits

Alternative 2 sets the Area 542 TAC equal to 65 percent of the ABC, and limits harvest within critical habitat to 50 percent of the Area 542 TAC. By comparison, Alternative 1, the status quo, imposes a TAC no greater than 47 percent of the ABC, and a critical habitat limit equal to 10 percent of the TAC. These limits are meant to protect Steller sea lions in this sensitive region, by limiting the potential harvest associated with permissible fishing activity.

[117] This is an approximation of the revenue increase, based solely on a consideration of the forgone Atka mackerel revenues, but not considering the potential for lost incidental catches.

The overall TAC under Alternative 1 limits fishing outside of critical habitat to the levels observed prior to the interim final rule. This prevents fishing operations from offsetting the limits in critical habitat, by increasing overall production in the remaining open areas of Area 542. Table 8-77 shows the actual Area 542 ABCs, TACs, and catches from 1994 through 2014, and compares these to the TACs that would be associated with 47 percent and 65 percent ABC based TACs discussed above.

As noted earlier, the Alternative 2 and Alternative 3 ABC-percentage based TAC options remove the Council's policy discretion to set alternative TACs in Area 542. Once the Area 542 ABC was determined, the TAC for Area 542 would be set by the percentage limit. This eliminates the Council's ability to set TACs at other levels in response to socio-economic criteria, or to use Aleutian Islands Atka mackerel as a tool to keep the sum of all BSAI TACs within the 2 million mt BSAI optimum yield limit.

While actual TACs that would be chosen by the Council in the absence of this rule could be below the levels implied by the 65 percent ABC based TAC rule, this did not happen from 1994 through 2010. It did happen in 2011 to 2014, while the interim final rule was in effect, since the interim final rule set the TAC no greater than 47 percent of the ABC, while Alternative 2 sets TAC equal to 65 percent of the ABC.

Table 8-77 Area 542 Atka mackerel TACs under options to Alternative 2 (metric tons)

Year	542 ABC	542 TAC	542 Catch	Alt 1: 47%	Alt 2: 65%
1994	55,125	44,525	28,871	25,909	35,831
1995	55,900	50,000	50,386	26,273	36,335
1996	33,600	33,600	33,523	15,792	21,840
1997	19,500	19,500	19,990	9,165	12,675
1998	22,400	22,400	20,209	10,528	14,560
1999	25,600	22,400	22,419	12,032	16,640
2000	24,700	24,700	22,383	11,609	16,055
2001	33,600	33,600	32,829	15,792	21,840
2002	23,800	23,800	22,291	11,186	15,470
2003	29,360	29,360	25,435	13,799	19,084
2004	31,100	31,100	30,169	14,617	20,215
2005	52,830	35,500	35,069	24,830	34,340
2006	46,860	40,000	39,836	22,024	30,459
2007	29,600	29,600	26,723	13,912	19,240
2008	24,300	24,300	22,329	11,421	15,795
2009	33,500	32,500	30,070	15,745	21,775
2010	29,600	29,600	26,389	13,912	19,240
2011	24,000	11,280	10,713	11,280	15,600
2012	22,900	10,763	12,002	10,763	14,885
2013	16,000	7,520		7,520	10,400
2014	15,700	7,379		7,379	10,205

Notes: Baseline years are shaded. Note that TACs may be set no greater than 47% under Alternative 1, while they are set equal to 65% under Alternative 2.
Sources: 2012 Atka mackerel SAFE chapter (Lowe, Ianelli, and Palsson 2012a) and AKR calculations.

Figure 8-10 shows the relationships between historical TAC, historical catch, residual catch in Area 542 under the Alternative 2 critical habitat closures, and the 47 percent or 65 percent ABC- percentage based TACs. A TAC equal to 65 percent of the ABC would have been less than the historical TAC in each of the baseline years. It would have been close to the Area 542 TAC in 2005, but not in other years. Clearly, the 47 percent TAC limit would be even further from the Council's TACs than the 65 percent limit.

During the baseline years, historical catches were close to the historical TAC in all years. Both the 47 percent TAC limit and the 65 percent TAC limit would have kept actual harvests below historical levels in the baseline years.

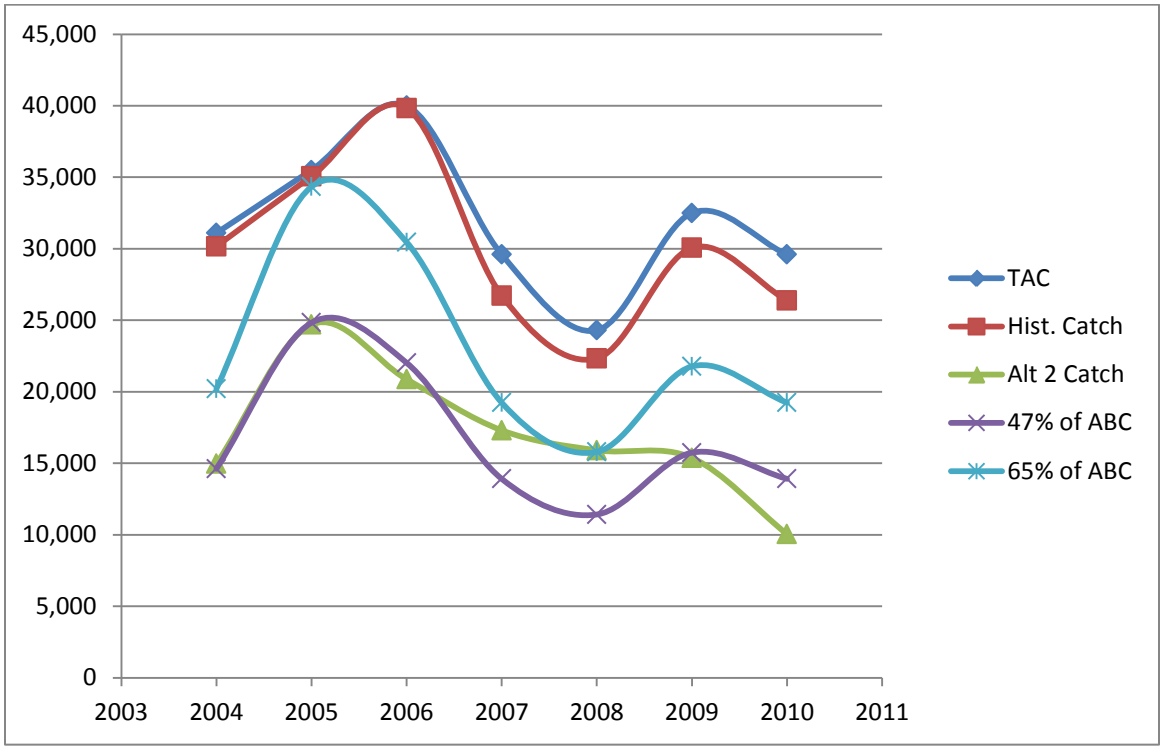


Figure 8-10 Alternative 2 Area 542 TAC analysis (metric tons)

In general, the 65 percent ABC based TAC would not have constrained harvests below the levels associated with critical habitat closures alone. The line in Figure 8-10 labeled, "Alt 2 Catch" is the estimated catch in the baseline years from areas that would have remained open to fishing under Alternative 2. Except in 2008, these are smaller than the catches allowed under the 65 percent ABC based TAC (even in 2008 the two values are only 114 metric tons apart). Thus, the 65 percent limit does not appear to add an important constraint on the harvest during the baseline years (beyond that created by the area closures).

If the Amendment 80 fleet is successfully able to redeploy from fishing in closed critical habitat, to areas that remain open, TACs that exceed historical harvests from open areas could make increased catches possible. Table 8-78 compares the open area catch estimates in Area 542 under Alternative 2 (from the analysis of critical habitat closures) with the TACs associated with the ABC-percentage based TAC options under Alternative 2, and calculates the additional catch that might be possible if the fleet could successfully redeploy to catch more Atka mackerel within Area 542.

Table 8-78 Potential additional production in area 542 if the Amendment 80 fleet can redeploy into open areas from closed areas

Year	Alternative 2 residual harvest	TACs by ABC-percentage options		Additional catch constraint associated with TAC by ABC-percentage option	
		47%	65%	47%	65%
2004	14,974	14,617	20,215	0	5,241
2005	24,698	24,830	34,340	132	9,642
2006	20,876	22,024	30,459	1,148	9,583
2007	17,306	13,912	19,240	0	1,934
2008	15,909	11,421	15,795	0	0
2009	15,380	15,745	21,775	365	6,395
2010	10,043	13,912	19,240	3,869	9,197

Table 8-79 provides estimates of the potential gross revenues that could have accrued to the fleet if it had been able to successfully redeploy under these ABC-percentage based TAC during the baseline years.[118] The gross revenues associated with the 65 percent ABC based TAC ranged from about zero in 2008, up to about $11.1 million in 2010.[119] Potential gross revenue increases could be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these revenue estimates. In particular, they depend on the Amendment 80 fleet's ability to redeploy from closed critical habitat and to fish successfully in areas in 542 that remain open.

Table 8-79 Estimates of potential revenue increases (over estimates based solely on critical habitat closures) of in Area 542 associated with ABC-percentage based TACs

Year	Real price per ton (2012 $/metric ton round weight)	47% of ABC (millions of 2012 $)	65% of ABC (millions of 2012 $)
2004	733	0.0	3.8
2005	772	0.1	7.4
2006	675	0.8	6.5
2007	815	0.0	1.6
2008	759	0.0	0.0
2009	1,094	0.4	7.0
2010	1,202	4.7	11.1

Alternative 2 also contains a provision allowing catches of up to 50 percent of the TAC to be taken from open critical habitat. This contrasts with a provision under Alternative 1, allowing up to 10 percent of the TAC to be taken from open critical habitat. These catch limits apply to incidental, as well as targeted catches of Atka mackerel, and to the discarded, as well as the retained portions of the catch.

Table 8-80 provides estimates of the impact of this provision. The leftmost column provides estimates of the volume of Atka mackerel taken from within critical habitat during the baseline years 2004 through 2010. This estimate includes total catch, including catch in Atka mackerel targets and other targets, and

[118] As in the Area 543 discussion, this is an approximation of the revenue increase, based solely on a consideration of the forgone Atka mackerel revenues, but not considering the potential revenue deficit for lost incidental catches.

[119] If the 114 metric tons by which the 65 percent TAC fell below harvests from open areas in 2008 were priced using the 2008 price in Table 8-79, the value would be about $87,000 in 2008. This has been rounded to zero in the text.

retained and discarded. The next two columns provide estimates of the TACs under Alternatives 1 and 2, given the ABCs in the baseline years. The next two columns show the limits on catch from within critical habitat implied by the TACs and by the Alternatives 1 and 2 critical habitat harvest limits of 10 percent and 50 percent, respectively. The final columns show the impact of the restrictions under Alternatives 1 and 2, and the impact of relaxing the Alternative 1 restriction and adopting the Alternative 2 restriction.

Alternative 1 restricts critical habitat catch from about 11,900 mt to about 18,400 mt, depending on the year. Alternative 2 restricts critical habitat catch from about 2,700 mt to about 8,100 mt, depending on the year.

The shift from the Alternative 1 to the Alternative 2 critical habitat limits relaxes the constraint. As noted in the background section, industry sources have indicated that in Area 542, the larger, more valuable fish were found inside critical habitat, and less valuable fish were found outside of critical habitat. Thus, this measure may positively affect revenues, compared to Alternative 1, if fishing operations are able to take relatively more of their fish inside critical habitat. However, information on the price differential between the areas is not good enough to permit a revenue estimate.

Table 8-80 Impact of Alternatives 1 and 2 critical habitat harvest limits in Area 542 (metric tons)

		542 TACs		542 Critical habitat limits		Estimated reduction in catch within critical habitat		
Year	542 Critical habitat	Alt 1 (47%)	Alt 2 (65%)	Alt 1 (10%)	Alt 2 (50%)	Alt 1 (10% of 47%)	Alt 2 (50% of 65%)	Difference between Alt 1 and Alt 2
2004	15,261	14,617	20,215	1,462	10,108	13,799	5,154	8,646
2005	19,883	24,830	34,340	2,483	17,170	17,400	2,713	14,687
2006	20,615	22,024	30,459	2,202	15,230	18,412	5,385	13,027
2007	13,303	13,912	19,240	1,391	9,620	11,912	3,683	8,229
2008	13,536	11,421	15,795	1,142	7,898	12,394	5,638	6,755
2009	18,972	15,745	21,775	1,575	10,888	17,398	8,085	9,313
2010	16,775	13,912	19,240	1,391	9,620	15,384	7,155	8,229

Source: AKR CIA, January 2013; TACs from ; calculations based on alternatives

Alternative 2, Area 541 limits

Under Alternative 1 (the status quo) critical habitat in Area 541 is closed to directed fishing for Atka mackerel. Critical habitat remains closed under Alternative 2, except for an area 12 nm to 20 nm southeast of Seguam Island (shown in Figure 2-9 in Chapter 2).

No directed fishing for Atka mackerel took place within this area of critical habitat during the baseline years, so the only estimates of Atka mackerel production from this area are for incidental catches of Atka mackerel in other target groundfish fisheries. As discussed in detail in Chapter 5, there is some evidence that the Atka mackerel present within the area proposed for opening are part of a stock that is currently fished in waters outside critical habitat, and which straddles the 20 nm critical habitat boundary in this area. There is also some evidence that this stock is separated to some extent from nearby stocks within critical habitat. The rationale for this provision is to reduce fishing costs, allowing operations to pursue stocks they are already fishing outside critical habitat, potentially without affecting stocks predominately within critical habitat. Further information, and an analysis of the potential for this action to affect Steller sea lion prey, may be found in Section 5.2.2.3.1.

To prevent excessive harvests from within critical habitat, a provision in Alternative 2 sets an Area 541 critical habitat limit equal to 50 percent of the TAC. Table 8-81 summarizes historical and current TACs in Area 541 from 1994 through 2014, shows the volumes taken from within critical habitat during the 2004 to 2010 baseline years (incidental harvests, as explained above), and shows the increased volume that might be taken from within critical habitat if the measure is adopted.

This does not necessarily represent an increase in actual production in Area 541. Area 541 retained catches have typically been close to the TACs. If this measure did lead to increased harvests, these would be small, as the fleet edges somewhat closer to the TAC each year. Thus, there would be little revenue impact associated with this increased fishing. This measure could, however, lead to a change in harvest location and reduce fishing operation costs.

Table 8-81 Potential for increased production from within Area 541 critical habitat if 50 percent of the Area 541 TAC may be taken within critical habitat (metric tons)

Year	Area 541 TAC	Potential critical habitat harvest if limit is 50% of the TAC	Actual catch from within critical habitat during the baseline years	Possible increase in production if the 50% limit is adopted
1994	13,475	6,738		
1995	13,500	6,750		
1996	26,700	13,350		
1997	15,000	7,500		
1998	14,900	7,450		
1999	17,000	8,500		
2000	16,400	8,200		
2001	7,800	3,900		
2002	5,500	2,750		
2003	10,650	5,325		
2004	11,240	5,620	433	5,187
2005	7,500	3,750	502	3,248
2006	7,500	3,750	406	3,344
2007	23,800	11,900	199	11,701
2008	19,500	9,750	104	9,646
2009	27,000	13,500	52	13,448
2010	23,800	11,900	171	11,729
2011	40,300	20,150		
2012	38,500	19,250		
2013	16,900	8,450		
2014	16,500	8,250		

Notes: Baseline years have been shaded. Note that the baseline catch and possible increase in catch include discarded and retained catches and exceeds retained catch.
Source:Lowe, Ianelli, and Palsson 2012b; AKR CIA dataset; AKR calculations.

Alternative 3, Area 543 critical habitat limits

Under Alternative 1, the status quo, retention of Atka mackerel is prohibited in Area 543. Some critical habitat is opened under Alternative 3 (shown in Figure 2-15 in Chapter 2). The impacts of these openings on the potential volume of Atka mackerel production are discussed later in this section. A provision in Alternative 3 sets an Area 543 critical habitat limit equal to 60 percent of the TAC.

Table 8-82 summarizes historical and current TACs in Area 543 from 1994 through 2014, shows the volumes taken from within critical habitat during the 2004 through 2010 baseline years, and shows the increased volume that might be taken from within critical habitat if the measure is adopted.

This action increases potential production from critical habitat considerably. However, during the baseline years, fishing operations had the opportunity to fish Area 543 Atka mackerel inside the critical habitat, and chose not to harvest more than the amount shown in the table, preferring to fish in open areas outside of critical habitat. While the sector may choose to increase fishing effort within critical habitat, it seems more likely that it would focus any additional effort in the areas where its production has been greatest in the past.

Table 8-82 Potential for increased production of Atka mackerel from within Area 543 critical habitat if 60 percent of the Area 543 TAC may be taken within critical habitat (metric tons)

Year	Area 543 TAC	Potential critical habitat harvest if limit is 60% of the TAC	Actual catch from within critical habitat during the baseline years	Potential harvest minus actual harvest during baseline years
1994	10,000	6,000		
1995	16,500	9,900		
1996	45,857	27,514		
1997	32,200	19,320		
1998	27,000	16,200		
1999	27,000	16,200		
2000	29,700	17,820		
2001	27,900	16,740		
2002	19,700	11,820		
2003	19,990	11,994		
2004	20,660	12,396	1,260	11,136
2005	20,000	12,000	3,431	8,569
2006	15,500	9,300	3,502	5,798
2007	9,600	5,760	3,528	2,232
2008	16,900	10,140	5,516	4,624
2009	16,900	10,140	6,427	3,713
2010	20,600	12,360	5,524	6,836
2011	1,500	900		
2012	1,500	900		
2013	1,500	900		
2014	1,500	900		

Notes: Baseline years have been shaded. Note that the baseline catch and possible increase in catch include discarded and retained catches and exceeds retained catch.
Source:Lowe, Ianelli, and Palsson 2012b; AKR CIA dataset; AKR calculations.

Alternative 3, Area 542 critical habitat limits

A provision in Alternative 3 sets an Area 542 critical habitat limit equal to 60 percent of the TAC west of 178° W longitude. This limit is evenly distributed between the A- and B-seasons.

Table 8-83 summarizes historical and current TACs in Area 542 from 1994 through 2014, shows the catches taken from within critical habitat during the 2004 to 2010 baseline years, and shows the increased catches that might be taken from within critical habitat, if this measure is adopted. This action increases

potential production from critical habitat. However, during the baseline years, fishing operations had the opportunity to fish Area 542 Atka mackerel inside the critical habitat, and chose not to harvest more than the amount shown in the table. While the sector may choose to increase fishing effort within Area 542 critical habitat, the most productive areas of critical habitat in the past remain closed under the alternative.

Table 8-83 Potential for increased Atka mackerel production from within Area 542 critical habitat if 60 percent of the Area 542 TAC may be taken within critical habitat (metric tons)

Year	Area 542 TAC	Potential critical habitat harvest if limit is 60% of the TAC	Actual catch from within critical habitat during the baseline years	Potential harvest minus actual harvest during baseline years
1994	44,525	26,715		
1995	50,000	30,000		
1996	33,600	20,160		
1997	19,500	11,700		
1998	22,400	13,440		
1999	22,400	13,440		
2000	24,700	14,820		
2001	33,600	20,160		
2002	23,800	14,280		
2003	29,360	17,616		
2004	31,100	18,660	15,261	3,399
2005	35,500	21,300	19,883	1,417
2006	40,000	24,000	20,615	3,385
2007	29,600	17,760	13,303	4,457
2008	24,300	14,580	13,536	1,044
2009	32,500	19,500	18,972	528
2010	29,600	17,760	16,775	985
2011	11,280	6,768		
2012	10,763	6,458		
2013	7,520	4,512		
2014	7,379	4,427		

Notes: Baseline years have been shaded. Note that the baseline catch and possible increase in catch include discarded and retained catches and exceeds retained catch.
Source: Lowe, Ianelli, and Palsson 2012b; AKR CIA dataset; AKR calculations.

BSAI trawl limited access critical habitat fishing

Alternative 1, the status quo, and an option to Alternative 2 include provisions prohibiting BSAI trawl limited access vessels from fishing within critical habitat in Area 542. A similar provision of Alternative 2 (not an option) prohibits BSAI trawl limited access sector fishing inside Area 541 critical habitat.

While this fleet has been able to harvest its Area 542 and Area 541 quotas under the interim final rule, this rule is restrictive for this fleet, and presumably increases its costs.

The purpose of the interim final rule is to facilitate Atka mackerel management. Amendment 80 vessels have 100 percent observer coverage, the observer data are linked to VMS data, and catch is assigned to critical habitat if, at any time during a trawl, a VMS point appears inside critical habitat. This allows the critical habitat limits to be managed. Catcher vessels that may fish the BSAI trawl limited access Atka mackerel quota do not have 100 percent observer coverage, so linking VMS data to fishing activity is not

possible at this time. Alaska Department of Fish and Game statistical areas reported on eLandings are not specific to critical habitat areas, so they do not identify potential critical habitat catch. An electronic logbook would provide the information necessary to link VMS data to fishing activity by these vessels; however, there is no current regulation to require electronic logbooks on trawl catcher vessels. Managing these critical habitat limits on that sector will be difficult and a solution to this problem will require changes in the catch accounting system and recordkeeping and reporting requirements.

Alternatives 3, 4, and 5 do not include the proposed prohibition on BSAI trawl limited access fishing within critical habitat. In the absence of this limit, and of an electronic logbook requirement, NMFS in-season managers would seek an agreement among the small number of participants to limit fishing, or would assume all harvest by this sector came from within critical habitat. NMFS in-season managers will close fishing within critical habitat to keep catch within an area and sector's critical habitat limit.

Revenues from potential redeployment within areas

As discussed in this section, ABC-percentage based TAC determination rules can restrict TACs below levels of harvest estimated for Alternative 2. In these instances, revenues may be lower than they would be based solely on a consideration of historical harvests from open and closed critical habitat. Similar effects were not identified with the critical habitat limits of either Alternatives 2 or 3.

Figure 8-11 is a variant of Figure 8-5, modified to remove gross revenue estimates for Alternatives 1 and 4,[120]and to create three Alternative 2 gross revenue estimates that take account of the reduced revenues associated with the 40 percent and 50 percent ABC based TACs in Area 543. Note while reading this figure, that the results for Alternative 3, and for Alternative 3b are very similar, as they are in Figure 8-5, while the results for Alternative 2 (in its various variants) and Alternative 3a, also tend to be similar, as they also are in Figure 8-5.

As discussed in Sub-section 8.8.2, the ABC-percentage based TACs can sometimes be larger than the estimated catch from the area, based on the assumption that Atka mackerel formerly caught in areas of critical habitat that have been closed, will be lost, and not made up by fishing activity in areas remaining open.

However, if the Amendment 80 sector is able to redeploy its fleet into the remaining open areas, it may make up some or all of the difference between the historical revenues from open areas, and the TAC. It was to avoid such an offsetting shift of production into open areas, that the interim final rule included a provision setting the Area 542 Atka mackerel TAC no greater than 47 percent of the ABC; this was the proportion of ABC observed catch coming from the areas that were to remain open in past years.

[120] Alternatives 1 and 4 were removed to make it easier to read the figure. Alternative 1 gross revenues were below revenue estimates from all other alternatives in each year, and Alternative 4 gross revenues were higher than revenue estimates from all other alternatives in each year.

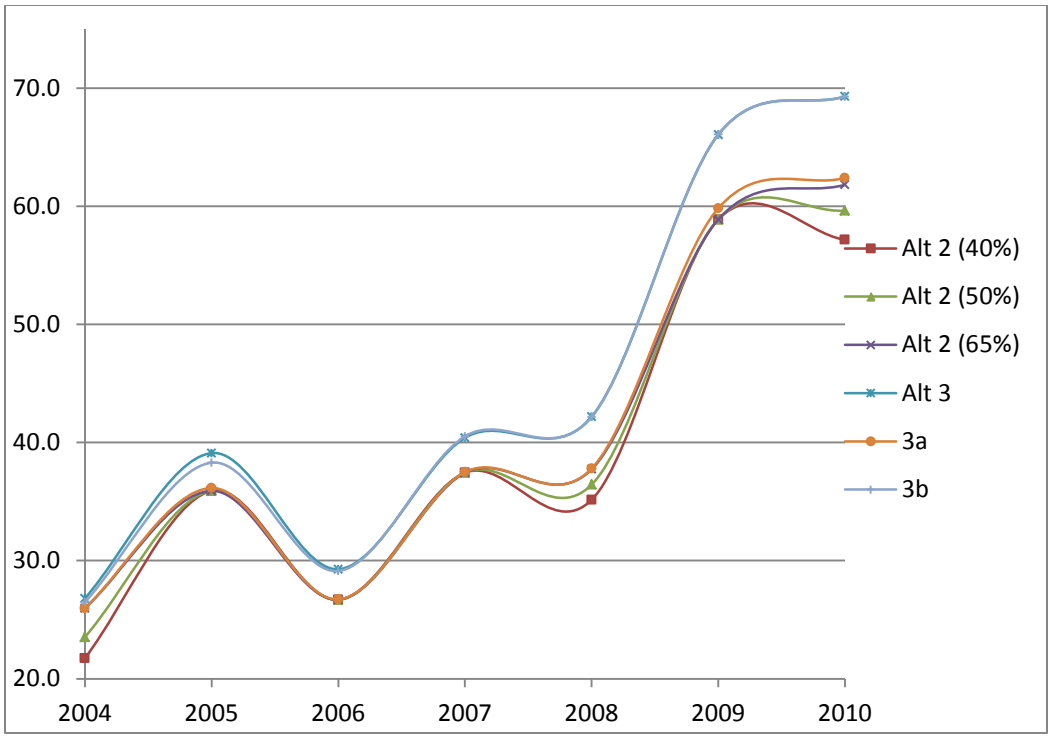


Figure 8-11 Atka mackerel Revenue streams modified to reflect Area 543 ABC-percentage based TACs under Alternative 2 (millions of dollars)

Earlier in this section it was pointed out that an increase in this proportion of the ABC to 65 percent might lead to increased production and increased revenues from Area 542. Figure 8-12 is based on Figure 8-11, adjusting the former figure to include potential additional revenues if the industry was able to harvest at the 65 percent level under Alternative 2. Since this figure is based on Figure 8-11, it also takes account of those years in which revenue streams might have fallen short, because of TAC constraints.

Consideration of potential harvest shifting out of closed critical habitat into remaining open areas has the potential to change the relative ranking of the alternatives. Alternatives 3, 3a, and 3b are unchanged in this figure. Alternatives 3 and 3b still have almost the same impacts. However, Alternative 2, which used to have an impact similar to that of Alternative 3a, now has a smaller adverse impact, with residual revenue flows that are often larger than those under Alternative 3a. This analysis is speculative, since it depends on the fleet's ability to harvest the available TAC, even if this means harvesting more from remaining open areas than it has in the past.

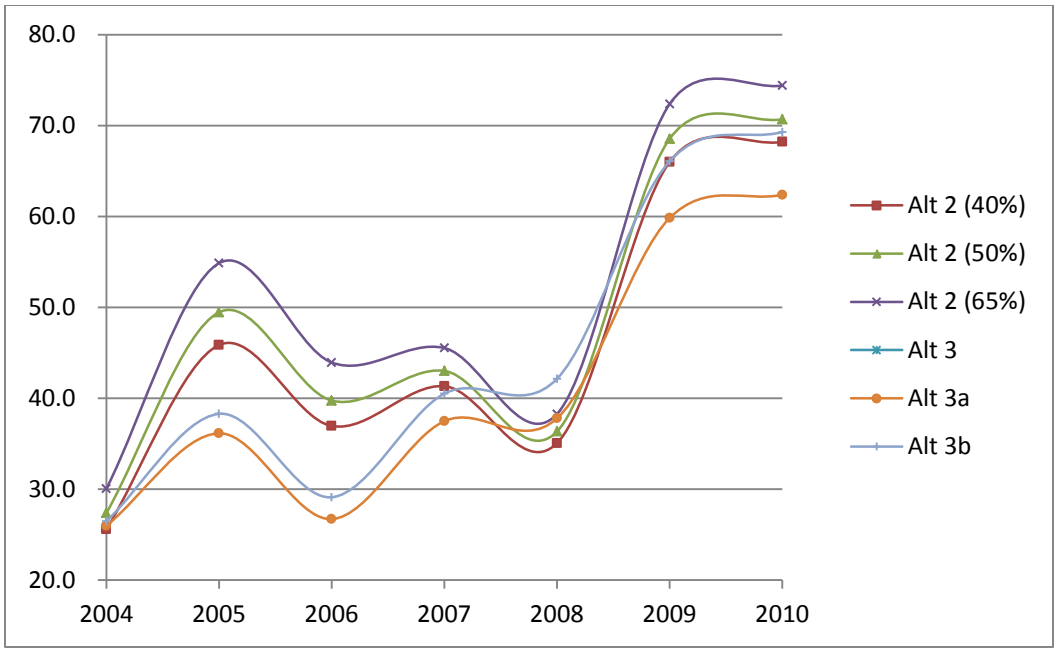


Figure 8-12 Revenue streams modified to reflect ABC-percentage based TACs and potential revenue increases under Alternative 2 (millions of dollars)

8.8.4 Maximum retainable amount changes, seasons, and rollovers

Maximum retainable amounts changes

Maximum retainable amount (MRA) is the amount of a groundfish species that is closed to directed fishing that a vessel may nonetheless retain. MRAs are calculated as a proportion of the retained amount of groundfish that is open for directed fishing; where the retained groundfish open to directed fishing are known as "basis" species. For Atka mackerel, the MRA is 20 percent of all basis species (Table 11 to Part 679). If Bering Sea Atka mackerel directed fishing is closed, vessels targeting groundfish species open to harvesting can only retain Atka mackerel up to 20 percent of their basis species.

Under Alternative 1, the status quo, the MRA must be met at any time during a fishing trip (§ 679.20(e)(3)(ii)). When Atka mackerel is closed to directed fishing, a vessel can only retain Atka mackerel up to 20 percent of the amount of the basis species actually on board. In the past, this regulation has required vessels to discard Atka mackerel in the Bering Sea.

Alternatives 2 through 4 include measures to revise the calculation of the MRA for Atka mackerel for vessels fishing for Amendment 80 and CDQ species in the Bering Sea. The Bering Sea would be closed to directed fishing for Atka mackerel, and instead of instantaneous calculation, the MRA would be calculated at the end of each offload, with respect to the basis species retained since the previous offload.

Therefore, if a vessel caught Atka mackerel, that vessel could retain all amounts of Atka mackerel if it was expected that it would subsequently harvest sufficient basis species to comply with the 20 percent MRA standard at offload. This is a relaxation of the MRA calculation and is meant to decrease regulatory discards, and to potentially facilitate Bering Sea, rather than Aleutian Islands Area 541, Atka mackerel harvests (Area 541 and the Bering Sea are subject to the same TAC).

This MRA calculation method will only apply to Amendment 80 vessels and vessels participating in CDQ fishing. Therefore, there will be little increase in the total amount of Atka mackerel harvested, because for these vessels Atka mackerel is managed under a hard cap. It is possible that there will be a shift in fishing activity from Area 541 of the Aleutian Islands to the Bering Sea, if vessels in the Bering Sea actively target Atka mackerel up to the MRA.

Incidental catch of other groundfish species and prohibited species may change; however, based on historical incidental catch rates in hauls that are primarily Atka mackerel in the Bering Sea, the change is likely to be minimal. It is not possible to quantify the change in incidental catch and PSC, because it is not possible to predict how much effort will shift in response to this management measure.

Industry sources indicate that Atka mackerel prices generally increase from west to east, as the Atka mackerel tend to increase in size. For this reason, a shift of production from Area 541 to the Bering Sea may be associated with somewhat greater revenues from the harvest of the EBS/541 TAC.

Seasons and rollovers

In 1999, the Atka mackerel fishery was temporally dispersed with the creation of two seasonal allowances. The A-season started on January 20 and ended on April 15. The B-season started on September 1 and ended on November 1. From 1999 to 2008, these seasons were enforced and TACs were reached prior to the season end dates.

In 2008, Amendment 80 was implemented. For many operations, this eliminated the race for fish, and introduced cooperative management. This cooperative management allowed the Amendment 80 participants to temporally spread out the catch of Atka mackerel to meet business needs. However, harvest limit area (HLA) regulations continued to temporally compress the Atka mackerel fishery.

In 2011, the interim final rule (75 FR 77535, December 13, 2010) removed the HLA regulations, changed the end date of the A-season from April 15 to June 10, and changed the B-season start date from September 1 to June 10. This resulted in the Alternative 1 (status quo) A-season starting on January 20 and ending on June 10, and the B-season starting on June 10 and ending on November 1. The effective result was a single season.

With the removal of the HLA regulations and the extension of the A- and B-seasons, the fishery in 2011 and 2012 was less concentrated in time than in previous years. When before, the majority of Atka mackerel fishing occurred only in January and February, in 2011 and 2012 fishing activity took place in most weeks from January 20 all the way to May. It also shifted the majority of the A-season Atka mackerel fishery to March and April. This has allowed some vessels to participate in the rock sole fishery in the BSAI, when roe value is optimal. It may have also reduced halibut prohibited species catch in the rock sole fishery, as halibut PSC rates are typically lower in January and February than in later months.

In 2011 and 2012, the B-season fishery saw benefits from the season extension. It allowed Amendment 80 vessels to remain in the Bering Sea yellowfin sole fishery longer, before moving to the Aleutian Islands to harvest Atka mackerel. This reduced the incidental catch of Pacific cod in yellowfin sole fisheries, which can be a limiting species to Amendment 80 vessels. However, because of the November 1 season end date, the Atka mackerel fishery production has concentrated somewhat at the end of October, as Amendment 80 vessels ensure that their allocation of Atka mackerel is harvested before the end of the B-season.

Alternative 1 and an option to Alternative 3 provide the same season dates as the fishery had in 2011 and 2012. By allowing for summer fishing, these season dates will likely result in similar fishing behavior and allow vessels to more efficiently harvest their allocations of groundfish in the BSAI than under the

baseline. There may be some benefits to ports that support these fisheries, such as Adak and Dutch Harbor, as these vessels are operating in the Aleutian Islands for longer periods of time than they did prior to 2011. Alternatives 2 through 5 seek to relax the B-season end date of November 1 to December 31 for all vessels. Extending the B-season to December 31 may provide the fleet with even more flexibility to temporally spread Atka mackerel fishing and operate more efficiently.

Alternative 2 contains measures prohibiting the rollover of seasonal allocations in critical habitat.

8.8.5 Redeployment

Section 8.3, evaluating Alternatives 1 and 4, included a detailed, but qualitative, discussion of the impacts of this action on the trawl catcher/processor fleet in the Aleutian Islands. Alternatives 1 and 4 represent the two extremes of restrictions on the trawl catcher/processor fleet. The restrictions under Alternative 1 (the interim final rule, which is the status quo for this analysis) are greater than those under other alternatives, and the restrictions under Alternative 4 (a return to the regulations as they were in 2010, with modest changes) are the least restrictive. The results for these two alternatives, therefore, can be thought of as bookends for the impacts of Alternatives 2 and 3 and their options.

This is true for redeployment, as well as for other impacts. In general, the conclusions with respect to redeployment under Alternative 1 hold (see Section 8.3.3), except that the fleet is not likely to redeploy to the same extent, since its fishing in Aleutian Islands Atka mackerel and Pacific cod fisheries will not have been restricted to the same extent. It is not possible to provide quantitative estimates of the differences between the alternatives.

Section 8.3.3 discussed redeployment under four headings: (1) other Amendment 80 species, (2) non-Amendment 80 species, (3) mothership operations, and (4) other activities. Amendment 80 species are allocated among participating firms as quota. A firm hoping to redeploy into another Amendment 80 species as a target must hold or acquire the quota to do it. It if does not hold the quota, much of its profit from redeployment is likely to be transferred to the entity from which it acquires the quota.

The fleet would have limited opportunities to fish for Atka mackerel elsewhere in the Aleutian Islands or in the Gulf of Alaska because of TACs. The ABC-percentage based TACs used in Alternative 2 may provide some additional opportunities for fishing in Aleutian Islands areas that remain open. There may be some increased activity in the Bering Sea, if the rules governing the MRAs are changed. Pacific cod fishing opportunities in the Aleutian Islands are limited, but Amendment 80 vessels may be able to fish their Pacific cod quota in the Bering Sea. Their ability to fully offset their Aleutian Islands Pacific cod losses in the Bering Sea could be limited, however, by the split between the Aleutian Islands and Bering Sea Pacific cod specifications, by higher halibut PSC rates in the Bering Sea, and possibly by lower prices for smaller Bering Sea Pacific cod. Amendment 80 vessels could shift into increased rock sole and yellowfin sole, although halibut PSC and incidental catches of other Amendment 80 species, such as Pacific cod may be limiting. Aleutian Islands Pacific ocean perch is fully allocated and harvested by the sectors that have allocations. Bering Sea Pacific ocean perch is not an Amendment 80 allocated species, and may offer some opportunities for these vessels. The Amendment 80 flathead sole quota has not been fully harvested in the past. The vessels are more likely to reserve their halibut PSC and Pacific cod for use in the rock sole, yellowfin sole, and arrowtooth flounder fisheries.

Trawl catcher/processors may turn to fisheries that are not limited by Amendment 80 quotas, including BSAI fisheries for arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, and other flatfish, and GOA fisheries for arrowtooth flounder, rockfish, and rex sole. The BSAI fisheries may provide attractive opportunities, although other flatfish is generally used as incidental catch in other

fisheries, rather than as a target fishery. The GOA fisheries are constrained by Amendment 80 sideboards for pollock, Pacific cod, Pacific ocean perch, northern rockfish, dusky rockfish, and halibut PSC. The Amendment 80 vessels could target the BSAI trawl allocation of sablefish, but there are high halibut PSC rates in this fishery.

Amendment 80 trawl catcher/processors could obtain some species for processing by acting as motherships for trawl catcher vessels in the BSAI trawl limited access sector. This has been a source of Atka mackerel for some trawl catcher/processors. These vessels could also seek to increase access to BSAI trawl limited access yellowfin sole; however, this could create conflicts with AFA catcher/processors also seeking access to BSAI trawl limited access yellowfin sole. Opportunities for Amendment 80 vessels outside of Alaska appear to be limited.

8.8.6 Incidental catch and PSC

When compared to the baseline years of 2004 to 2010, there would be a reduction in targeted Atka mackerel fishing in the Aleutian Islands for Alternative 1, Alternative 2, and Alternative 3. This will reduce incidental catches of other groundfish, and slightly reduce PSC. Table 8-84 summarizes the average rates of incidental catch and PSC in Atka mackerel targets in the Aleutian Islands from 2004 through 2012.

As seen in Table 8-84 the species with the highest incidental catch rate in Atka mackerel targets is Pacific ocean perch. A reduction in Atka mackerel targeted fishing in the Aleutian Islands may result in a smaller catch of Pacific ocean perch in Atka mackerel targeted fishing. However, Pacific ocean perch is an Amendment 80 species, so total harvest of Pacific ocean perch is unlikely to decrease. Pacific ocean perch not caught while targeting Atka mackerel will likely be harvested in the directed fishery for Pacific ocean perch.

The species with the second highest incidental catch rate is northern rockfish. Incidental catch of northern rockfish is higher in Areas 542 and 543. It is likely that a reduction of Atka mackerel harvest in those areas would result in a reduction in incidental catches of northern rockfish. In recent years, northern rockfish TACs have been increasing in the BSAI. Contingent on agreements by the Amendment 80 fleet that they will not target northern rockfish, the Regional Administrator has opened directed fishing for northern rockfish. This allows the Amendment 80 fleet to avoid regulatory discards of northern rockfish, caused by the MRA when northern rockfish is closed for directed fishing. When compared to the baseline years, a decrease in incidental catch of northern rockfish will allow this management to continue.

Table 8-84 Average rate of incidental catch and PSC in Atka mackerel targets between 2004 and 2012

	541	542	543	All Areas
Groundfish (percentage of total groundfish catch in Atka mackerel targets)				
Atka Mackerel	86.32%	84.74%	80.90%	84.39%
Northern Rockfish	2.31%	4.99%	6.73%	4.51%
Pacific Ocean Perch	5.98%	4.37%	8.44%	5.82%
Other Rockfish	0.79%	0.17%	0.12%	0.36%
Pacific Cod	1.98%	3.10%	2.00%	2.49%
All Other Species	2.62%	2.63%	1.80%	2.44%
Prohibited species catch (numbers of animals per mt of groundfish)				
Golden King Crab	0.197	0.115	0.035	0.124
Red King Crab	0.003	0.025	0.007	0.013
Bairdi Tanner Crab	0.003	0.000	0.000	0.001
Chinook Salmon	0.002	0.004	0.001	0.003
Non Chinook Salmon	0.008	0.005	0.025	0.011
Prohibited species catch (percentage of total groundfish)				
Halibut mortality	0.28%	0.07%	0.08%	0.14%

Pacific cod has the third highest incidental catch rate and, like Pacific ocean perch, is also an Amendment 80 species. A reduction in Atka mackerel harvest is unlikely to be the cause of a change the total BSAI Pacific cod harvest. Catch limits in the Pacific cod sections of the alternatives may create incentive to decrease Pacific cod incidental catch in Atka mackerel targets to provide for more flexibility in the Pacific cod directed fishery.

Prohibited Species Catch

Prohibited species catch in Atka mackerel target fisheries during the baseline years was low compared to other fisheries. A reduction in Atka mackerel harvest under the alternatives would likely result in a small decrease in PSC. A reduction in PSC, in particular halibut, may make halibut PSC allowance amounts available for other target fisheries that have higher halibut PSC rates. PSC rates of crab and salmon species in the Atka mackerel target are relatively low and are not currently a management concern.

8.8.7 Fleet and community impacts

Amendment 80 trawl catcher/processors

Atka mackerel is targeted by the Amendment 80 trawl catcher/processor fleet. The reduction in Atka mackerel fishing opportunities in the Aleutian Islands adversely affects this fleet, and the vessels in this fleet will redeploy into other fishing activities as they seek to minimize the adverse impacts of the action. It is likely that the impact of the interim final rule was lessened to some extent in 2011 and 2012 by relatively high TACs and a relatively high allocation of the ABC and TACs in Area 541. Area 541 had fewer restrictions from the interim final rule than Areas 542 and 543. The higher TACs and Area 541 apportionments are not available in 2013, and possibly 2014, as ABCs have decreased, and ABC area apportionments have shifted, relatively, away from Area 541. These are temporary fluctuations, and the longer term ABC and apportionments are unclear.

Alternatives 2 through 4 are expected to have smaller impacts on this fleet than Alternative 1. The relative impacts of the alternatives on this fleet may be identified in Figure 8-5, which uses estimated impacts on gross revenues as an index of the impact. Alternative 1 has the greatest adverse impact on this fleet, followed by Alternative 2 and Alternative 3b (with the option closing critical habitat in Area 543 west of 174.5° E longitude), and then by Alternatives 3 and 3a. Alternative 4 has the least adverse impact.

Adak/Seattle-Tacoma

Atka mackerel are processed at sea and, thus, processing in Adak would not be affected by this action. However, vessels fishing Atka mackerel in the Aleutian Islands visit the port of Adak to purchase goods and services. These include fuel and use of the Adak airport for crew rotation. At the time the interim final rule became effective, the number of visits to Adak by trawl catcher/processors fishing for Atka mackerel declined. The number of visits, which averaged about 44 a year from 2004 to 2010, decreased to 28 in 2011. (See Chapter 10 of this EIS for more details). In addition, as discussed in Section 8.2.11 of this chapter, Adak receives a share of revenues from the fisheries business tax, collected by the State of Alaska, from vessels processing catch and delivering it to shore. A decline in Atka mackerel production may reduce revenues from this source (although the decline in production may be offset in part by an increase in the Atka mackerel price, moderating the decline in tax collections).

It does not appear that Amendment 80 trawl catcher/processors left the fishery. Purchases of goods and services in the Puget Sound base areas of this fleet may have declined, but if they did, and that is not known, there is no information on the size of the decline. If incomes received by participants in the fishery declined (profits to the fishing companies and wages, salaries, and shares for persons working for the companies) expenditures by these persons may have declined as well. This could have reduced spending in the Puget Sound region. However, any change in fishing company purchases, or in spending out of personal income by fishing vessel employees or owners, is small in comparison to the Puget Sound economy.

CDQ

The alternatives reduce CDQ group allocations of Atka mackerel, and, thus, adversely affect the CDQ groups and the communities that they benefit. The comparison of alternatives follows the discussion above, for the Amendment 80 sector.

Benefits of protecting Steller sea lions

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA analysis.

8.8.8 Summary

Table 8-85 summarizes key results from this analysis for all Atka mackerel alternatives and options (including Alternative 1 and 4 results from Section 8.3). The inclusion of Alternative 1 and 4 results provides overall context for the Alternative 2 and 3 results.

Table 8-85 Comparison of Atka mackerel alternatives

	Alternative 1:	Alternative 2:	Alternative 3			Alternative 4
Description	**Status quo**	**SSLMC some additional fishing**	**SSLMC more additional fishing**	**3(a) Close all CH and Buldir Island 0–15 nm, except portions in 10–15 nm zone**	**3(b) Close Area 543 west of 174.5° E longitude**	**Return to most 2010 measures (not including the HLA)**
Amendment 80 trawl catcher/processors and trawl catcher vessels delivering to vessels acting as motherships; CDQ; trawl limited access allocation	Residual gross revenues are 38% to 66% of baseline revenues.	Residual gross revenues are 63% to 79% of baseline revenues.	Residual gross revenues are 70% to 88% of baseline revenues.	Residual gross revenues are 64% to 79% of baseline revenues.	Residual gross revenues are 69% to 88% of baseline revenues.	Residual gross revenues are 100% of baseline gross revenues.
Other fishing sectors	MRA relaxation may lead to more topping off in Bering Sea by trawl vessels	MRA relaxation may lead to more topping off in Bering Sea by trawl vessels	MRA relaxation may lead to more topping off in Bering Sea by trawl vessels	MRA relaxation may lead to more topping off in Bering Sea by trawl vessels	MRA relaxation may lead to more topping off in Bering Sea by trawl vessels	MRA relaxation may lead to more topping off in Bering Sea by trawl vessels
Adak	Fewer port visits by Amendment 80 vessels generate less local income. Visits dropped from 44 a year in 2004–2010 to 28 in 2011.	Port visits lower than baseline years, but not as low as under Alternative 1.	More port visits than under Alternative 2.	Similar to Alternative 2.	More port visits than under Alternative 2.	Back to baseline levels of visits (i. e., approx. 44 per year).
Other communities	This may have adverse impacts on ports in the Pacific Northwest supplying logistic services to Amendment 80 vessels, and to places where persons earning incomes in these fleets spend their incomes. Impacts are small compared to overall economies.	Adverse impacts smaller than under Alternative 1.	Adverse impacts smaller than under Alternatives 1 and 2.	Similar to Alternative 2.	Similar to Alternative 2.	Back to baseline levels.
CDQ	The distribution of impacts to CDQ groups and associated communities is similar to that for the Amendment 80 fleet.					
Incidental catch and PSC	None of the alternatives appear to create serious issues for incidental catch or PSC.					

	Alternative 1:	Alternative 2:	Alternative 3			Alternative 4
Description	**Status quo**	**SSLMC some additional fishing**	**SSLMC more additional fishing**	**3(a) Close all CH and Buldir Island 0–15 nm, except portions in 10–15 nm zone**	**3(b) Close Area 543 west of 174.5° E longitude**	**Return to most 2010 measures (not including the HLA)**
Steller sea lion stock	This is the most attractive alternative for the Steller sea lion stock since it has the greatest potential impact on prey competition, disturbance, and takes. However, it is not possible to quantify the impact on the population.	This is less attractive for the Steller sea lion stock, and for people who value the health of the stock than Alternative 1.	This option is likely to be less attractive for the Steller sea lion stock than Alternative 2.	This option may be comparable to Alternative 2 with respect to the health of the Steller sea lion stock.	This option may be comparable to Alternative 3 without any options, with respect to the health of the Steller sea lion stock.	This alternative, which returns to baseline levels of Atka mackerel removal, may be the least attractive with respect to the health of the Steller sea lion stock.
Sum of producers and consumers surpluses	The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Atka mackerel products, and consumers' surpluses accruing to persons who value SSL population health. Producers' surpluses increase by an undetermined amount, surpluses accruing to U.S. consumers are unlikely to change much, since the Atka mackerel market is an export market. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion.					

8.8.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Atka mackerel by trawl catcher/processors. This analysis of these measures is summarized in the catch and revenue impact tables in this appendix. The appendix includes a catch table, and a wholesale gross revenue table, for each of the principal alternative-option combinations.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the catch taken from areas remaining open as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars, respectively. Each alternative and option combination is summarized in one catch and one revenue table.

Table 8-86 Location of estimated Atka mackerel harvests with respect to Alternative 2 area closures

	Total catch (mt)				Catch from areas closed by Alt 2 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	3,161	26,561	16,527	46,248	174	11,586	1,025	12,785	2,987	14,974	15,501	33,463	72%
2005	3,356	33,720	18,730	55,806	257	9,021	3,327	12,605	3,099	24,698	15,403	43,201	77%
2006	4,013	38,447	14,374	56,835	164	17,571	3,460	21,196	3,849	20,876	10,914	35,639	63%
2007	19,752	25,475	8,846	54,074	92	8,169	3,449	11,710	19,660	17,306	5,397	42,364	78%
2008	18,701	22,175	15,654	56,531	48	6,266	5,492	11,806	18,653	15,909	10,162	44,724	79%
2009	25,734	28,461	15,466	69,661	19	13,081	6,245	19,345	25,715	15,380	9,221	50,316	72%
2010	23,074	24,033	17,462	64,568	72	13,990	5,345	19,407	23,001	10,043	12,117	45,162	70%

Notes: Volumes refer to retained, targeted Atka mackerel from CDQ and non-CDQ catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-87 Estimated Alternative 2 Atka mackerel wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.1	17.2	10.9	30.1	0.1	7.4	0.7	8.3	1.9	9.8	10.1	21.8	73%
2005	2.5	23.4	14.5	40.4	0.3	6.3	2.9	9.5	2.2	17.1	11.6	30.9	76%
2006	2.8	24.9	9.7	37.4	0.1	11.2	2.4	13.7	2.7	13.7	7.3	23.8	63%
2007	16.0	20.4	7.4	43.8	0.3	6.4	2.8	9.6	15.7	13.9	4.5	34.2	78%
2008	14.5	17.8	13.0	45.3	0.3	4.9	4.2	9.5	14.2	12.9	8.7	35.8	79%
2009	28.3	32.0	17.9	78.1	0.6	14.9	7.0	22.5	27.7	17.1	10.9	55.6	71%
2010	29.8	31.2	24.5	85.5	0.8	17.9	7.4	26.2	29.0	13.2	17.1	59.3	69%
Real revenues (in 2012 dollars)													
2004	2.4	20.4	12.9	35.8	0.1	8.8	0.9	9.8	2.3	11.6	12.1	26.0	73%
2005	3.0	27.2	16.8	47.0	0.4	7.3	3.4	11.1	2.6	19.9	13.4	35.9	76%
2006	3.2	28.0	10.9	42.1	0.1	12.6	2.6	15.4	3.1	15.4	8.2	26.7	63%
2007	17.6	22.3	8.1	48.0	0.4	7.0	3.1	10.5	17.2	15.3	5.0	37.4	78%
2008	15.3	18.7	13.7	47.7	0.3	5.2	4.5	10.0	15.0	13.6	9.2	37.7	79%
2009	29.9	33.9	18.9	82.7	0.6	15.8	7.4	23.8	29.3	18.1	11.5	58.9	71%
2010	31.1	32.5	25.5	89.1	0.9	18.7	7.7	27.3	30.2	13.8	17.8	61.8	69%

Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-88 Location of estimated Atka mackerel harvests with respect to Alternative 3 area closures

	Total catch (mt)				Catch from areas closed by Alt 3 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	3,161	26,561	16,527	46,248	174	11,586	15	11,775	2,987	14,974	16,511	34,473	75%
2005	3,356	33,720	18,730	55,806	257	9,021	1	9,279	3,099	24,698	18,729	46,527	83%
2006	4,013	38,447	14,374	56,835	164	17,571	4	17,740	3,849	20,876	14,370	39,095	69%
2007	19,752	25,475	8,846	54,074	92	8,169	0	8,261	19,660	17,306	8,846	45,813	85%
2008	18,701	22,175	15,654	56,531	48	6,266	1	6,316	18,653	15,909	15,653	50,215	89%
2009	25,734	28,461	15,466	69,661	19	13,081	60	13,161	25,715	15,380	15,406	56,500	81%
2010	23,074	24,033	17,462	64,568	72	13,990	44	14,106	23,001	10,043	17,418	50,462	78%

Notes: Volumes refer retained, targeted Atka mackerel from CDQ and non-CDQ catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-89 Estimated Alternative 3 Atka mackerel wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.1	17.2	10.9	30.1	0.1	7.4	0.0	7.5	1.9	9.8	10.8	22.6	75%
2005	2.5	23.4	14.5	40.4	0.3	6.3	0.2	6.8	2.2	17.1	14.3	33.7	83%
2006	2.8	24.9	9.7	37.4	0.1	11.2	0.1	11.4	2.7	13.7	9.6	26.0	70%
2007	16.0	20.4	7.4	43.8	0.3	6.4	0.1	6.9	15.7	13.9	7.2	36.9	84%
2008	14.5	17.8	13.0	45.3	0.3	4.9	0.0	5.2	14.2	12.9	13.0	40.1	88%
2009	28.3	32.0	17.9	78.1	0.6	14.9	0.2	15.7	27.7	17.1	17.6	62.4	80%
2010	29.8	31.2	24.5	85.5	0.8	17.9	0.2	19.0	29.0	13.2	24.3	66.5	78%
Real revenues (in 2012 dollars)													
2004	2.4	20.4	12.9	35.8	0.1	8.8	0.0	9.0	2.3	11.6	12.9	26.8	75%
2005	3.0	27.2	16.8	47.0	0.4	7.3	0.2	7.9	2.6	19.9	16.6	39.1	83%
2006	3.2	28.0	10.9	42.1	0.1	12.6	0.1	12.8	3.1	15.4	10.8	29.3	70%
2007	17.6	22.3	8.1	48.0	0.4	7.0	0.2	7.6	17.2	15.3	7.9	40.4	84%
2008	15.3	18.7	13.7	47.7	0.3	5.2	0.0	5.5	15.0	13.6	13.7	42.2	88%
2009	29.9	33.9	18.9	82.7	0.6	15.8	0.2	16.7	29.3	18.1	18.7	66.1	80%
2010	31.1	32.5	25.5	89.1	0.9	18.7	0.2	19.8	30.2	13.8	25.3	69.3	78%

Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-90 Location of estimated Atka mackerel harvests with respect to Alternative 3, Option to close Area 543 critical habitat and portions of Buldir

	Total catch (mt)				Catch from areas closed by Alt 2 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	3,161	26,561	16,527	46,248	174	11,586	1,024	12,784	2,987	14,974	15,503	33,464	72%
2005	3,356	33,720	18,730	55,806	257	9,021	3,322	12,600	3,099	24,698	15,408	43,206	77%
2006	4,013	38,447	14,374	56,835	164	17,571	3,448	21,184	3,849	20,876	10,926	35,651	63%
2007	19,752	25,475	8,846	54,074	92	8,169	3,393	11,654	19,660	17,306	5,453	42,420	78%
2008	18,701	22,175	15,654	56,531	48	6,266	5,484	11,798	18,653	15,909	10,170	44,733	79%
2009	25,734	28,461	15,466	69,661	19	13,081	5,503	18,604	25,715	15,380	9,963	51,058	73%
2010	23,074	24,033	17,462	64,568	72	13,990	4,982	19,044	23,001	10,043	12,480	45,524	71%

Notes: Volumes refer retained, targeted Atka mackerel from CDQ and non-CDQ catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-91 Estimated Alternative 3, Option to close Area 543 critical habitat and portions of Buldir, Atka mackerel wholesale gross revenues for open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.1	17.2	10.9	30.1	0.1	7.4	0.7	8.2	1.9	9.8	10.1	21.8	73%
2005	2.5	23.4	14.5	40.4	0.3	6.3	2.7	9.3	2.2	17.1	11.8	31.1	77%
2006	2.8	24.9	9.7	37.4	0.1	11.2	2.3	13.7	2.7	13.7	7.3	23.8	64%
2007	16.0	20.4	7.4	43.8	0.3	6.4	2.8	9.6	15.7	13.9	4.6	34.2	78%
2008	14.5	17.8	13.0	45.3	0.3	4.9	4.2	9.4	14.2	12.9	8.8	35.9	79%
2009	28.3	32.0	17.9	78.1	0.6	14.9	6.1	21.6	27.7	17.1	11.8	56.5	72%
2010	29.8	31.2	24.5	85.5	0.8	17.9	6.8	25.6	29.0	13.2	17.7	59.9	70%
Real revenues (in 2012 dollars)													
2004	2.4	20.4	12.9	35.8	0.1	8.8	0.9	9.8	2.3	11.6	12.1	26.0	73%
2005	3.0	27.2	16.8	47.0	0.4	7.3	3.1	10.8	2.6	19.9	13.7	36.1	77%
2006	3.2	28.0	10.9	42.1	0.1	12.6	2.6	15.3	3.1	15.4	8.2	26.7	64%
2007	17.6	22.3	8.1	48.0	0.4	7.0	3.1	10.5	17.2	15.3	5.0	37.5	78%
2008	15.3	18.7	13.7	47.7	0.3	5.2	4.4	9.9	15.0	13.6	9.3	37.8	79%
2009	29.9	33.9	18.9	82.7	0.6	15.8	6.5	22.9	29.3	18.1	12.5	59.8	72%
2010	31.1	32.5	25.5	89.1	0.9	18.7	7.1	26.7	30.2	13.8	18.4	62.4	70%

Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-92 Location of estimated Atka mackerel harvests with respect to Alternative 3, Option to close Area 543 west of 174.5° E Long

	Total catch (mt)				Catch from areas closed by Alt 2 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	3,161	26,561	16,527	46,248	174	11,586	459	12,219	2,987	14,974	16,068	34,029	74%
2005	3,356	33,720	18,730	55,806	257	9,021	596	9,874	3,099	24,698	18,135	45,933	82%
2006	4,013	38,447	14,374	56,835	164	17,571	81	17,817	3,849	20,876	14,293	39,018	69%
2007	19,752	25,475	8,846	54,074	92	8,169	1	8,262	19,660	17,306	8,846	45,812	85%
2008	18,701	22,175	15,654	56,531	48	6,266	5	6,320	18,653	15,909	15,649	50,211	89%
2009	25,734	28,461	15,466	69,661	19	13,081	65	13,165	25,715	15,380	15,401	56,496	81%
2010	23,074	24,033	17,462	64,568	72	13,990	53	14,115	23,001	10,043	17,409	50,454	78%

Notes: Volumes refer retained, targeted Atka mackerel from CDQ and non-CDQ catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-93 Estimated Alternative 3, Option to close Area 543 west of 174.5° E Long, Atka mackerel wholesale gross revenues for open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenue in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.1	17.2	10.9	30.1	0.1	7.4	0.3	7.8	1.9	9.8	10.6	22.3	74%
2005	2.5	23.4	14.5	40.4	0.3	6.3	0.9	7.5	2.2	17.1	13.6	33.0	82%
2006	2.8	24.9	9.7	37.4	0.1	11.2	0.2	11.5	2.7	13.7	9.5	25.9	69%
2007	16.0	20.4	7.4	43.8	0.3	6.4	0.0	6.8	15.7	13.9	7.3	37.0	84%
2008	14.5	17.8	13.0	45.3	0.3	4.9	0.0	5.3	14.2	12.9	12.9	40.0	88%
2009	28.3	32.0	17.9	78.1	0.6	14.9	0.2	15.7	27.7	17.1	17.6	62.4	80%
2010	29.8	31.2	24.5	85.5	0.8	17.9	0.2	19.0	29.0	13.2	24.3	66.5	78%
Real revenues (in 2012 dollars)													
2004	2.4	20.4	12.9	35.8	0.1	8.8	0.4	9.3	2.3	11.6	12.6	26.5	74%
2005	3.0	27.2	16.8	47.0	0.4	7.3	1.0	8.7	2.6	19.9	15.8	38.3	82%
2006	3.2	28.0	10.9	42.1	0.1	12.6	0.2	12.9	3.1	15.4	10.6	29.1	69%
2007	17.6	22.3	8.1	48.0	0.4	7.0	0.0	7.4	17.2	15.3	8.0	40.5	84%
2008	15.3	18.7	13.7	47.7	0.3	5.2	0.0	5.5	15.0	13.6	13.6	42.2	88%
2009	29.9	33.9	18.9	82.7	0.6	15.8	0.2	16.7	29.3	18.1	18.7	66.1	80%
2010	31.1	32.5	25.5	89.1	0.9	18.7	0.2	19.8	30.2	13.8	25.3	69.3	78%

Source: NMFS AKR estimates using CIA data, January 22, 2013.

8.9 Pacific cod trawl catcher/processor analysis (Alternatives 2, 3, and their options)

8.9.1 Introduction

Of the six alternatives, Alternatives 1 (status quo) and 4 (return to most of the measures in place before the interim final rule became effective in 2011) were analyzed in Section 8.3, and Alternative 5 (adopted by the Council as its preliminary preferred alternative in April 2013) and Alternative 6 are analyzed in Section 8.13. This section deals with Alternatives 2 and 3 and their options.

Table 8-94, based on Table 2-21 in Chapter 2, summarizes and contrasts the Pacific cod alternatives as they apply to trawl gear. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts showing the different areas listed in the table.

In addition to the measures described in Table 8-94, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 8.18.2.

For the purpose of this analysis, the trawl catcher/processor sector includes:

- trawl catcher/processor vessels targeting, or taking incidental catches of, Atka mackerel and/or Pacific cod in the Aleutian Islands,
- trawl catcher/processors acting as motherships to trawl catcher vessels making deliveries of Atka mackerel, and
- catcher vessels delivering Atka mackerel to catcher/processors acting as motherships.

Production and revenues by trawl catcher vessels delivering Pacific cod to catcher/processors acting as motherships have been included in the trawl catcher/vessel sector and not in this one. Production in that sector reflects both shoreside and mothership deliveries of trawl catcher vessel caught Pacific cod. This division of the sectors protects the confidentiality of Pacific cod deliveries to motherships. This fleet definition must be kept in mind while reading this section, since Alternative 2 includes options that both permit and prohibit trawl catcher vessel deliveries of Area 543 Pacific cod to motherships.

Table 8-94 Comparison of alternatives for Pacific cod trawl gear.

Alternative	Seasons	Area 543		Area 542		Area 541	
		closures	Catch and participation limits	closures	Catch and participation limits	Closures	Catch and participation limits
1	A season: 1/20–4/1 B season: 4/1–6/10 C season: 6/10–11/1	No retention	Not applicable	Critical habitat closed except between 178°W and 177° W long.	ESA reinitiation trigger with harvest more than 2% of BSAI Pacific cod ABC.	Critical habitat closed 0–10 nm year round and 0–20 nm June 10–Nov. 1.	ESA reinitiation trigger with harvest more than 11.5% of BSAI Pacific cod ABC.
	Seasonal apportionment based on BSAI wide TAC level under Amend 85.			Critical habitat closed 0–10 nm year round and 0–20 nm June 10–Nov. 1.		Seguam Foraging Area closed.	
2	A season: 1/20–4/1 B season: 4/1–6/10 C season: CVs and AFA CPs: 6/10–11/1. CDQ and Amend. 80 coop: 6/10–12/31.	Critical habitat closed except close 0–10 nm from rookeries and haulouts between 174.5° E long. and 173° E long.	Catch limit based on annual stock assessment.	Critical habitat closed except east of 178°W and west of 174°W long., critical habitat closed 0–3 from haulouts and 0–10 from rookeries	Catch limit in proportion to Area 542/541 abundance based on annual stock assessment.	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.	Combined with Area 542.
			Vessels limited to CPs and CVs. Option 1: Prohibit motherships. Option 2: Allow motherships.				
	Seasonal apportionment based on BSAI wide TAC level under Amend 85.	Protective option: A and B season: Close 0–10 nm from rookeries, close 0–20 nm from haulouts between 173° E long. and 174.5° E long.	Set catch limit for CP or CP/mothership sector based on average annual catch 2006–2010.		Set CP/mothership catch limit based on average annual catch 2006–2010.	Critical habitat closed east of 174°W long.	
			Prohibit directed fishing after April 30				
			Shoreside CVs limited to overall area catch limit.		Shoreside CVs limited to overall area catch limit.	Seguam Foraging Area closed.	
3	Area 543: A season: 1/20–4/1 B season: 4/1–6/10 C season: 6/10–11/1	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
	Areas 542/541: A season: 1/20–4/1 B season: 4/1–6/10 C season: CVs and AFA CPs: 6/10–11/1. CDQ and Amend. 80 coop: 6/10–12/31.		Set catch limit for CP/mothership sector based on average annual catch 2006–2010.				
	Seasonal apportionment based on BSAI wide TAC level under Amend 85.		Shoreside CVs limited to overall area catch limit.				
4	A season: 1/20–4/1 B season: 4/1–6/10 CVs and AFA CPs: C season: 6/10–11/1. Amend. 80 and CDQ: C season: 6/10–12/31	Same as Alternative 3	None	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.	None	Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries, except a 20 nm closure from Agligadak.	None
	Seasonal apportionment based on BSAI wide TAC level under Amend 85.					Seguam Foraging Area closed.	
5	Same as Alternative 4	Same as Alternatives 3 and 4	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4
6	Not applicable.	No retention	Not applicable.	No retention	Not applicable.	No retention	Not applicable.

CDQ= Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, ESA=Endangered Species Act, CP= catcher/processor. CV=catcher vessel, CP=catcher/processor

8.9.2 Pacific cod harvest limits

Alternatives 2 and 3 include provisions for the allocation of Aleutian Islands Pacific cod among Areas 541, 542, and 543, and for sector limits on trawl and non-trawl catcher/processor catches in these areas. These measures treat Area 543 independently and group Areas 541 and 542 together. This section looks at the area allocation measures first, and then at the sector limits. A subsequent section (Section 8.9.3) examines the interaction of area and sector limits with the constraints on harvests imposed by the critical habitat closure rules in the alternatives.

Area allocations

During the baseline years, Pacific cod was managed as one stock in the BSAI. The ITAC was divided among nine separate sector allocations, in addition to the CDQ allocation. As explained in Section 8.2.16, in December 2013 the Council adopted separate Pacific cod harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species. While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Alternatives 2 and 3 require the definition of area catch limits for Area 543 and for Areas 541-542 (considered jointly). The measures call for setting catch limits in proportion to the Area 543 and Area 541-542 biomasses, estimated during the annual stock assessment process.

NMFS has approached this in the following steps:

- The proportion of the annual BSAI biomass estimated to be in the Aleutian Islands from the annual Pacific cod Stock Assessment and Fishery Evaluation Report (SAFE) chapter is used to determine the overall Aleutian Islands harvest limit as a percent of the BSAI ABC. This ranged from 16 percent to 7 percent over the period 2004 through 2014, which includes the baseline years (2004 through 2010), and the years under the interim final rule (2011 through 2014).
- The product of this biomass proportion, and the BSAI Pacific cod ABC in a year is treated, for this analysis, as an Aleutian Islands ABC.[121]
- The State of Alaska's Pacific cod guideline harvest level (GHL) fishery is assumed to take 3 percent of the Aleutian Islands ABC.
- The Area 543, and Area 541-542, area limits are determined from this Aleutian Islands ABC minus the GHL. These limits are based on a moving average of the relative biomass sizes in these two areas as determined from the most recent four summer trawl surveys. The volumes in Area 543 range between 24.5 percent and 26.4 percent of the whole; the volumes in Area 541-542 consequently range between 73.6 percent and 74.6 percent.
- The balances in each region will cover the CDQ directed fishing allocation (DFA), incidental catch allowances (ICAs) and the Aleut Corporation DFA. ICAs have not been separately identified here, since these will be determined by NMFS during the fishing year.

[121] This assumption was made for analytical purposes and provides a practical method for estimating the Aleutian Islands Pacific cod TACs and sector allocations for the different fleets as an illustrative approach for the purpose of this analysis. As noted above, the Council has now split the Aleutian Islands and Bering Sea for Pacific cod specifications. The methods used by the Council may change through time if changing biological understanding leads to changes in the tier status of Aleutian Islands Pacific cod. The results from any given method will change through time as information about the Aleutian Islands stock status changes.

In Table 8-95, these rules have been applied to data from 2004 through 2014[122] to estimate the amount of an Aleutian Islands "ABC" in each year and to estimate how that ABC net of the GHL would have been allocated to CDQ, ICA, and DFA in Area 543, and in Areas 541-542 (jointly). These are hypothetical estimates, made for these years, assuming the rules under consideration here had been in place during those years.

For comparative purposes, the effective 2014 proportion of the annual BSAI biomass estimated to be in the Aleutian Islands is 5.6 percent (as opposed to 7.0 percent in Table 8-95). The 2014 Aleutian Islands ABC was 15,100 metric tons, the GHL was 8,103 metric tons, and the Aleutian Islands ABC net of the GHL was 6,997 metric tons. (NMFS AKR In-season management, personal communication, January 17, 2014). Given the management area percentages used in Table 8-95 for 2014, this would have meant an Area 543 limit of 1,847 metric tons, and an Area 541-542 limit of 5,150 metric tons.

[122] Catch, TAC, and ABC data from earlier years are included in Table 8-95 to provide context for the information from 2004 to 2014. Data for 2013 and 2014 are based on the 2013/2014 harvest specifications published March 1, 2013 (78 FR 13813).

Table 8-95 Area allocation of Pacific cod limits under Alternatives 2 and 3 (metric tons and percentages)

	BSAI Historical			Percent			Aleutian Islands wide			Area Limits	
Year	Catch	TAC	ABC	AI	Area 543	Areas 541-542	AI ABC	GHL	ABC net of GHL	543	541-542
1992	207,278	182,000	182,000								
1993	167,391	164,500	164,500								
1994	193,802	191,000	191,000								
1995	245,033	250,000	328,000								
1996	240,676	270,000	305,000								
1997	257,765	270,000	306,000								
1998	193,256	210,000	210,000								
1999	173,998	177,000	177,000								
2000	191,060	193,000	193,000								
2001	176,749	188,000	188,000								
2002	197,356	200,000	223,000								
2003	210,969	207,500	223,000								
2004	212,161	215,500	223,000	15.0%	24.5%	75.5%	33,450	6,690	26,760	6,543	20,217
2005	205,635	206,000	206,000	15.0%	24.5%	75.5%	30,900	6,180	24,720	6,045	18,675
2006	193,017	189,786	194,000	16.0%	25.4%	74.6%	31,040	5,820	25,220	6,398	18,822
2007	174,124	170,720	176,000	16.0%	25.4%	74.6%	28,160	5,280	22,880	5,805	17,075
2008	170,853	170,720	176,000	16.0%	25.4%	74.6%	28,160	5,280	22,880	5,805	17,075
2009	175,732	176,540	182,000	16.0%	25.4%	74.6%	29,120	5,460	23,660	6,002	17,658
2010	171,851	168,780	174,000	16.0%	26.4%	73.6%	27,840	5,220	22,620	5,974	16,646
2011	220,134	227,950	235,000	9.0%	26.4%	73.6%	21,150	7,050	14,100	3,724	10,376
2012	212,170	261,000	314,000	9.0%	26.4%	73.6%	28,260	9,420	18,840	4,975	13,865
2013	n.a.	260,000	307,000	7.0%	26.4%	73.6%	21,490	9,210	12,280	3,243	9,037
2014	n.a.	260,880	323,000	7.0%	26.4%	73.6%	22,610	9,690	12,920	3,412	9,508

Notes: Shaded years are years during which the interim final rule was in effect. The projected 2013 and 2014 limits are based on the biomass distribution from the 2012 Pacific Cod SAFE, and the ABCs from the 2013-2014 specifications adopted by the Council. The 2006 TAC was originally 194,000 mt, but was reduced mid-season to adjust for the State of Alaska GHL fishery introduced that year. While area percentages are reported rounded to a single decimal digit, the area limit estimates are based on area percentages to five decimal digits.
Sources:Thompson and Lauth 2012; AKR CAS; AKR calculations.

Sector limits

Within the two area allocations created by Alternatives 2 and 3 (for Area 543 and joint Areas 541-542) the alternatives include provisions that place limits on trawl and non-trawl catcher/processor sector catches. These sector limits are not allocations, but limits on the amounts that may be caught by the sectors to which they are assigned. Catcher vessels, not subject to these limits, could conceivably fully harvest the available Pacific cod, leaving nothing for the sectors that do have limits. However, the opposite could not happen; a sector with its own limit could not catch more of the area allocation than its sector limit permits. The sector limits are based on historical average catches from 2006 through 2010. While catcher vessels are not subject to sector limits in these areas, they are subject to the overall area limits.

Alternative 2 has an option *prohibiting* catcher vessel deliveries to motherships in Area 543, and an option *allowing* catcher vessel deliveries to motherships in Area 543. The mothership limit in Area 543 does not prohibit a catcher vessel from fishing in Area 543, so long as the catch is not delivered to a mothership. Thus, a catcher vessel could deliver fish caught in Area 543 to a shoreside plant, perhaps at Adak, or to a shoreside floating processor. Similarly, the delivery of fish caught in Area 542 to a mothership in Area 543 is not prohibited.

These two options have different implications for sector allocations in Area 543 since, when motherships are included, the trawl sector allocation is determined by the proportion of area catch taken by trawl catcher/processors and motherships, while when motherships are prohibited, the allocation is determined by the proportion of area catch taken by catcher/processors only. In the first case, the sector allocation is 67.7 percent, while in the second it is 28.02 percent.

Table 8-96 builds on the area allocation estimates summarized in Table 8-95 and incorporates the sector limits discussed above. Under Alternative 2, Option 1, which <u>excludes</u> motherships from Area 543, the trawl catcher/processor sector would receive 28.02 percent of the 2006 to 2010 average catch; under Alternative 2, Option 2, which <u>includes</u> motherships, the sector would receive 67.7 percent of the average catch. Under Alternative 3, which does not have an option prohibiting catcher vessel deliveries to motherships, the sector receives 67.7 percent in Area 543. Under both alternatives, the sector receives 47.01 percent in Areas 541 and 542.

As shown in Table 8-96, area-sector limits can be quite small in some years (for example, 909 metric tons to 1,394 metric tons from 2010 to 2014 under Alternative 2, Option 1, in Area 543). Once catch has been set aside for incidental catch of Pacific cod in other groundfish fisheries, low area-sector limits may preclude directed fishing for Pacific cod by this sector, in some areas, during some years.

Table 8-96 Estimated trawl catcher/processor sector limits under Alternatives 2 and 3, 2004 through 2014 (metric tons)

Year	Area Limits		Area 543 sector allocations			Areas 541-542 sector allocations	
	543	541-542	Alt 2 O1	Alt 2 O2	Alt 3	Alt 2	Alt 3
2004	6,543	20,217	1,833	4,430	4,430	9,504	9,504
2005	6,045	18,675	1,694	4,092	4,092	8,779	8,779
2006	6,398	18,822	1,793	4,332	4,332	8,848	8,848
2007	5,805	17,075	1,626	3,930	3,930	8,027	8,027
2008	5,805	17,075	1,626	3,930	3,930	8,027	8,027
2009	6,002	17,658	1,682	4,064	4,064	8,301	8,301
2010	5,974	16,646	1,674	4,044	4,044	7,825	7,825
2011	3,724	10,376	1,043	2,521	2,521	4,878	4,878
2012	4,975	13,865	1,394	3,368	3,368	6,518	6,518
2013	3,243	9,037	909	2,196	2,196	4,248	4,248
2014	3,412	9,508	956	2,310	2,310	4,470	4,470

Notes: Shaded years are years during which the interim final rule was in effect. As explained in the text, Alt2 Opt1 assumes motherships are prohibited, while Alt2 Opt2 does not.
Source: Table 8-95, AKR calculations.

Pacific cod Alternatives 2 and 3 incorporate separate limits on catch for trawl and non-trawl catcher/processors in Area 543, and in Areas 541-542. These are limits on sector harvests in each area or area combination, but not sector allocations. Because they are not allocations, they do not guarantee a sector a share of the area harvest. The catcher vessel sectors in Area 543 and in Area 541-542 are not subject to similar sector limits, and could, potentially, harvest both area limits completely themselves.

Targeted catcher/processor and catcher vessel trawl fishing for Pacific cod in the Federal and parallel fisheries in the Aleutian Islands takes place primarily from mid-February through April. The catcher/processors also make incidental catches of Pacific cod in the fall. Non-trawl vessels, primarily catcher/processors, target Pacific cod early in the year during the same period as the trawlers, but also have an important targeted Pacific cod fishery again in the fall. (Figure 3-8 in Chapter 3; NMFS AKR In-season managers) Thus, the catcher/processors have been fishing simultaneously with, or after, the catcher vessels.

Since the catcher vessels could conceivably complete the harvest of all the area allocations of Pacific cod before the catcher/processor sectors could take their sector limits, Alternatives 2 and 3 could create a race for the Pacific cod, as catcher/processors harvest Pacific cod earlier in the year than they otherwise would. The potential for such a race, and its costs, depends on the relative attractiveness of Aleutian Islands Pacific cod vis-à-vis Bering Sea Pacific cod. The catcher/processors are fishing against a BSAI-wide allocation (not a limit). If they fail to catch part of it in the Aleutian Islands, it is still reserved for them in the Bering Sea.

8.9.3 Critical habitat closures

In addition to the catch and participation limits discussed in Sub-section 8.9.2, the alternatives include measures that close different areas of critical habitat to directed fishing for Pacific cod. This section examines the differences in revenues associated with the areas remaining open to directed fishing under the different alternatives. This is done first without considering the possible additional effect of the trawl catcher/processor limits discussed in the preceding sub-section. However, the impacts of critical habitat

closures cannot be treated in isolation from the proposed sector limits. The second part of this section discusses this interaction.

The discussions in this section pertain to the sector as defined for the purposes of this analysis: that is, trawl catcher/processors processing Pacific cod that they harvest themselves. The catch and revenue at risk, and residual catch and revenue estimates discussed in this section do not include catch by catcher vessels delivering to catcher/processors acting as motherships. This affects the analysis of the mothership restrictions under consideration.

Critical habitat closures treated in isolation

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing activity. The impacts of these alternatives have been evaluated by identifying the volumes of Pacific cod retained from inside and from outside of the closed critical habitat areas by trawl catcher/processors[123] in the baseline years 2004 through 2010, assuming that the volumes from inside the closed areas would no longer be harvested, and that this loss in Pacific cod production would not be made up by increased fishing in the areas outside of the closed critical habitat. These volumes, and associated revenues, are commonly referred to in similar analyses as production or revenues "at risk."

The results for each of the alternatives, and the principal options within each alternative, have been summarized in a set of tables in an appendix to this section. Figure 8-13 and Figure 8-14 summarize this analysis (adding, for comparison, results for Alternatives 1 and 4). Figure 8-13 shows the residual gross revenues for each alternative, and Figure 8-14 shows these residual gross revenues as a percentage of estimated actual gross revenues in the baseline years.[124] The figures summarize the more detailed analysis in the tables of the appendix to this section.[125] As explained in the discussion of methodology, in Section 8.2.14, these are not projections of future revenues or of the revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

The high revenue year (2007) saw high real prices and high production; while prices remained high in 2008, production of Pacific cod in the Aleutian Islands by trawl catcher/processors decreased.[126] This may reflect changes in the way the Amendment 80 segment of the fleet used Pacific cod after the introduction of Amendment 80 quotas in 2008. Amendment 80 vessel operators now were faced with new types of tradeoffs between targeting Pacific cod in the Aleutian Islands and Bering Sea, and husbanding it to cover their incidental catches of Pacific cod in other groundfish fisheries in those subareas.

Alternative 4 clearly imposes the smallest burden on trawl catcher/processors harvesting Pacific cod; this is because the alternative reverts to the regulations in place before the interim final rule (Alternative 1, the status quo) became effective in 2011. However, Alternatives 2 and 3 are very similar to the interim final rule in their impacts on the sector. Alternative 3 is generally somewhat more attractive than Alternative 2, but each of these can be better for the fleet than Alternative 1, or worse, depending on the baseline

[123] Because this sector has been defined to exclude mothership Pacific cod production, this only includes Pacific cod taken by the catcher/processors themselves.

[124] These figures summarize the gross revenues from areas remaining open under the alternatives (the residual gross revenues). These figures are not adjusted to take account of the possible gross revenue impacts of TAC percentage determination rules, or of critical habitat limits.

[125] Both figures have been simplified by identifying gross revenues under Alternative 4 with gross revenues under the baseline, thereby obviating the need for separate baseline and Alternative 4 revenue lines.

[126] The value per metric ton round weight from the Groundfish Economic SAFE provides an index of relative prices. This took a value for BSAI catcher/processor Pacific cod of $2,035 in 2007, $2,027 in 2008, and $1,247 in 2009. (Fissel et al. 2012b, Table 27)

period year. Each of the lines in Figure 8-13 is a crude estimate of revenues under the proposed alternative, with a confidence interval whose width is unknown, but which is believed to be wide. This uncertainty about the true position of each of these lines contributes to the difficulty of ranking Alternatives 1, 2, and 3 with respect to Pacific cod for this fleet. The Alternative 2 protective option has the greatest adverse impact on revenues from fishing in closed areas.

While residual revenue estimates may be useful indices of relative impacts, they are not, as just noted, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). This welfare measure, however, is not available. In addition, this measure focuses attention on the remaining revenues in the Pacific cod fishery, and does not take account of the ability of fishing operations to take actions in response to the alternatives that would minimize the impact of the alternatives on their revenues, most importantly in this instance, their ability to substitute into other fisheries.

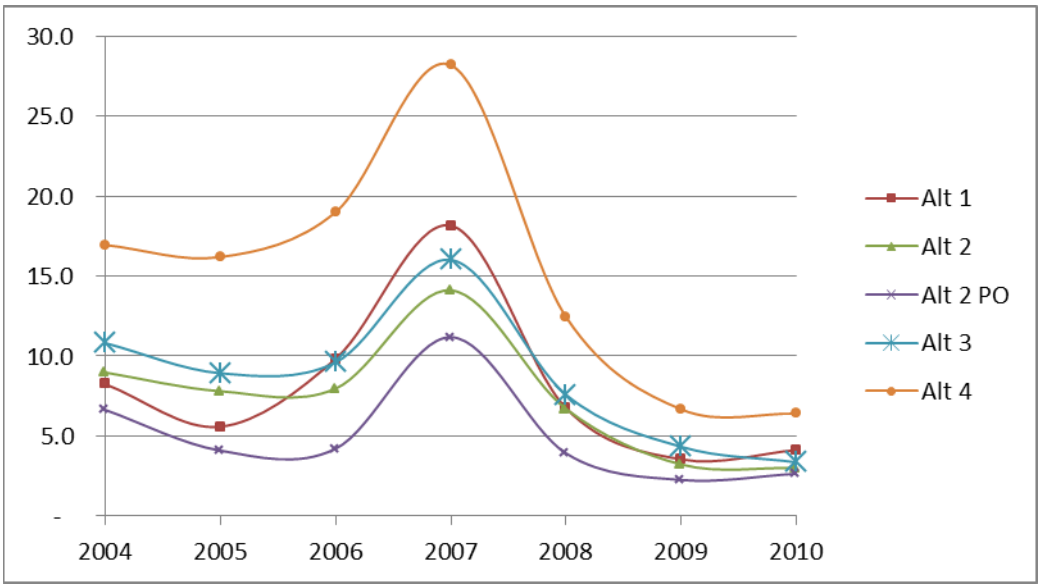


Figure 8-13 Hypothetical trawl catcher/processor residual revenues from 2004 through 2010 for each of the Pacific cod alternatives (millions of 2012 dollars)

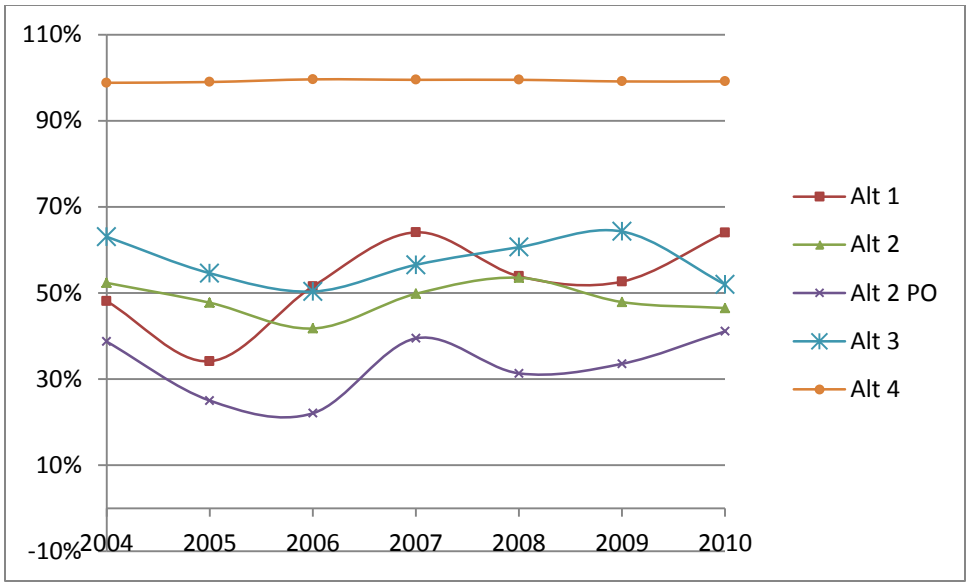


Figure 8-14 Hypothetical trawl catcher/processor residual revenues from 2004 through 2010 for each of the Pacific cod alternatives, expressed as a percentage of baseline revenues

Interaction of critical habitat limits and area-sector limits

In some years, some of the area-sector limits would have restricted Pacific cod harvests by trawl catcher/processors more than would be expected by simply closing critical habitat to fishing activity. Table 8-97 compares the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) with the area-sector limit restrictions in the alternatives and options, and shows how much the area-sector limits restrict harvest beyond the levels associated with the critical habitat closures. Where there is no limit, the value has been set to zero. Similar information is not provided for Areas 541-542, since the area-sector limits proposed in those areas did not constrain harvests.

A comparison of the residual harvests associated with area closures and area-sector limits has only been prepared for the no-mothership option.[127] For the purposes of protecting the confidentiality of catcher vessels delivering to catcher/processors acting as motherships, and of catcher/processors acting as motherships, the trawl catcher/processor sector has been defined to include only Pacific cod that has been both caught and processed by catcher/processors. The Pacific cod caught by catcher vessels and delivered to catcher/processors acting as motherships has been grouped with the Pacific cod caught by catcher vessels and delivered to shoreside processors or shoreside floating processors. Thus the residual volumes of Pacific cod harvest for this sector only include the volumes the catcher/processors caught themselves.

[127] Residual catch includes only retained catch. However, in the analysis in this section, the proposed limits apply to retained and discarded catch. Discarding of Pacific cod is prohibited by increased retention/increased utilization regulations, with minor exceptions (e.g., damages or tainted fish; regulatory discards). Trawl catcher/processor Pacific cod discards averaged about a half percent per year from 2008 to 2010. These are the years in which the Amendment 80 rules were in force. Average annual discard rates were higher in the earlier baseline years, but the overall 2004 through 2010 average was only about 1 percent. Discard behavior under the Amendment 80 rules is believed to be more relevant for this analysis. Thus, while use of retained catch may cause the analysis to understate the extent to which the constraints bind, the amount of understatement is believed to be relatively small.

A comparison of these volumes with an area-sector limit that included mothership processing would not be informative. The area-sector limit would not bind the residual catch. The comparison has been carried out for the area-sector limit defined only for catcher/processors processing their own catch.

Table 8-97 shows that the area-sector limits bind most often under Alternative 2 in the early years of the baseline period. Table 8-98 provides estimates of the revenues associated with these production shortfalls (using real 2012 dollar estimates).[128] Potential gross revenue decreases could be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

[128] This is an approximation of the revenue shortfall, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost incidental catches. Prices are BSAI-wide and may not capture the potentially higher value of larger Aleutian Islands Pacific cod. The impact of these changes in volume on price are unclear, since this is a small part of overall BSAI production. Any effect would take the form of a mitigation of revenue declines as volume reductions are offset by price rises.

Table 8-97 Constraints imposed on potential Area 543 trawl catcher/processor residual catches by area-sector limits (metric tons)

Alternative 2			
Year	**Open Critical Habitat Residual harvest**	**Catcher/processor only area-sector limit**	**Residual harvest minus area-sector limit**
2004	1,939	1,833	105
2005	3,393	1,694	1,699
2006	2,154	1,793	362
2007	1,408	1,626	0
2008	1,274	1,626	0
2009	772	1,682	0
2010	327	1,674	0
Alternative 2, protective option			
Year	**Open Critical Habitat Residual harvest**	**Catcher/processor only area-sector limit**	**Residual harvest minus area-sector limit**
2004	255	1,833	0
2005	720	1,694	0
2006	179	1,793	0
2007	156	1,626	0
2008	104	1,626	0
2009	33	1,682	0
2010	108	1,674	0
Alternative 3			
Year	**Open Critical Habitat Residual harvest**	**Catcher/processor only area-sector limit**	**Residual harvest minus area-sector limit**
2004	3,239	1,833	1,406
2005	4,099	1,694	2,405
2006	3,016	1,793	1,223
2007	2,227	1,626	601
2008	1,649	1,626	22
2009	1,631	1,682	0
2010	548	1,674	0

Notes: Where the area-sector limit is greater than the open critical habitat catch estimate, the area-sector limit would not bind, and the cell has been set equal to zero.
Sources: Open critical habitat residual harvest estimates from this section's appendix tables; area-sector limits from Table 8-96

Table 8-98 Estimates of revenues associated with production shortfalls in Area 543 associated with trawl catcher/processor area-sector limits (millions of real 2012 dollars)

Year	Real price per ton ($/metric ton round weight)	Alt 2	Alt 2 – P.O.	Alt 3
2004	1,364	0.1	-	1.9
2005	1,368	2.3	-	3.3
2006	1,868	0.7	-	2.3
2007	2,286	-	-	1.4
2008	2,358	-	-	0.1
2009	1,271	-	-	-
2010	1,594	-	-	-

Source: Table 8-97, AKFIN price estimates, AKR calculations.

Figure 8-15 shows the relationships between the alternatives, and the Alternative 2 protective option given the constraints placed on revenues when the area-sector limits are less than residual catch from the open areas in the baseline years. The estimates in the preceding tables have been supplemented with gross revenues for Alternatives 1 and 4, calculated "as if" area-sector limits were applied to these alternatives. Although these alternatives do not explicitly include area-sector limits, under an Aleutian Islands/Bering Sea Pacific cod split measures similar to those included in Alternatives 2 and 3 may be implemented under Alternatives 1 and 4. Treating all the alternatives this way, in this figure, enhances comparability of the revenue flows.

Alternative 4 has the largest revenue flows, while the protective option to Alternative 2 has the lowest. Alternatives 1, 2, and 3 have very similar revenues. Alternative 2 may have revenues somewhat lower than the other two alternatives. Too much weight should not be placed on small revenue differences, given the uncertainties inherent in this analysis. The Alternative 2 limits are the catcher/processor only limits. This figure does not allow a comparison of the limits when catcher vessels are allowed to make deliveries to motherships.

The similarity of the results of Alternatives 1, 2, and 3 with respect to residual gross revenues may seem counter-intuitive. Alternative 1, the status quo, reflects the adverse impacts on fishery production and revenues caused by the interim final rule. Alternatives 2 and 3 were designed to mitigate the adverse impact of Alternative 1. However, in aggregate, it is not clear that they provide large benefits to trawl catcher/processors. An examination of production data suggests that Alternative 1 performs worse than Alternatives 2 and 3 for trawlers in Area 543, and in Area 542, but that it performs better in Area 541, and that the differences offset each other to some extent. The key is the recognition that in Areas 541-542 (considered jointly), Alternatives 2 and 3 prohibit trawling in critical habitat east of 174 degrees west. An examination of the location of trawl Pacific cod production in Figure 8-19 shows that this line lies just to the east of Atka, and that a very large amount of the Area 541 Pacific cod production has taken place just to the east of this line.

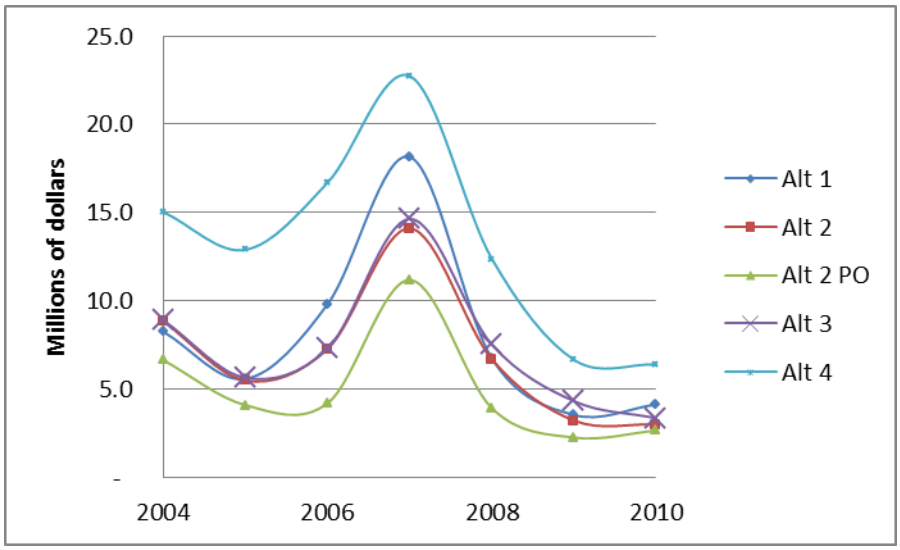


Figure 8-15 Hypothetical trawl catcher/processor gross revenues, by alternative, taking account of the catcher/processor only area-sector limits (millions of 2012 dollars)

In other years, some of the area-sector limits would have exceeded the harvests coming from areas outside of closed critical habitat in the baseline years. If trawl catcher/processors successfully redeploy from fishing in closed critical habitat to areas that remain open, these limits may allow increased production. Table 8-99 compares the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) and in Areas 542-543 with the TACs associated with the percentage TAC options under Alternatives 2 and 3, and calculates the additional Pacific cod catch that might be possible, if the fleet could successfully redeploy into Pacific cod within Area 543. For the reasons discussed earlier in this sub-section, this analysis is only carried out for the Alternative 2 option that does not allow catcher vessels to deliver their Area 541 catches to catcher/processors acting as motherships.

Table 8-99 Potential expansion of open area fishing within the limits imposed on open area catches (residual catches) by area-sector limits (metric tons)

Area 543 - Alternative 2			
Year	**Open Critical Habitat Residual harvest**	**Catcher/processor only area-sector limit**	**Area-sector limit minus residual harvest**
2004	1,939	1,833	0
2005	3,393	1,694	0
2006	2,154	1,793	0
2007	1,408	1,626	218
2008	1,274	1,626	352
2009	772	1,682	910
2010	327	1,674	1,347
Area 543 - Alternative 2, protective option			
Year	**Open Critical Habitat Residual harvest**	**Catcher/processor only area-sector limit**	**Area-sector limit minus residual harvest**
2004	255	1,833	1,579
2005	720	1,694	974
2006	179	1,793	1,614
2007	156	1,626	1,471
2008	104	1,626	1,523
2009	33	1,682	1,649
2010	108	1,674	1,566
Area 543 - Alternative 3			
Year	**Open Critical Habitat Residual harvest**	**Catcher/processor only area-sector limit**	**Area-sector limit minus residual harvest**
2004	3,239	1,833	0
2005	4,099	1,694	0
2006	3,016	1,793	0
2007	2,227	1,626	0
2008	1,649	1,626	0
2009	1,631	1,682	51
2010	548	1,674	1,126
Area 541-542 – Alternatives 2, 2 with protective option, and 3 (these have same residual harvest)			
Year	**Open Critical Habitat Residual harvest**	**Joint catcher processor - mothership area-sector limit**	**Area-sector limit minus residual harvest**
2004	4,433	9,504	5,071
2005	2,184	8,779	6,595
2006	1,984	8,848	6,864
2007	4,621	8,027	3,407
2008	1,549	8,027	6,478
2009	1,667	8,301	6,634
2010	1,520	7,825	6,306

Notes: Where the area-sector limit is greater than the open critical habitat catch estimate, the area-sector limit would not bind, and the cell has been set equal to zero.
Sources: Open critical habitat residual harvest estimates from this section's appendix tables; harvests under options from Table 8-96

Table 8-100 provides estimates of the possible monetary value of this potential production increase (using real 2012 dollar estimates).[129] There is a large, but unknown, degree of uncertainty associated with these revenue estimates. These are not predictions of revenue increases; the estimates are speculative and assume that the fleets are able to shift effort from closed to open areas under each alternative, within the area-sector limits.

Table 8-100 Estimates of potential trawl catcher/processor wholesale gross revenue increases (over estimates based solely on critical habitat closures and net of possible area-year shortfalls) associated with area-sector limits (millions of dollars)

Year	Real price per ton ($/metric ton round weight)	Alt 2 Option 1	Alt 2 – P.O. Option 1	Alt 3
2004	1,364	6.8	9.1	5.0
2005	1,368	6.7	10.4	5.7
2006	1,868	12.1	15.8	10.5
2007	2,286	8.3	11.2	6.4
2008	2,358	16.1	18.6	15.2
2009	1,271	9.6	10.5	8.5
2010	1,594	12.2	12.5	11.9

Source: Estimates calculated as the product of the values shown and the relevant volumes from Table 8-99, minus the appropriate revenue estimates from Table 8-96.

The preceding discussion focuses on the interaction residual revenues and the area-sector limits, assuming the "no mothership" option was chosen in Area 543 under Alternative 2. The no-mothership area-sector limits have been compared to the area closure residual revenues for the trawl catcher/processor sector to determine in what years the area-sector limits would restrict harvests below the area closure restrictions, and in what years they might allow a redeployment of harvesting activity into areas remaining open for fishing.

However, trawl catcher/processors active in Area 543 are physically capable of operating as motherships for trawl catcher vessels. The "no mothership" option prohibits them from doing so. Table 8-101 provides estimates of the potential "revenues at risk" for the trawl catcher/processor fleet if they are prohibited from operating as motherships. In this table, the estimated area-sector limits, if motherships are prohibited, are subtracted from those if motherships were allowed. The difference provides a measure of the restriction in the volumes of Pacific cod caught in Area 543 (forgone by catcher vessels and not processed by catcher/processors) and processed by catcher/processors. The final column provides wholesale revenue estimates for these volumes of Pacific cod. These estimates range from $1.7 million up to $5.4 million during the baseline years.

These revenues at risk are not necessarily revenues that would have been generated by mothership activity if it were allowed. The Alternative 2 option that allows motherships does not prohibit the trawl catcher/processors from catching the entire area-sector limit themselves (similarly, it does not prohibit the entire limit from being harvested by trawl catcher vessels and being delivered to catcher/processors for processing).

[129] This is an approximation of the revenue increase, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost incidental catch revenues.

Table 8-101 Potential wholesale gross revenue loss to trawl catcher/processor sector of inability to act as motherships in Area 543 under Alternative 2, Option 1

Year	Area-sector limit permitting motherships	Area-sector limit if motherships are prohibited	Difference between the two area-sector limits	Value in 2012 $/mt	Value of difference in million $
2004	4,430	1,833	2,597	1,364	3.5
2005	4,092	1,694	2,398	1,368	3.3
2006	4,331	1,793	2,538	1,868	4.7
2007	3,930	1,626	2,304	2,286	5.3
2008	3,930	1,626	2,304	2,358	5.4
2009	4,064	1,682	2,382	1,271	3.0
2010	4,044	1,674	2,370	1,594	3.8

Note: Motherships would have acquired the Pacific cod from catcher vessels. They would have had to pay the catcher vessels for the fish.
Source: Limits summarized from Table 8-96.

Because the sector limits are defined with respect to the share of harvests from 2006 to 2010, a period when vessel counts suggest mothership activity was greater than in 2004-2005 (see Table 8-3), the area-sector limit for motherships may not be very restrictive.

8.9.4 Seasons and other measures

The trawl Pacific cod fisheries in the Bering Sea and Aleutian Islands are temporally dispersed into three seasons—an A-season from January 20 to April 1, a B-season from April 1 to June 10, and a C-season from June 10 to November 1. Unused amounts in A-season rollover to the subsequent season. Alternative 1 keeps these seasons in place for all sectors.

Alt 2 prohibition on directed fishing after April 30 in Area 543

Alternative 2 prohibits directed fishing using trawl gear for Pacific cod after April 30 in Area 543. This proposed directed fishing end date would not impact the Pacific cod fishery, all else equal. From 2004 through 2010, all targeted Pacific cod catch by trawl vessels in Area 543 was harvested before April 30.

However, this proposed directed fishing closure date may affect retention of Pacific cod after April 30. A prohibition on directed fishing means that vessels harvesting more than the 20 percent MRA after April 30 are required to discard some Pacific cod. From 2004 through 2010, approximately 4 percent of total Pacific cod catch harvested after April 30 in Area 543 was discarded. Since Pacific cod is required to be retained if the Pacific cod fishery is open, the amounts of discards likely occurred when the fishery was closed due to halibut PSC limit management. After the implementation of Amendment 80 in 2008 through 2010, less than 1 percent was discarded.

Alt 2, 3, and 4 C-season end date extension in Areas 541 and 542

Alternatives 2, 3, and 4 relax the C-season end date from November 1 to December 31 in Areas 541 and 542 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. Alternatives 2 and 4 relax the C-season end date from November 1 to December 31 in Area 543 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. This relaxation of the season date would not apply to other vessels or the Bering Sea subarea. Limiting this to

Amendment 80 and trawl vessels fishing for CDQ Pacific cod has been proposed to address potential regulatory discards of Pacific cod after November 1.

From 2004 through 2010, approximately 0.3 percent of total Pacific cod harvest by trawl catcher/processors and motherships in the Aleutian Islands was harvested after November 1. Catch after November 1 was rarely discarded. The information is confidential; however, less than 0.01 percent was discarded from 2004 through 2010. This indicates that regulatory discards are not a concern, all else equal.

This relaxation of the C-season end date may impact the reallocation of Pacific cod later in the year. Catch limits per area in Alternatives 2 and 3 would limit any additional catch and likely prevent any impact on reallocation of Pacific cod. However, there could be an impact for Alternative 4, if the total TAC of Aleutian Islands Pacific cod, expected to be implemented in the 2014 harvest specifications, is not fully harvested.

In most years, the C-season apportionment of the BSAI trawl catcher vessel allocation is not fully harvested. This allows NMFS to reallocate Pacific cod in the BSAI from the BSAI trawl catcher vessel sector, and any other sectors not expected to fully harvest their allocation, to the sectors that can harvest it. This reallocation is usually done late in the year, from mid-October to early December, when NMFS Inseason management staff can determine that the trawl catcher vessel sector is not able to harvest their allocation.

The regulations at 50 CFR 679.20(a)(7)(iii)(A) determine the sectors that get preference during this reallocation. These regulations state that the less than 60-foot hook-and-line and pot sector gets first preference of available Pacific cod, second is trawl gear reallocations to other trawl gear sectors, and third is Pacific cod reallocations to the other non-trawl sectors including the hook-and-line catcher/processors.

In a typical year, a small amount of Pacific cod is reallocated to the less than 60-foot hook-and-line and pot sector. The Amendment 80 sector gets a portion of the reallocated Pacific cod to support incidental catch, but due to C-season end date of November 1, this amount is typically limited. All remaining amounts get reallocated to the hook-and-line catcher/processor sector.

With the change of the November 1 season date to December 31, a directed fishery for Pacific cod could develop in the Aleutian Islands after November 1. This concern is limited because this change only applies to the Aleutian Islands and the Pacific cod TAC is expected to be split from the Bering Sea TAC in 2014. However, in years when the Aleutian Islands Pacific cod TAC is high, and if the sector allocations are still managed BSAI wide, this scenario could occur under Alternative 4 and a directed fishery for Pacific cod could develop in the Aleutian Islands after November 1.

Under Amendment 80, trawl catcher/processors may use their Pacific cod allocation for directed fishing or for incidental harvests of Pacific cod. The Amendment 80 fleet cannot know for sure what its incidental Pacific cod needs will be at the start of the year, although these will become clearer as the year progresses. Once these needs are more clearly defined, the fleet will learn the full scope of its potential directed Pacific cod harvests. If a directed fishery becomes possible later in the year, the Amendment 80 sector may request all remaining amounts of trawl catcher vessel Pacific cod to support this directed fishery. Since this relaxation of the season end date proposed in the alternatives only applies to Amendment 80 vessels, they would be the only sector to benefit from a late directed fishery for Pacific cod. This could result in smaller reallocations to the hook-and-line catcher/processor sector.

ESA re-initiation triggers.

Under Alternative 1, ESA consultation is to be reinitiated if area-sector Pacific cod harvests exceed certain trigger levels. These are: (a) 11.5 percent of the BSAI Pacific cod ABC for trawl gear, and 1.5 percent for non-trawl gear, in Area 541, and (b) 2 percent of BSAI Pacific cod ABC for trawl gear, and 1.5 percent for non-trawl gear in Area 542. These limits are meant to constrain production from these areas to levels observed from 2007 through 2009. (Chapter 2 of this EIS)

These trigger levels were not reached in the years 2011 through 2013. They were put in place to prevent an increase of harvest in the Aleutian Islands. This is not a limit that is managed inseason or subject to closures. Therefore, this trigger could be reached. However, it is possible that an area-sector trigger may be exceeded, for example if Pacific cod harvests were concentrated only one area of the Aleutian Islands.

Alternatives 2 and 3 remove this trigger in lieu of sector and area allocations to prevent additional catch. Since under these alternatives these limits are established, the trigger is not necessary. Alternative 4 has no limits or triggers and could result in more catch in an area or by a sector than has occurred historically.

8.9.5 Redeployment

Section 8.3, evaluating Alternatives 1 and 4, included a detailed, qualitative discussion of the impacts of this action on the trawl catcher/processor sector in the Aleutian Islands. Alternatives 1 and 4 represent the two extremes of restrictions on the trawl catcher/processor sector. The restrictions under Alternative 1 (the interim final rule, which is the status quo for this analysis) are greater than those under other alternatives, and the restrictions under Alternative 4 (a return to the regulations as they were in 2010, with modest changes) are the least restrictive. The results for these two alternatives, therefore, can be thought of as bookends for the impacts of Alternatives 2 and 3, and their options.

This is true for redeployment, as well as for other impacts. In general, the conclusions with respect to redeployment under Alternative 1 hold (see Section 8.3.3), except that the fleet is not likely to redeploy to the same extent, since its fishing in Aleutian Islands Atka mackerel and Pacific cod fisheries will not have been restricted to the same extent. It is not possible to provide quantitative estimates of the differences between the alternatives, since the analysis has necessarily been qualitative.

Section 8.3.3 discussed redeployment under four headings: (1) other Amendment 80 species; (2) non-Amendment 80 species; (3) mothership operations; and (4) other activities. Amendment 80 species are allocated among participating firms in cooperatives as quota share. A firm hoping to redeploy into another Amendment 80 species as a target must hold or acquire the quota share. If it does not hold the quota share, much of its profit from redeployment is likely to be transferred to the firm from which it acquires the quota.

The fleet would have limited opportunities to fish for Atka mackerel elsewhere in the Aleutian Islands or in the Gulf of Alaska because of TAC limits. There may be some increased activity in the Bering Sea, if the rules governing the MRA are changed.

Pacific cod fishing opportunities in the Aleutian Islands are limited, but vessels may be able to fish their Pacific cod quota in the Bering Sea. Given the Aleutian Islands and Bering Sea Pacific cod specifications split, the ability to shift to the Bering Sea may be constrained by the directed fishing allowance for the Bering Sea area. Their ability to fully offset their Aleutian Islands Atka mackerel losses here, however, could be limited by higher halibut PSC rates, and possibly lower prices for smaller Bering Sea Pacific cod. Vessels could shift into increased rock sole and yellowfin sole, although halibut PSC and incidental

catches of other Amendment 80 species, such as Pacific cod may be limiting. Aleutian Islands Pacific ocean perch is fully allocated and harvested and, therefore, is not available for redeployment. Bering Sea Pacific ocean perch is not an Amendment 80 allocated species, and may offer some opportunities for these vessels. Flathead sole has not been targeted by these vessels in the past; however, the vessels are more likely to reserve their halibut PSC and Pacific cod quota for use as incidental catch in the rock sole, yellowfin sole, and arrowtooth flounder fisheries.

Trawl catcher/processors may turn to fisheries that are not limited by Amendment 80 quotas, including BSAI fisheries for arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, and "other flatfish," and Gulf of Alaska fisheries for arrowtooth flounder, rockfish, and rex sole. The BSAI fisheries may provide attractive opportunities, although "other flatfish" is generally used as incidental catch in other fisheries, rather than as a target. The GOA fisheries are constrained by Amendment 80 sideboards. The vessels could target the trawl allocation of sablefish, but there are high halibut prohibited species catch rates in this fishery.

Amendment 80 trawl catcher/processors could obtain some species for processing by acting as motherships for trawl catcher vessels. This has been a source of Atka mackerel and Pacific cod for some trawl catcher/processors. These vessels could also seek to increase access to BSAI trawl catcher vessel yellowfin sole; however, this could create conflicts with American Fisheries Act catcher/processors also seeking access to these yellowfin sole. Opportunities for these vessels outside of Alaska appear to be limited.

8.9.6 Incidental catch and PSC

When compared to the baseline data of 2004 to 2010, there would be a reduction in targeted Pacific cod fishing in the Aleutian Islands under Alternatives 1, 2, and 3. The Aleutian Islands Pacific cod TAC split will reduce this catch even more. The end result may be a reduction of groundfish caught incidental to Pacific cod. It may also result in a slight reduction of prohibited species catch (PSC). Table 8-102 provides the average rate of incidental catch and PSC in Pacific cod targets in the Aleutian Islands from 2004 through 2012.

Table 8-102 Aleutian Islands average rate of incidental catch and PSC in Pacific cod targets by trawl gear from 2004 through 2012

	541	542	543	All areas
Groundfish (percentage of total groundfish catch in Pacific cod targets)				
Pacific cod	92.75%	88.26%	92.86%	92.22%
Atka mackerel	1.67%	3.07%	1.85%	1.87%
Pollock	1.00%	2.95%	1.10%	1.26%
Rock sole	2.34%	1.92%	1.31%	2.12%
All other species	2.24%	3.80%	2.88%	2.53%
Prohibited Species catch (#s of animals per metric tons of groundfish)				
C. opilio king crab	0.013	0.017	0.000	0.012
Red king crab	0.004	0.219	0.002	0.030
C. bairdi tanner crab	0.113	0.085	0.100	0.107
Chinook salmon	0.053	0.031	0.003	0.042
Non-Chinook salmon	0.007	0.042	0.001	0.010
Prohibited species catch (percentage of total groundfish)				
Halibut	0.30%	0.29%	0.14%	0.27%

As seen in Table 8-102 the species with the highest incidental rate in Pacific cod targets by trawl gear is rock sole. A reduction in Pacific cod targeted fishing by trawl gears in the Aleutian Islands may result in less incidental catch of rock sole. Rock sole is an Amendment 80 species and an ICA is set for all other vessels. The overall reduction in rock sole is likely not enough to affect the amount used to set the ICA and total harvest of rock sole by Amendment 80 and CDQ vessels is unlikely to decrease. Rock sole that is not caught incidentally by Amendment 80 and CDQ vessels is likely to be harvested in the directed fishery in the Bering Sea.

The next highest incidental catch rate is Atka mackerel. Similar to rock sole, a reduction in incidental catch rates is unlikely to change overall harvest or amounts set aside for the ICA. The incidental catch rates for pollock may be reduced; however, this is unlikely to change the amount set for the ICA. All other species caught incidentally in Pacific cod targets by trawl gear currently are not a management concern.

PSC in Pacific cod targets by trawl gear during the baseline years is very low. A reductions in Pacific cod catch by trawl gear under the alternatives would likely result in a small decrease in PSC. A reduction in PSC, in particular halibut, may provide halibut PSC limits available for other target fisheries that have higher halibut PSC rates. However, because the halibut PSC rate in the Aleutian Islands is (relatively) so low, that change is likely to be small. PSC rates of crab and salmon species are low and currently are not a substantial management concern.

8.9.7 Fleet and community impacts

Trawl catcher/processors

The reduction in Pacific cod fishing opportunities in the Aleutian Islands adversely affects the trawl catcher/processor fleet, and the vessels in it seek to redeploy into other fishing activities to minimize the adverse impacts of the action on their profitability. The owners of scarce resources used in this fishery (limited fishing rights, exceptional fishing skills) will experience a loss of the returns accruing to those resources. As shown in Figure 8-13, considering only the area closures, the protective option of Alternative 2 has the greatest adverse impact on fishing revenues, while Alternative 4, has minimal or trivial impacts. Alternatives 1, 2 (without the protective option), and 3 have intermediate impacts. The relative impacts of these alternatives on fishing operations will depend on year-specific circumstances.

Adak/Seattle-Tacoma

Trawl catcher/processors process Pacific cod at sea and, thus, potential processing at Adak would not be affected by this action. However, vessels fishing Pacific cod in the Aleutian Islands visit the port of Adak, and purchase goods and services there. These include fuel, and use of the airport at Adak for crew rotation. At the time the interim final rule became effective, the number of visits to Adak by trawl catcher/processors fishing for Pacific cod, either before or after the visit, declined. The number of visits, which averaged about 29 a year from 2004 to 2010, decreased to 13 in 2011 **(**see Table 10-13 of this EIS for more details). In addition, as discussed in Section 8.2.11 of this chapter, Adak receives a share of revenues from the fisheries business tax collected by the State of Alaska from vessels processing catch and delivering it to shore. A decline in Pacific cod production may reduce revenues from this source.

The impact of the measure in Alternative 2 that would prohibit the use of catcher/processors as motherships for Pacific cod caught in Area 543 may cause catcher vessels to deliver Pacific cod to Adak as an alternative, assuming that option is available. However, by increasing catcher vessel operating costs in Area 543, it may also reduce overall catcher vessel fishing activity in that area.

It does not **appear** that Amendment 80 trawl catcher/processors left the BSAI fisheries following the effective date of the interim final rule. Purchases of goods and services in the Puget Sound base areas of this fleet may have declined, but if they did, and that is not known, there is no information on the size of the decline. If incomes received by participants in the fishery declined (profits to the fishing companies and wages, salaries, and shares for persons working for the companies) expenditures by these persons probably declined as well. This could have reduced spending in the Puget Sound region. However, any change in fishing company purchases, or in spending out of personal income by employees or owners, is small in comparison to the Puget Sound economy.

CDQ communities and Aleut Corporation stockholders

The alternatives under consideration here reduce CDQ group allocations of Pacific cod and, thus, adversely affect the CDQ groups, and the communities that they benefit. The comparison of alternatives follows the discussion above, for the trawl catcher/processor sector.

The alternatives under consideration here may affect the revenues of the Aleut Corporation subsidiary, the Aleut Enterprise Corporation, by reducing fuel sales, and purchases of other goods and services, at Adak. Changes in activity at Adak can affect Aleut Corporation objectives of contributing to the development of Adak.

Benefits of protecting Steller sea lions

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, and of destruction or adverse modification to Steller sea lion critical habitat, represents a legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA and Regulatory Impact Review analysis.

8.9.8 Summary

Table 8-103 summarizes key results from this analysis for all Pacific cod alternatives and options (including Alternative 1 and 4 results from Section 8.3). The inclusion of Alternative 1 and 4 results provides context for the Alternative 2 and 3 results.

Table 8-103 Comparison of Pacific cod trawl catcher/processor alternatives

Description	Alternative 1	Alternative 2		Alternative 3	Alternative 4
		Basic	With Protective Option		
Amendment 80 trawl catcher/processors	Residual gross revenues are 34% to 64% of baseline revenues	Residual gross revenues are 42% to 54% of baseline revenues.	Residual gross revenues are 22% to 41% of baseline revenues.	Residual gross revenues are 50% to 64% of baseline revenues.	Residual gross revenues are 99% to 100% of baseline revenues.
Adak	Fewer port visits by trawl catcher/processors generate less local income. Visits dropped from 29 a year in 2004–2010 to 13 in 2011. Reduced revenues, lower income from State shared fishery taxes.	Comparable to Alternative 1	Fewer port visits than under Alternatives 1, 2, and 3.	Comparable to Alternative 1	More port visits than under all other alternatives.
Other communities	This may have adverse impacts on ports in the Pacific Northwest supplying logistical services to trawl catcher/processors, and to places where persons earning incomes in these fleets spend their incomes. Impacts are small compared to overall economies.	Adverse impacts smaller than those under Alternative 1.	Adverse impacts smaller than under Alternatives 1 and 2.	Similar to Alternative 2.	Similar to Alternative 3.
CDQ communities and the Aleut Corporation	The relative distribution of impacts to CDQ communities and Aleut Corporation stockholders is similar to that for the trawl catcher/processor fleet.				
Incidental catch and PSC	None of the alternatives appear to create serious issues for incidental catch or PSC.				
Steller sea lion stock	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	This alternative appears to remove the least prey from the prey field and, thus, may have a smaller impact on Steller sea lions than the other alternatives.	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	This alternative removes the most prey from the prey field, and, thus, may have the greatest adverse impact on Steller sea lions.
Sum of producers and consumers surpluses	The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Pacific cod products, and consumers' surpluses accruing to persons who value SSL population health. Producers' surplus changes cannot be estimated, surpluses accruing to U.S. consumers are unlikely to change much since overall BSAI Pacific cod production is unlikely to change much. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus, the net benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion.				

8.9.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Pacific cod by trawl catcher/processors. This analysis of these measures is summarized in the catch and revenue tables in this appendix. The appendix includes a catch table, and a revenue table, for each of the principal alternative-option combinations.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the residual catch as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars. Each alternative and option combination is summarized in one catch and one revenue table.

Table 8-104 Location of catcher/processor Pacific cod harvests with respect to Alternative 1 area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open by (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	5,597	3,269	3,239	12,105	739	2,334	3,239	6,313	4,857	935	0	5,792	48%
2005	5,117	2,187	4,099	11,403	1,410	1,934	4,099	7,443	3,706	254	0	3,960	35%
2006	5,045	1,854	3,016	9,915	336	1,462	3,016	4,814	4,709	391	0	5,101	51%
2007	7,724	2,145	2,228	12,098	725	1,413	2,228	4,366	6,999	732	0	7,731	64%
2008	2,834	785	1,652	5,271	259	523	1,652	2,434	2,574	262	0	2,837	54%
2009	1,966	1,518	1,657	5,141	43	748	1,657	2,448	1,923	770	0	2,693	52%
2010	2,123	1,284	549	3,956	87	815	549	1,450	2,036	469	0	2,506	63%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-105 Estimated Alternative 1 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	6.7	3.9	3.8	14.4	0.9	2.8	3.8	7.5	5.9	1.1	0.0	6.9	48%
2005	6.3	2.7	5.1	14.1	1.8	2.4	5.1	9.3	4.5	0.3	0.0	4.8	34%
2006	8.6	3.2	5.2	17.0	0.6	2.5	5.2	8.2	8.1	0.7	0.0	8.7	52%
2007	16.5	4.6	4.7	25.8	1.5	3.0	4.7	9.3	15.0	1.6	0.0	16.6	64%
2008	6.4	1.8	3.7	11.9	0.6	1.2	3.7	5.5	5.8	0.6	0.0	6.4	54%
2009	2.5	1.8	2.1	6.3	0.1	0.9	2.1	3.0	2.4	0.9	0.0	3.3	53%
2010	3.4	2.0	0.8	6.2	0.1	1.3	0.8	2.2	3.2	0.7	0.0	4.0	64%
Real revenues (in 2012 dollars)													
2004	8.0	4.6	4.5	17.1	1.0	3.3	4.5	8.9	7.0	1.3	0.0	8.2	48%
2005	7.3	3.1	5.9	16.3	2.1	2.8	5.9	10.8	5.2	0.3	0.0	5.6	34%
2006	9.7	3.6	5.8	19.1	0.6	2.8	5.8	9.2	9.1	0.7	0.0	9.8	52%
2007	18.1	5.0	5.2	28.3	1.7	3.3	5.2	10.2	16.4	1.7	0.0	18.2	64%
2008	6.7	1.9	3.9	12.5	0.6	1.2	3.9	5.8	6.1	0.6	0.0	6.7	54%
2009	2.6	1.9	2.2	6.7	0.1	1.0	2.2	3.2	2.5	1.0	0.0	3.5	53%
2010	3.5	2.1	0.9	6.5	0.1	1.3	0.9	2.3	3.4	0.8	0.0	4.1	64%

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-106 Location of catcher/processor Pacific cod harvests with respect to Alternative 2 area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open by (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	5,597	3,269	3,239	12,105	2,098	2,334	1,301	5,733	3,499	935	1,939	6,372	53%
2005	5,117	2,187	4,099	11,403	3,187	1,934	706	5,827	1,930	254	3,393	5,577	49%
2006	5,045	1,854	3,016	9,915	3,452	1,462	862	5,776	1,593	391	2,154	4,139	42%
2007	7,724	2,145	2,228	12,098	3,836	1,413	820	6,069	3,888	733	1,408	6,029	50%
2008	2,834	785	1,652	5,271	1,553	516	378	2,447	1,281	268	1,274	2,824	54%
2009	1,966	1,518	1,657	5,141	1,069	748	885	2,702	897	770	772	2,439	47%
2010	2,123	1,284	549	3,956	1,073	815	222	2,110	1,050	470	327	1,846	47%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-107 Estimated Alternative 2 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	6.7	3.9	3.8	14.4	2.5	2.8	1.5	6.9	4.2	1.1	2.3	7.6	52%
2005	6.3	2.7	5.1	14.1	4.0	2.4	1.0	7.4	2.3	0.3	4.1	6.7	48%
2006	8.6	3.2	5.2	17.0	5.9	2.5	1.5	9.9	2.7	0.7	3.7	7.1	42%
2007	16.5	4.6	4.7	25.8	8.2	3.0	1.7	13.0	8.3	1.6	3.0	12.9	50%
2008	6.4	1.8	3.7	11.9	3.5	1.2	0.8	5.5	2.9	0.6	2.9	6.3	54%
2009	2.5	1.8	2.1	6.3	1.3	0.9	1.1	3.3	1.1	0.9	1.0	3.0	48%
2010	3.4	2.0	0.8	6.2	1.7	1.3	0.3	3.3	1.7	0.7	0.5	2.9	47%
Real revenues (in 2012 dollars)													
2004	8.0	4.6	4.5	17.1	3.0	3.3	1.8	8.2	5.0	1.3	2.7	9.0	52%
2005	7.3	3.1	5.9	16.3	4.7	2.8	1.1	8.5	2.7	0.3	4.8	7.8	48%
2006	9.7	3.6	5.8	19.1	6.7	2.8	1.6	11.1	3.0	0.7	4.2	8.0	42%
2007	18.1	5.0	5.2	28.3	9.0	3.3	1.9	14.2	9.1	1.7	3.3	14.1	50%
2008	6.7	1.9	3.9	12.5	3.7	1.2	0.9	5.8	3.0	0.6	3.0	6.7	54%
2009	2.6	1.9	2.2	6.7	1.4	1.0	1.1	3.5	1.2	1.0	1.0	3.2	48%
2010	3.5	2.1	0.9	6.5	1.8	1.3	0.4	3.5	1.7	0.8	0.5	3.0	47%

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-108 Location of catcher/processor Pacific cod harvests with respect to Alternative 2 protective option area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open by (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	5,597	3,269	3,239	12,105	2,098	2,334	2,985	7,417	3,499	935	255	4,688	39%
2005	5,117	2,187	4,099	11,403	3,187	1,934	3,380	8,500	1,930	254	720	2,903	25%
2006	5,045	1,854	3,016	9,915	3,452	1,462	2,837	7,751	1,593	391	179	2,163	22%
2007	7,724	2,145	2,228	12,098	3,836	1,413	2,073	7,322	3,888	733	156	4,776	39%
2008	2,834	785	1,652	5,271	1,553	516	1,548	3,618	1,281	268	104	1,653	31%
2009	1,966	1,518	1,657	5,141	1,069	748	1,624	3,441	897	770	33	1,700	33%
2010	2,123	1,284	549	3,956	1,073	815	441	2,329	1,050	470	108	1,627	41%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-109 Estimated Alternative 2 protective option trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	6.7	3.9	3.8	14.4	2.5	2.8	3.5	8.8	4.2	1.1	0.3	5.6	39%
2005	6.3	2.7	5.1	14.1	4.0	2.4	4.2	10.6	2.3	0.3	0.9	3.5	25%
2006	8.6	3.2	5.2	17.0	5.9	2.5	4.8	13.2	2.7	0.7	0.4	3.7	22%
2007	16.5	4.6	4.7	25.8	8.2	3.0	4.4	15.6	8.3	1.6	0.3	10.2	39%
2008	6.4	1.8	3.7	11.9	3.5	1.2	3.5	8.1	2.9	0.6	0.2	3.7	31%
2009	2.5	1.8	2.1	6.3	1.3	0.9	2.0	4.2	1.1	0.9	0.1	2.1	34%
2010	3.4	2.0	0.8	6.2	1.7	1.3	0.7	3.6	1.7	0.7	0.2	2.5	41%
Real revenues (in 2012 dollars)													
2004	8.0	4.6	4.5	17.1	3.0	3.3	4.2	10.5	5.0	1.3	0.4	6.6	39%
2005	7.3	3.1	5.9	16.3	4.7	2.8	4.8	12.3	2.7	0.3	1.1	4.1	25%
2006	9.7	3.6	5.8	19.1	6.7	2.8	5.4	14.9	3.0	0.7	0.4	4.2	22%
2007	18.1	5.0	5.2	28.3	9.0	3.3	4.8	17.1	9.1	1.7	0.4	11.2	39%
2008	6.7	1.9	3.9	12.5	3.7	1.2	3.7	8.6	3.0	0.6	0.2	3.9	31%
2009	2.6	1.9	2.2	6.7	1.4	1.0	2.1	4.5	1.2	1.0	0.1	2.3	34%
2010	3.5	2.1	0.9	6.5	1.8	1.3	0.7	3.8	1.7	0.8	0.2	2.7	41%

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-110 Location of catcher/processor Pacific cod harvests with respect to Alternative 3 area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open by (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	5,597	3,269	3,239	12,105	2,099	2,334	0	4,433	3,498	935	3,239	7,672	63%
2005	5,117	2,187	4,099	11,403	3,187	1,934	0	5,120	1,930	254	4,099	6,283	55%
2006	5,045	1,854	3,016	9,915	3,452	1,462	0	4,914	1,593	391	3,016	5,000	50%
2007	7,724	2,145	2,228	12,098	3,836	1,413	1	5,250	3,888	733	2,227	6,848	57%
2008	2,834	785	1,652	5,271	1,553	516	3	2,073	1,281	268	1,649	3,198	61%
2009	1,966	1,518	1,657	5,141	1,069	748	26	1,843	897	770	1,631	3,298	64%
2010	2,123	1,284	549	3,956	1,073	815	1	1,889	1,050	470	548	2,067	52%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-111 Estimated Alternative 3 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	6.7	3.9	3.8	14.4	2.5	2.8	0.0	5.3	4.2	1.1	3.8	9.1	63%
2005	6.3	2.7	5.1	14.1	4.0	2.4	0.0	6.4	2.3	0.3	5.1	7.7	55%
2006	8.6	3.2	5.2	17.0	5.9	2.5	0.0	8.4	2.7	0.7	5.2	8.5	50%
2007	16.5	4.6	4.7	25.8	8.2	3.0	0.0	11.2	8.3	1.6	4.7	14.6	57%
2008	6.4	1.8	3.7	11.9	3.5	1.2	0.0	4.7	2.9	0.6	3.7	7.2	61%
2009	2.5	1.8	2.1	6.3	1.3	0.9	0.0	2.3	1.1	0.9	2.0	4.1	64%
2010	3.4	2.0	0.8	6.2	1.7	1.3	0.0	3.0	1.7	0.7	0.8	3.2	52%
Real revenues (in 2012 dollars)													
2004	8.0	4.6	4.5	17.1	3.0	3.3	0.0	6.3	5.0	1.3	4.5	10.8	63%
2005	7.3	3.1	5.9	16.3	4.7	2.8	0.0	7.4	2.7	0.3	5.9	8.9	55%
2006	9.7	3.6	5.8	19.1	6.7	2.8	0.0	9.5	3.0	0.7	5.8	9.6	50%
2007	18.1	5.0	5.2	28.3	9.0	3.3	0.0	12.3	9.1	1.7	5.2	16.0	57%
2008	6.7	1.9	3.9	12.5	3.7	1.2	0.0	4.9	3.0	0.6	3.9	7.6	61%
2009	2.6	1.9	2.2	6.7	1.4	1.0	0.0	2.4	1.2	1.0	2.1	4.3	64%
2010	3.5	2.1	0.9	6.5	1.8	1.3	0.0	3.1	1.7	0.8	0.9	3.4	52%

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-112 Location of catcher/processor Pacific cod harvests with respect to Alternative 4 area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open by (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	5,597	3,269	3,239	12,105	100	49	0	149	5,497	3,220	3,239	11,956	99%
2005	5,117	2,187	4,099	11,403	38	83	0	120	5,079	2,105	4,099	11,283	99%
2006	5,045	1,854	3,016	9,915	19	19	0	39	5,025	1,834	3,016	9,875	100%
2007	7,724	2,145	2,228	12,098	13	48	1	62	7,711	2,097	2,227	12,036	99%
2008	2,834	785	1,652	5,271	13	10	3	26	2,821	775	1,649	5,245	100%
2009	1,966	1,518	1,657	5,141	16	4	26	45	1,950	1,514	1,631	5,095	99%
2010	2,123	1,284	549	3,956	28	6	1	34	2,095	1,279	548	3,922	99%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-113 Estimated Alternative 4 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	6.7	3.9	3.8	14.4	0.1	0.1	0.0	0.2	6.6	3.8	3.8	14.3	99%
2005	6.3	2.7	5.1	14.1	0.0	0.1	0.0	0.1	6.3	2.6	5.1	13.9	99%
2006	8.6	3.2	5.2	17.0	0.0	0.0	0.0	0.1	8.6	3.1	5.2	16.9	100%
2007	16.5	4.6	4.7	25.8	0.0	0.1	0.0	0.1	16.5	4.5	4.7	25.7	99%
2008	6.4	1.8	3.7	11.9	0.0	0.0	0.0	0.1	6.4	1.7	3.7	11.8	100%
2009	2.5	1.8	2.1	6.3	0.0	0.0	0.0	0.1	2.4	1.8	2.0	6.3	99%
2010	3.4	2.0	0.8	6.2	0.0	0.0	0.0	0.1	3.3	2.0	0.8	6.1	99%
Real revenues (in 2012 dollars)													
2004	8.0	4.6	4.5	17.1	0.1	0.1	0.0	0.2	7.9	4.6	4.5	16.9	99%
2005	7.3	3.1	5.9	16.3	0.1	0.1	0.0	0.2	7.3	3.0	5.9	16.2	99%
2006	9.7	3.6	5.8	19.1	0.0	0.0	0.0	0.1	9.7	3.5	5.8	19.0	100%
2007	18.1	5.0	5.2	28.3	0.0	0.1	0.0	0.1	18.1	4.9	5.2	28.2	99%
2008	6.7	1.9	3.9	12.5	0.0	0.0	0.0	0.1	6.7	1.8	3.9	12.4	100%
2009	2.6	1.9	2.2	6.7	0.0	0.0	0.0	0.1	2.6	1.9	2.1	6.7	99%
2010	3.5	2.1	0.9	6.5	0.0	0.0	0.0	0.1	3.5	2.1	0.9	6.4	99%

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

8.10 Pacific Cod Non-trawl Catcher/Processors (Alternatives 2, 3, and their options)

8.10.1 Introduction

The non-trawl gear (hook-and-line, pot, and jig) catcher/processor sector includes vessels fishing and processing Pacific cod in the Aleutian Islands. Mothership activity by these vessels has been minimal.

Alternatives 1 (status quo) and 4 (return to most of the measures in place before the interim final rule went into effect in 2011) were analyzed in Section 8.4, and Alternative 5 (the preliminary preferred alternative adopted by the Council in April 2013) and Alternative 6 are analyzed in Section 8-13. This section deals with Alternatives 2 and 3 and their options.

Table 8-114, based on Table 2-20 in Chapter 2, summarizes and contrasts the Pacific cod alternatives as they apply to non-trawl gear. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

Table 8-114 Comparison of alternatives for Pacific cod non-trawl gear.

Alternative	Seasons	Area 543		Area 542		Area 541	
		closures	Catch and participation limits	closures	Catch and participation limits	closures	Catch and participation limits
1	Hook-and-Line: A season: 1/1–6/10 B season: 6/10–12/31	No retention	Not applicable	Critical habitat closed 0–6 nm year round.	ESA reinitiation trigger with harvest more than 1.5% of BSAI Pacific cod ABC.	Critical habitat closed 0–10 nm year round and 0–20 nm Jan 1–March 1.	ESA reinitiation trigger with harvest more than 1.5% of BSAI Pacific cod ABC.
	Pot: A season: 1/1–6/10 B season: 9/1–12/31			For vessels ≥60 ft, close critical habitat 0–20 nm Jan 1–March 1			
	Jig: A season: 1/1–4/30 B season: 4/30–8/31 C season: 8/31–12/31					Seguam Foraging Area closed.	
	Seasonal apportionments based on BSAI-wide TACs under Amend 85.			Prohibit directed fishing after Nov. 1.		Prohibit directed fishing after Nov. 1.	
2	Hook-and-Line: A season: 1/1–6/10 B season: 6/10–11/1	Critical habitat closed 0–6 nm from rookeries and haulouts.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Critical habitat closed 0–3 nm from rookeries.	Catch limit in proportion to Area 542/541 abundance based on annual stock assessment.	Critical habitat closed 0–3 nm from rookeries.	Catch limit in proportion to Area 542/541 abundance based on annual stock assessment.
	Pot: A season: 1/1–6/10 B season: 9/1–11/1		Option 1: Only CPs and shoreside CVs. Prohibit motherships. Option 2: Only CPs, CVs, and motherships with associated CVs.				
	Jig: A season: 1/1–4/30 B season: 4/30–8/31 C season: 8/31–11/1	<u>Protective option</u>: A season: Close 0–10 nm from rookeries and haulouts. B and C seasons: Close 0–6 nm from rookeries and haulouts.	Set catch limit for CP or CP/mothership sector in proportion to average annual catch 2006–2010.		Set 542/541 catch limit for CP/mothership sector based on portion of average annual catch 2006–2010.	Seguam Foraging Area closed.	Set 542/541 catch limit for CP/mothership sector based on portion of average annual catch 2006–2010.
	Seasonal apportionments based on BSAI-wide TACs under Amend 85.		Shoreside CVs limited to overall Area 543 catch limit.		Shoreside CVs limited to overall 542/541 area catch limit.		Shoreside CVs limited to overall 542/541 area catch limit.
3	Same As Alternative 1	Critical habitat closed 0–3 nm from rookeries and 0–10 nm from Buldir Island.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
			Set catch limit for CP/mothership sector in proportion to average annual catch 2006–2010.				
4	Same as Alternatives 1 and 3	Hook-and-line and pot: Critical habitat closed 0–3 nm from rookeries and 0–10 from Buldir Island.	None	Hook-and-line and pot: Critical habitat closed 0–3 nm from rookeries.	None	Hook-and-line and pot: Critical habitat closed 0–3 nm from rookeries W of 172.59° W long.,	None
						Hook-and-line and pot:: Critical habitat closed east of 172.59° W long.	
						Hook-and-line, pot and jig: Seguam Foraging Area closed.	
5	Same as Alternatives 1, 3, and 4	Same as Alternative 4	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4
6	Not applicable.	No retention	Not applicable.	No retention	Not applicable.	No retention	Not applicable.

ESA=Endangered Species Act, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, GHL=guideline harvest level, CV=catcher vessel, CP=catcher/processor

8.10.2 Pacific cod harvest limits

Alternatives 2 and 3 include provisions for the allocation of Aleutian Islands Pacific cod among Areas 541, 542, and 543, and for the creation of limits on trawl and non-trawl gear catcher/processor harvest in these areas. These measures treat Area 543 independently, and group Areas 541 and 542 together.

This section looks at the area allocation measures first, and then the sector limits. A subsequent section (Section 8.10.3) examines the interaction of area and sector limits with the constraints on harvests imposed by the critical habitat closure rules in the alternatives.

Area allocations

During the baseline years, Pacific cod was managed as one stock in the BSAI. The ITAC was divided among nine separate sector allocations, in addition to the CDQ allocation. As explained in Section 8.2.16, in December 2013 the Council adopted separate Pacific cod harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species. While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Alternatives 2 and 3 require the definition of area catch limits for Area 543 and for Areas 541-542 (considered jointly). The measures call for setting catch limits in proportion to the Area 543 and Area 541-542 biomasses, estimated during the annual stock assessment process.

NMFS has approached this in the following steps:

- The proportion of the annual BSAI biomass estimated to be in the Aleutian Islands from the annual Pacific cod Stock Assessment and Fishery Evaluation Report (SAFE) chapter is used to determine the overall Aleutian Islands harvest limit as a percent of the BSAI ABC. This ranged from 16 percent to 7 percent in the baseline years (2004 through 2010), and in the years under the interim final rule (2011 through 2014).[130]
- The product of this biomass proportion and the BSAI Pacific cod ABC in a year is treated, for this analysis, as an Aleutian Islands ABC.
- Because the State of Alaska's Pacific cod Guideline Harvest Level (GHL) fishery takes place almost entirely within Areas 541, 542, and 543, the entire GHL of 3 percent of the BSAI ABC is deducted from this new estimated Aleutian Islands ABC.
- The Area 543 and Area 541-542 area limits are determined from this Aleutian Islands ABC minus the GHL. These limits are based on a moving average of the relative biomass sizes in these two areas as determined from the most recent four summer trawl surveys. The volumes in Area 543 range between 24.5 percent and 26.4 percent of the whole; the volumes in Area 541-542 consequently range between 73.6 percent and 74.6 percent.

[130] This assumption was made for analytical purposes and provides a practical method for estimating the Aleutian Islands Pacific cod TACs and sector allocations for the different fleets as an illustrative approach for the purpose of this analysis. As noted above, the Council has now split the Aleutian Islands and Bering Sea for Pacific cod specifications. The methods used by the Council may change through time if changing biological understanding leads to changes in the tier status of Aleutian Islands Pacific cod. The results from any given method will change through time as information about the Aleutian Islands stock status changes.

- The balances in each region will cover Community Development Quota (CDQ) harvests, incidental catch allowances (ICAs) and directed fishing allowances (DFAs). ICAs have not been separately identified here, since these will be determined by NMFS during the fishing year.

These rules have been applied to data from 2004 through 2014 to estimate the size of an Aleutian Islands "ABC" in each year, and to estimate how that ABC, net of the GHL, would have been allocated to CDQ, ICA, and DFA in Area 543, and in Areas 541-542 (jointly). Data for 2013 and 2014 are based on the 2012/2013 harvest specifications assuming catch is equal to TAC. These are hypothetical estimates, made for these years, assuming the rules under consideration had been in place during those years. The estimates were summarized in Section 8.9.2, in Table 8-95, and are not reproduced here.

Sector limits

Alternatives 2 and 3 include provisions dividing the available Pacific cod among areas, and then creating harvest limits for certain vessel sectors within these areas. These sector limits are not allocations, but limits on the amounts that may be harvested by the vessel sectors to which they are assigned. Other vessel sectors, not facing their own limits, could conceivably fully harvest the resource, leaving nothing for the vessel sectors that do face limits. However, the opposite could not happen; a sector with its own limit could not harvest more of the area allocation than its limit permits. This is a common characteristic of this action with respect to those gear/modes with sector limits.

The alternatives include separate rules for Areas 543 and 541-542. Non-trawl catcher/processor limits are based on the sector share of historical average catches from 2006 through 2010. Table 8-115 builds on the area allocation estimates summarized in Table 8-95, and incorporates the non-trawl catcher/processor sector limits. Under Alternatives 2 and 3 in Area 543, the non-trawl gear catcher/processor sector would have a catch limit equal to 32.21 percent of the TAC; under Alternatives 2 and 3 in Areas 541-542, the sector would have a catch limit equal to 19.23 percent of the TAC.

Although Alternative 2 includes options prohibiting the use of non-trawl catcher/processors as motherships for catcher vessels in Area 543, and allowing them to do so in that area, the measures would have had no practical effect during the baseline years. Mothership activity did not take place here. Thus, fixed gear operations would have received the same share of the TAC (32.21 percent) under either option.

As shown in Table 8-115, area-sector limits can be quite small in some years (for example, between about 1,000 and about 1,200 metric tons in Area 543 in 2011, 2013, and 2014). Once accommodation is made for incidental catch allowances, low area-sector allocations may preclude directed fishing for Pacific cod by this sector in some areas for some years.

Table 8-115 Estimated non-trawl catcher/processor sector allocations under Alternatives 2 and 3, 2004 through 2014 (metric tons)

	Area Limits		Area 543 sector allocations			Areas 541-542 sector allocations	
Year	543	541-542	Alt 2 Opt1	Alt 2 Opt2	Alt 3	Alt 2	Alt 3
2004	6,543	20,217	2,108	2,108	2,108	3,888	3,888
2005	6,045	18,675	1,947	1,947	1,947	3,591	3,591
2006	6,398	18,822	2,061	2,061	2,061	3,619	3,619
2007	5,805	17,075	1,870	1,870	1,870	3,284	3,284
2008	5,805	17,075	1,870	1,870	1,870	3,284	3,284
2009	6,002	17,658	1,933	1,933	1,933	3,396	3,396
2010	5,974	16,646	1,924	1,924	1,924	3,201	3,201
2011	3,724	10,376	1,199	1,199	1,199	1,995	1,995
2012	4,975	13,865	1,603	1,603	1,603	2,666	2,666
2013	3,243	9,037	1,045	1,045	1,045	1,738	1,738
2014	3,412	9,508	1,099	1,099	1,099	1,828	1,828

Notes: The interim final rule was in effect during the shaded years.
Source: Table 8-95. AKR calculations.

An Aleutian Islands and Bering Sea split of the current BSAI Pacific cod ABC and TAC will also affect Alternatives 1 and 4. However, these alternatives do not include measures to allocate any resulting Aleutian Islands ABC or TAC among the three regulatory areas, nor among sectors.

Under Alternatives 1 and 4, and an Aleutian Islands split, and in the absence of other area-sector limits, fishing by vessels from different sectors would continue in the Aleutian Islands, until the directed fishing allowances for the year were taken. Then the directed fisheries in the Aleutian Islands would be closed, leaving enough incidental catch allowance to meet fishery incidental catch needs for the remainder of the year. BSAI Pacific cod is allocated among sectors, and these sectors could continue fishing for their sector BSAI allocations in the Bering Sea, should the Aleutian Islands close to directed fishing for Pacific cod, since the sectoral allocations may be fished in either the Aleutian Islands or Bering Sea, so long as area TACs are unharvested.

Pacific cod Alternatives 2 and 3 incorporate separate limits on catch for trawl and non-trawl catcher/processors in Area 543, and in Areas 541-542. These limits are sector limits, but not sector allocations. As such, they do not guarantee a sector a share of the area harvest. The catcher vessel sectors in Area 543 and in Area 541-542 are not subject to similar sector limits, and could, potentially, harvest both area limits completely.

Targeted catcher/processor and catcher vessel trawl fishing for Pacific cod in the Federal and parallel fisheries in the Aleutian Islands takes place primarily from mid-February through April. Catcher/processors also take incidental catches of Pacific cod in the fall. Non-trawl vessels, primarily catcher/processors, target Pacific cod early in the year during the same period as the trawlers, but also have an important targeted Pacific cod fishery again in the fall. (Figure 3-8 in Chapter 3; NMFS AKR In-season managers) Thus, the catcher/processors have been fishing simultaneously with, or after, the catcher vessels.

Since the catcher vessels could conceivably complete the harvest of all the area allocations of Pacific cod before the catcher/processor sectors could take their sector limits, Alternatives 2 and 3 could create a race for the Pacific cod, as catcher/processors harvest Pacific cod earlier in the year than they otherwise would have done so. The potential for such a race, and its costs, depends on the relative attractiveness of

Aleutian Islands Pacific cod vis-à-vis Bering Sea Pacific cod. The catcher/processors are fishing against a BSAI-wide allocation (not a limit). If they fail to catch part of it in the Aleutian Islands, it is still reserved for them in the Bering Sea as long as the Bering Sea directed fishing allowance is not fully harvested or PSC limits trigger closure.

8.10.3 Critical habitat closures

In addition to the catch and participation limits discussed in Sub-section 8.10.2, the alternatives include measures that close different areas of critical habitat to directed fishing for Pacific cod with non-trawl gear. This section examines the revenues associated with the areas remaining open to directed fishing under the different alternatives. This is done first without considering the possible additional effect of the non-trawl catcher/processor limits discussed in the preceding sub-section. However, the impacts of critical habitat closures cannot be treated in isolation from the proposed sector limits. The second part of this sub-section discusses this interaction.

Critical habitat closures

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing. The impacts of these alternatives have been evaluated by identifying the volumes of Pacific cod retained from inside and from outside of the closed critical habitat areas by fishing vessels in the baseline years 2004 through 2010, assuming that the volumes from inside the closed areas would no longer be harvested, and that this loss of Pacific cod production would not be made up by increased fishing in the areas outside of the critical habitat.

The results for each of the alternatives, and the principal options within each alternative, have been summarized in a set of tables provided as an appendix to this section. For each alternative or option, these tables summarize (1) the harvest or associated gross revenues in the baseline years 2004 through 2010; (2) the volume of harvest or associated gross revenues from the areas that are closed to fishing under the alternative or option, described as the harvest or revenue placed at risk by the action; (3) the volume of harvest or associated gross revenues from the areas that remain open under the alternative, described as the residual harvest or gross revenue associated with the action; and (4) the residual harvest expressed as a percentage of the baseline harvest. As explained in the discussion of methodology, in Section 8.2.14, these are not projections of future revenues or of the revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

Figure 8-16 and Figure 8-17 summarize the more detailed analysis in the appendix to this section.[131] Figure 8-16 shows the residual gross revenues after closing critical habitat in each alternative, and Figure 8-17 shows these residual gross revenues as a percentage of the baseline gross revenues.[132]

Alternative 1 would have had a large adverse impact on sector gross revenues from the Aleutian Islands Pacific cod fishery in the baseline years 2004 through 2010. Depending on the year, revenues generated from areas left open ranged from 25 percent to 41 percent of baseline levels. Median annual revenuesd from areas left open under Alternative 1 are 33 percent of their baseline levels.

[131] Both figures have been simplified by identifying gross revenues under Alternative 4, with gross revenues under the baseline, thereby obviating the need for separate baseline and Alternative 4 revenue lines.

[132] These figures summarize the residual gross revenues resulting from the analysis of the volumes of Pacific cod from closed critical habitat, under each alternative. These figures are not adjusted to take account of the possible gross revenue impacts of TAC percentage determination rules, or of critical habitat limits.

Relatively little gross revenues came from closed areas in the baseline years under Alternatives 2 (including the protective option), 3, or 4. Alternatives 3 and 4 have no adverse impact. Under Alternative 2 the median annual gross revenues from open areas are equal to 97 percent of their baseline levels, while under the protective option to Alternative 2 they are equal to 92 percent.

Industry sources have indicated that the larger Pacific cod harvested in the Aleutian Islands bring a higher price. NMFS was unable to confirm this. Because of this, the revenue estimates in the figures (and the appendix tables) may understate revenues and adverse revenue impacts. If the sector is able to offset these Aleutian Islands production reductions by redeploying to the Bering Sea, then it is still possible it could receive a lower price for its Pacific cod in the Bering Sea.

While residual revenue estimates may be useful indices of relative impacts, they are not, as noted earlier, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). This welfare measure, however, is not available. In addition, this measure focuses attention on the remaining revenues in the Pacific cod fishery, and does not take account of the ability of fishing operations to take actions in response to the alternatives that could minimize the impact of the alternatives on their profits, most importantly in this instance, their ability to substitute into other fisheries.

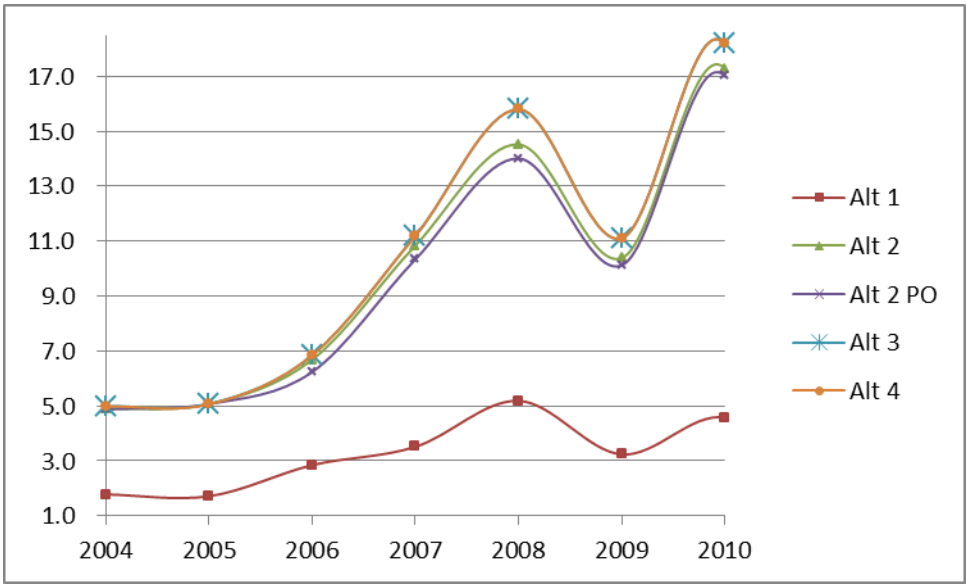


Figure 8-16 Hypothetical non-trawl gear catcher/processor residual revenues in the Baseline Years for each of the Pacific cod alternatives (millions of 2012 dollars)

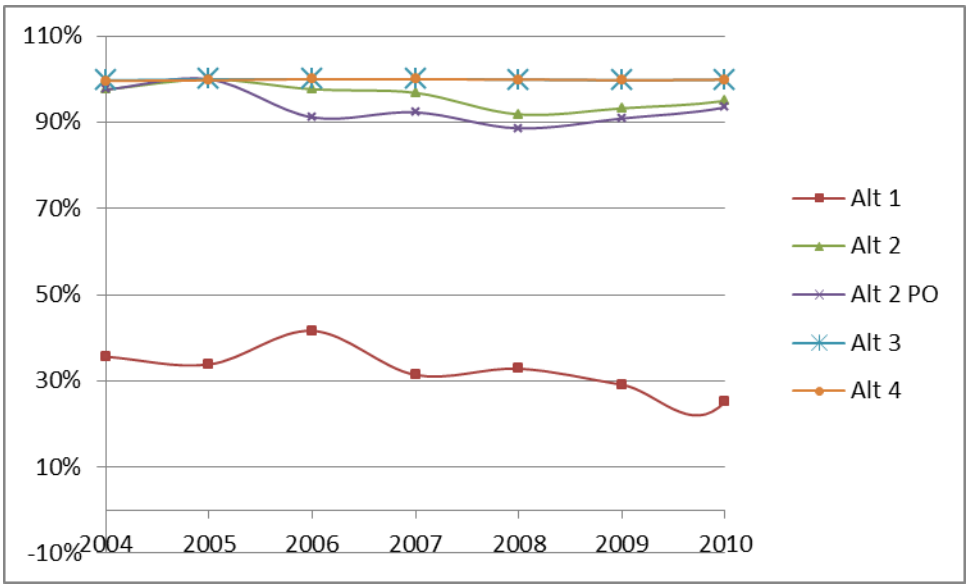


Figure 8-17 Hypothetic non-trawl gear catcher/processor residual revenues in the baseline years for each of the Pacific cod alternatives. Expressed as a percentage of baseline revenues

Interaction of critical habitat closures and area-sector limits

In some years, some of the area-sector limits would have restricted Pacific cod harvests by non-trawl catcher/processors more than would be expected by simply closing critical habitat to fishing activity. Table 8-116 compares the residual harvest in Area 543 and Areas 541-542 (from the analysis of critical habitat closures summarized in the appendix to this section) with the area-sector limit restrictions in the alternatives and options, and calculates how much the area-sector limits restrict harvest beyond the levels associated with the critical habitat closures.[133] Table 8-116 shows that the area-sector constraints bind more often in the later years of the baseline period, when the proportion of the biomass in the Aleutian Islands subarea decreased from the levels of former years.

In other baseline years, area-sector limits exceeded the harvests from areas outside of closed critical habitat. If the non-trawl gear catcher/processor sector is successful in redeploying from fishing in closed critical habitat to areas that remain open, these limits may make possible increased fishing. Table 8-116 identifies these situations as well.

[133] Residual catch includes only retained catch. However, in the analysis in this section, the proposed limits apply to retained and discarded catch. Non-trawl catcher/processor Pacific cod discards averaged about 2 percent per year from 2008 to 2010. This was approximately the same average over the entire baseline period (about 2 percent). Thus, while use of retained catch may cause the analysis to understate the extent to which the constraints bind, the amount of understatement is relatively small.

Table 8-116 Impact of area limits on potential non-trawl catcher/processor Pacific cod harvests during the baseline years 2004 through 2010, showing years in wich those harvests would be limited, and years in which there was potential for increased harvests. (metric tons)

	Residual catch		Area limits		Area 543 comparisons		Areas 541-542 comparisons	
Year	**543**	**541-542**	**543**	**541-542**	**Shortfall**	**Overage**	**Shortfall**	**Overage**
Alternative 2								
2004	C	C	2,108	3,888	C	C	C	C
2005	C	C	1,947	3,591	C	C	C	C
2006	C	C	2,061	3,619	C	C	C	C
2007	1,504	2,521	1,870	3,284	0	366	0	763
2008	1,785	4,388	1,870	3,284	0	85	-1,104	0
2009	2,468	3,214	1,933	3,396	-535	0	0	182
2010	2,744	5,085	1,924	3,201	-820	0	-1,884	0
Alternative 2 (protective option)								
2004	C	C	2,108	3,888	C	C	C	C
2005	C	C	1,947	3,591	C	C	C	C
2006	C	C	2,061	3,619	C	C	C	C
2007	1,307	2,521	1,870	3,284	0	563	0	763
2008	1,562	4,388	1,870	3,284	0	308	-1,104	0
2009	2,321	3,214	1,933	3,396	-388	0	0	182
2010	2,619	5,085	1,924	3,201	-695	0	-1,884	0
Alternative 3								
2004	C	C	2,108	3,888	C	C	C	C
2005	C	C	1,947	3,591	C	C	C	C
2006	C	C	2,061	3,619	C	C	C	C
2007	1,639	2,520	1,870	3,284	0	231	0	764
2008	2,330	4,387	1,870	3,284	-460	0	-1,103	0
2009	2,861	3,214	1,933	3,396	-928	0	0	182
2010	3,146	5,085	1,924	3,201	-1,222	0	-1,884	0

Note: Negative results in the comparisons mean that the area limit falls short of the residual catch; positive results mean that the area limit exceeds the residual catch. Zeros in cells mean there is no shortfall, or overage, depending on the column in which they appear.
Sources: Residual catches are from appropriate tables in the appendix to this section; area limits are from Table 8-115.

Table 8-117 provides estimates of the revenues associated with these production shortfalls (using real 2012 dollar estimates).[134] In most area-year combinations, the limits would not impose costs. In the three years in which each alternative-option combination creates costs (2008 through 2010) these costs for all three options are similar. Potential gross revenue decreases would be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

[134] This is an approximation of the gross revenue shortfall, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost incidental catch revenues. Prices are BSAI-wide and may not capture the potentially higher value of larger Aleutian Islands Pacific cod (if they exist). The impact of these changes in volume on price is unclear, since this is a small part of overall BSAI production. Any effect would take the form of a mitigation of gross revenue declines as volume reductions are offset by price rises.

Table 8-117 Shortfalls in open area gross revenues, or potential to exceed those gross revenues, associated with area-sector limits (Millions of 2012 $)

Year	Value	Alt 2			Alt 2, Protective option			Alt 3		
		Short	Over	Balance	Short	Over	Balance	Short	Over	Balance
2004	1,617	C	C	5.2	C	C	5.2	C	C	5.1
2005	1,801	C	C	4.9	C	C	4.9	C	C	4.9
2006	2,128	C	C	5.7	C	C	6.2	C	C	5.6
2007	2,560	0.0	2.9	2.9	0.0	3.4	3.4	0.0	2.5	2.5
2008	2,290	2.5	0.2	(2.3)	2.5	0.7	(1.8)	3.6	0.0	(3.6)
2009	1,785	1.0	0.3	(0.6)	0.7	0.3	(0.4)	1.7	0.3	(1.3)
2010	2,121	5.7	0.0	(5.7)	5.5	0.0	(5.5)	6.6	0.0	(6.6)

Notes: "C" identified confidential data.
Source: Volumes from Table 8-116; values per metric ton as shown.

Figure 8-18 shows the relationships between Alternatives 1 through 4, given the limits placed on gross revenues when the area-sector limits are less than residual catch from the open areas in the baseline years. To enhance comparability, the gross revenue estimates for Alternatives 1 and 4 have been "normalized" to reflect the area-sector allocations of Alternatives 2 and 3, even though area-sector splits are not part of these alternatives. A comparison with Figure 8-16 shows little change for Alternative 1, but a large downward shift in the levels of residual gross revenues for Alternatives 2, 3, and 4. Alternatives 1 and 4 do not include area and sector limits, such as those in in Alternatives 2 and 3. However, to the extent that the area-sector allocations are a response to the Aleutian Islands and Bering Sea Pacific cod split, the area-sector limits may one day be relevant to those alternatives. Thus, they have been included in this figure to enhance the comparability of the full set of alternatives.

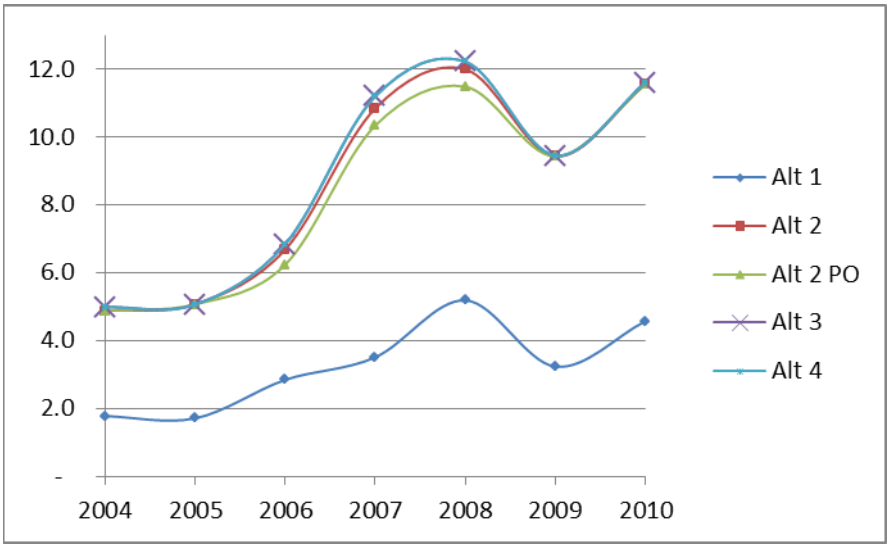


Figure 8-18 Gross revenues for Alternatives 2 and 3, taking account of the area-sector limits (millions of 2012 dollars)

8.10.4 Seasons and other measures

Seasons and rollovers

Most hook-and-line and pot gear Pacific cod fisheries in the BSAI are temporally dispersed into two seasons. The A-season is from January 1 to June 10 and the B-season from June 10 to December 31. The exception is the allocation to vessels less than 60 feet LOA, which is not temporally dispersed into seasons. In addition to these seasons, directed fishing for Pacific cod is prohibited after November 1 in the Aleutian Islands subarea of the BSAI. This was imposed as a Steller sea lion protection measure in the interim final rule in 2011. As with the trawl gear sectors, a sector's unused amounts of Pacific cod in the "A" season roll over to the subsequent season. Alternatives 1 and 2 retain these seasons for all sectors.

Alternative 3, 4, and 5 would relax the November 1 season end date in the Aleutian Islands. This would allow directed fishing for Pacific cod to continue until the end of the year. This would be the same season end date used during the baseline years, from 2004 through 2010. In general, the hook-and-line catcher/processor sector would benefit from this relaxation of the season end date more than other sectors. Seasonal changes aren't applicable under Alternative 6.

During five of the seven baseline years, from 2004 through 2010, hook-and-line catcher/processors fished for Pacific cod in the Aleutian Islands after November 1. On average 5 percent of the total Pacific cod harvested in the BSAI after November 1 occurred in the Aleutian Islands. When compared to the Pacific cod harvest for the whole year by hook-and-line catcher/processors, less than 1 percent was harvested in the Aleutian Islands after November 1. Hook-and-line catcher/processors currently operate under a voluntary cooperative. The mitigation of the race for fish for this sector may have contributed to directed fishing for Pacific cod the entire year.

Vessels greater than 60 feet LOA using pot gear typically do not fish in the Aleutian Islands; therefore, the November 1 season end in the Aleutian Islands may not affect them. While some pot catcher/processors have participated in the Aleutian Islands, this fishery typically closes prior to November 1. Vessels less than 60 feet LOA using hook-and-line, pot, or jig gear typically do not operate in the Aleutian Islands in the late fall months. The vessels using these gears typically deliver to processors in Dutch Harbor or Akutan after November 1. It is possible that if the fishery is still open, then vessels could fish in the Aleutian Islands after November 1. However, this did not occur during the baseline years.

ESA re-initiation triggers

Under Alternative 1, there are ESA re-initiation triggers for the non-trawl gear Pacific cod sector. These triggers would result in ESA consultation if more than 1.5 percent of the BSAI Pacific cod ABC is harvested in Area 542, or more than 1.5 percent of the BSAI Pacific cod ABC is harvested in Area 541. Combined with the 13.5 percent trigger from the trawl gear sectors, the total trigger is 16.5 percent of the BSAI ABC. With the Bering Sea-Aleutian Islands Pacific cod specification split, the Aleutian Islands Pacific cod TAC may be reached prior to a trigger. However, it is still possible that sector and area triggers could be exceeded if one sector fishes more or concentrates activity in only one area.

These triggers were developed to prevent an increase of Pacific cod harvest in the Aleutian Islands. The triggers are not a limit that is managed inseason or subject to closures. Therefore, a trigger could be reached and directed fishing for Pacific cod may continue. In 2011 and 2012, the increase in the BSAI ABC ensured that these triggers were not reached.

Alternatives 2 and 3 remove this trigger in lieu of sector and area allocations to prevent increased catch. With the sector allocations, these triggers may not be necessary. Alternative 4 has no limits or triggers, and could result in more catch in an area or by a sector than has occurred historically.

8.10.5 Redeployment

Potential redeployment opportunities for non-trawl gear catcher/processors were discussed in Section 8.4.3. The discussion is summarized here. There is limited scope for redeployment for Pacific cod in the Aleutian Islands, because of the combination of a relatively large fishing footprint for hook-and-line vessels, and because of the limited amount of Pacific cod habitat outside of Steller sea lion critical habitat.

Conversely, the sector currently has opportunities to offset lost fishing opportunities in the Aleutian Islands with increased Pacific cod fishing in the Bering Sea. The vessels active in the Aleutian Islands also have a history of fishing for Pacific cod in the Bering Sea. However, prices in the Bering Sea may be lower than those in the Aleutian Islands.

The Council has created separate TACs for the Aleutian Islands and the Bering Sea management areas. Sector allocations, including those for the freezer longliners and pot vessels, overlap the Aleutian Islands and Bering Sea. Thus, vessels that are not fully able to harvest their allocation in the Aleutian Islands will be able to redeploy into the Bering Sea and harvest the remainder of their allocation in the Bering Sea, all else equal. However, the split may limit these opportunities, since they are only available so long as the Bering Sea DFA has not been taken by other sectors.

Freezer longliner and pot vessels will have limited opportunities to fish for additional Pacific cod in the Gulf of Alaska. Some freezer longliners are limited by Pacific cod sideboards in the Gulf of Alaska.

This action could lead to increased interest in Greenland turbot in the Bering Sea. There have been concerns about conflicts with trawl catcher/processors also interested in Greenland turbot. Both sectors have more opportunities to fish Greenland turbot, since they formed cooperatives. These alternatives may exacerbate these conflicts. Few other groundfish species are good alternatives for the non-trawl catcher/processor sector.

8.10.6 Incidental catch and PSC

Alternatives that reduce Pacific cod catch should tend to reduce groundfish incidental catch and PSC in the Aleutian Islands. When compared to the baseline data from 2004 through 2010, these critical habitat and area closures result in a possible reduction of targeted fishing for Pacific cod in the Aleutian Islands in Alternative 1 and a slight reduction in Alternative 2. Alternative 3 and 4 do not significantly reduce Pacific cod catches from critical habitat and area closures. Table 8-118 provides the average rate of incidental catch and PSC in Pacific cod targets in the Aleutian Islands from 2004 through 2012.

Table 8-118 Average rate of incidental catch and PSC in Pacific cod targets by non-trawl gear between 2004 and 2013

Species	541	542	543	All AI	BS
Groundfish species (proportions per each metric ton of groundfish retained)					
Pacific cod	83%	84%	83%	83%	82%
Pollock	0%	0%	0%	0%	4%
Skates	8%	6%	9%	8%	11%
Sculpins	6%	5%	3%	5%	1%
Rockfish	1%	3%	2%	2%	0%
Flatfish	1%	0%	1%	1%	2%
Other	1%	1%	1%	1%	0%
PSC species (number of animals per metric ton of groundfish)					
Opilio Tanner crab	1.075	9.765	3.907	4.711	1.160
Bairdi Tanner crab	1.653	8.483	1.184	3.836	0.521
Red King Crab	0.056	0.215	0.028	0.102	0.115
Golden King Crab	0.045	0.014	0.112	0.051	0.002
Chinook salmon	0.000	0.000	-	0.000	0.000
Non-chinook salmon	0.000	0.000	-	0.000	0.001
Halibut (mt of halibut per mt of groundfish)					
Halibut mortality	0.01	0.00	0.01	0.01	0.00
Total halibut	0.06	0.04	0.10	0.06	0.03

Source: NMFS AKR SF In-season management, March 6, 2014.

Chapter 4 provides more details on incidental catch in the Aleutian Islands. A reduction in targeted fishing for Pacific cod by these vessels in the Aleutian Islands may result in smaller Aleutian Islands incidental catches of these species. These species are typically not targeted, and most are closed to directed fishing. Any Pacific cod catch reduction in the Aleutian Islands will likely not affect the management of these species. All other groundfish species harvested incidentally in Pacific cod target fisheries are encountered at very low rates. These reductions would be offset to some extent if vessels shift their operations to the Bering Sea.

PSC in non-trawl Pacific cod target fisheries by catcher/processors in the Aleutian Islands during the baseline years was dominated by Tanner crab. Any reduction in Pacific cod catch by these vessels under the alternatives would likely result in a small decrease in PSC of these species. For non-trawl gear vessels, there are currently no PSC limits for crab species and any reduction or increase in this PSC does not currently affect this fishery.

Halibut incidental catch mortality rates in the Aleutian Islands are higher than in the Bering Sea. As shown in Table 8-118, the average rate of mortality in metric tons, per metric ton of groundfish caught was about 1/100 th of a metric ton in the Aleutian Islands, but rounded to zero in the Bering Sea. The expected reduction in PSC in the Aleutian Islands, in particular halibut, may make more of the halibut PSC limit available in the Bering Sea. However, halibut PSC has not been a concern for non-trawl gear vessels in recent years.

8.10.7 Sector and community impacts

Non-trawl gear catcher/processors

Alternative 1 imposes the largest reductions in output associated with these alternatives. It reduces gross revenues from $3.2 million to $13.6 million or from 25 percent to 42 percent of baseline levels, depending on the year. If area-sector allocations and their interaction with area closures are taken into consideration, the remaining alternatives appear to have very similar impacts. If the area-sector limits do not bind, Alternatives 3 and 4 have no adverse impacts, and Alternative 2, with and without its protective option, has only small impacts on harvests. If the area-sector limits do bind, however, Alternatives 2, 3, and 4 can have larger impacts on the sector. The vessels in this sector have reasonably good opportunities for redeploying into other areas of the Bering Sea to attempt to offset Aleutian Islands production losses, so long as Bering Sea DFA is available, although lower prices for Bering Sea Pacific cod may reduce the gross revenues associated with any given level of harvest. The owners of scarce resources used in this fishery (limited fishing rights, exceptional fishing skills) will experience a loss of the returns accruing to those resources.

Adak/Seattle-Tacoma Metropolitan Statistical Area

This sector processes Pacific cod at sea, and, thus, Adak processing would not be affected by this action. However, non-trawl gear catcher/processors fishing Pacific cod in the Aleutian Islands visit the port of Adak, and purchase goods and services there. These include fuel, and use of the airport at Adak for crew rotation. At the time the interim final rule became effective, the number of visits to Adak by non-trawl gear catcher/processors fishing for Pacific cod declined. The number of visits, which averaged about 29 a year from 2004 through 2010, decreased to 13 in 2011 (see Chapter 10 of this EIS for more details). In addition, as discussed in Sub-section 8.2.12 of this chapter, Adak receives a share of revenues from the fisheries business tax collected by the State of Alaska from vessels processing catch and delivering it to shore. A decline in Pacific cod production may reduce revenues from this source.

The freezer longliner participants of this sector formed a voluntary cooperative in late 2010, and have been rationalizing the harvest. Purchases of goods and services in the Puget Sound area by this fleet may have declined, but if they did, and that is not known, there is no information on the size of the decline. If incomes received by participants in the fishery declined (profits to the fishing companies and wages, salaries, and shares for persons working for the companies) expenditures by these persons probably declined as well. This could have reduced spending in the Puget Sound area. However, any change in fishing company purchases, or in spending out of personal income by employees or owners of fishing operations active in these fisheries, is small in comparison to the Puget Sound economy.

CDQ communities and Aleut Corporation stockholders

The alternatives under consideration here reduce CDQ group allocations of Pacific cod, and, thus, may adversely affect the CDQ groups, and the communities that they benefit. The comparison of alternatives follows the discussion above, for the Amendment 80 sector.

The alternatives under consideration here may affect the revenues of the Aleut Corporation subsidiary, the Aleut Enterprise Corporation, by reducing marine fuel sales, sales of other goods and services, and tax receipts, at Adak. Changes in activity at Adak can affect Aleut Corporation objectives of contributing to the development of Adak.

Benefits of protecting Steller sea lions

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA analysis.

8.10.8 Summary

Table 8-119 summarizes key results from this analysis for all Pacific cod alternatives and options (including Alternative 1 and 4 results from Section 8.3). The inclusion of Alternative 1 and 4 results provides overall context for the Alternative 2 and 3 results.

Table 8-119 Comparison of Pacific cod non-trawl catcher/processor alternatives

Description	Alternative 1	Alternative 2		Alternative 3	Alternative 4
		Basic	With Protective Option		
Non-trawl catcher/processors	Non-trawl catcher/processor gross revenues decrease of 25% to 42% (depending on the year) of their baseline levels. Revenue reductions range between $3.2 million and $13.6 million, depending on the year.	Non-trawl catcher/processor gross revenues decrease modestly under the alternative. Revenues remain at 92% to 100% of their baseline levels for Alternative 2, and 89% to 100% for Alternative 2 with the protective option. Revenues decline by up to $1.3 million, depending on the year under Alternative 2, and by up to $1.8 million under Alternative 2 with the protective option. While consideration of area-sector limits appear to reduce the revenues under this alternative, these reductions are due to factors essentially unrelated to the Steller sea lion protection measures.		Non-trawl catcher/processor gross revenues are unaffected by these alternatives. While consideration of area-sector limits appear to reduce the revenues under these alternatives, these reductions are due to factors essentially unrelated to the Steller sea lion protection measures.	
Adak	Adversely affected, to an unknown extent, by a loss of sales of goods and services to non-trawl catcher/processors visiting the port, and decline in tax revenues.	Minor adverse impacts, of unknown size, as sector reduces purchases of goods and services at Adak, and minor decline in tax revenues.		Adak would not be affected by these alternatives.	
Other communities	May reduce some sales of goods and services to non-trawl fleet in western Washington. May reduce induced effects there, if industry participants spend less of their income. Impacts small in relation to the region.	Adverse impacts would be minor. Any impacts likely to be felt in western Washington.		Other communities would not be affected by these alternatives.	
CDQ communities and the (non-CDQ) Aleut Corporation	Loss of CDQ income. Aleut Corporation loses income from fuel sales at Adak; Aleut Corporation Adak development objectives adversely affected.	Adverse impacts would be minor.		CDQ communities and the Aleut Corporation would not be affected by these alternatives.	
Incidental catch and PSC	Reduced targeting of Pacific cod may reduce incidental catches of other species and PSC; PSC allowances may be freed for use in the Bering Sea. Changes in Aleutian Islands will not be likely to affect management of other groundfish. Reduced halibut PSC use in the Aleutian Islands and shift of non-trawl catcher/processors to the Bering Sea are likely to have little impact on halibut PSC management for non-trawl vessels.	Only minor affects to incidental catch and PSC		Incidental catch and PSC would not be affected by these alternatives.	

Description	Alternative 1	Alternative 2		Alternative 3	Alternative 4
		Basic	With Protective Option		
Steller sea lion stock	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	This option appears to remove the least prey from the prey field, and thus may less impact on Steller sea lions than the other alternatives.	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	This alternative removes the most prey from the prey field, and, thus, may have the greatest adverse impact on Steller sea lions.
Sum of producers and consumers surpluses	The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Pacific cod products, and consumers' surpluses accruing to persons who value SSL population health. Alternatives that relax restrictions on fishing operations may increase producers' surpluses relative to the status quo; surpluses accruing to U.S. consumers may not change much, since the overall BSAI level of production of Pacific cod may not change. However, there may be consumer surplus effects associated with action-induced changes in the size composition of BSAI Pacific cod production. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus, the net benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranking on this criterion.				

8.10.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Pacific cod by non-trawl catcher/processors. This analysis of these measures is summarized in the catch and revenue tables in this appendix. The appendix includes a catch table, and a revenue table, for each of the principal alternative-option combinations.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the residual catch as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars, respectively. Each alternative and option combination is summarized in one catch and one revenue table.

Table 8-120 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 1 area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	1,568	C	S	2,937	961	C	S	1,885	607	C	S	1,052	36%
2005	S	C	C	2,794	S	C	C	1,856	S	C	C	938	34%
2006	S	C	C	3,054	S	C	C	1,799	S	C	C	1,256	41%
2007	1,770	751	1,639	4,160	958	288	1,639	2,885	812	463	0	1,275	31%
2008	1,898	2,495	2,330	6,723	1,334	841	2,330	4,505	565	1,654	0	2,219	33%
2009	1,226	1,997	2,866	6,090	618	824	2,866	4,309	608	1,173	0	1,780	29%
2010	2,659	2,426	3,146	8,231	1,710	1,324	3,146	6,180	949	1,102	0	2,051	25%

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches of Pacific cod. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-121 Estimated Alternative 1 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.2	C	S	4.2	1.4	C	S	2.7	0.9	C	S	1.5	36%
2005	S	C	C	4.4	S	C	C	2.9	S	C	C	1.5	34%
2006	S	C	C	6.1	S	C	C	3.6	S	C	C	2.5	42%
2007	4.4	1.9	4.0	10.2	2.3	0.7	4.0	7.0	2.0	1.2	0.0	3.2	31%
2008	4.3	5.5	5.2	15.0	3.0	1.9	5.2	10.1	1.2	3.7	0.0	4.9	33%
2009	2.1	3.4	5.0	10.5	1.1	1.4	5.0	7.5	1.0	2.0	0.0	3.1	29%
2010	5.7	5.1	6.7	17.5	3.6	2.7	6.7	13.1	2.1	2.3	0.0	4.4	25%
Real revenues (in 2012 dollars)													
2004	2.7	C	S	5.0	1.6	C	S	3.2	1.0	C	S	1.8	36%
2005	S	C	C	5.1	S	C	C	3.4	S	C	C	1.7	34%
2006	S	C	C	6.8	S	C	C	4.0	S	C	C	2.8	42%
2007	4.8	2.1	4.4	11.2	2.5	0.8	4.4	7.7	2.2	1.3	0.0	3.5	31%
2008	4.5	5.8	5.5	15.8	3.2	2.0	5.5	10.6	1.3	3.9	0.0	5.2	33%
2009	2.2	3.6	5.3	11.1	1.1	1.5	5.3	7.9	1.1	2.1	0.0	3.2	29%
2010	5.9	5.3	7.0	18.2	3.8	2.9	7.0	13.6	2.1	2.4	0.0	4.6	25%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-122 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 2 area closures

	Total catch (mt)				Catch from areas closed by Alt 1 (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	1,568	C	S	2,937	5	C	S	70	1,563	C	S	2,866	98%
2005	S	C	C	2,794	S	C	C	1	S	C	C	2,792	100%
2006	S	C	C	3,054	S	C	C	75	S	C	C	2,979	98%
2007	1,770	751	1,639	4,160	0	0	135	135	1,770	751	1,504	4,025	97%
2008	1,898	2,495	2,330	6,723	0	6	545	551	1,898	2,489	1,785	6,172	92%
2009	1,226	1,997	2,866	6,090	0	9	399	408	1,226	1,988	2,468	5,682	93%
2010	2,659	2,426	3,146	8,231	0	0	402	402	2,659	2,426	2,744	7,829	95%

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches of Pacific cod. "C" indicates confidential data. "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-123 Estimated Alternative 2 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.2	C	S	4.2	0.0	C	S	0.1	2.2	C	S	4.1	98%
2005	S	C	C	4.4	S	C	C	0.0	S	C	C	4.4	100%
2006	S	C	C	6.1	S	C	C	0.1	S	C	C	5.9	98%
2007	4.4	1.9	4.0	10.2	0.0	0.0	0.3	0.3	4.4	1.9	3.6	9.9	97%
2008	4.3	5.5	5.2	15.0	0.0	0.0	1.2	1.2	4.3	5.5	4.0	13.8	92%
2009	2.1	3.4	5.0	10.5	0.0	0.0	0.7	0.7	2.1	3.4	4.3	9.8	93%
2010	5.7	5.1	6.7	17.5	0.0	0.0	0.9	0.9	5.7	5.1	5.8	16.6	95%
Real revenues (in 2012 dollars)													
2004	2.7	C	S	5.0	0.0	C	S	0.1	2.6	C	S	4.9	98%
2005	S	C	C	5.1	S	C	C	0.0	S	C	C	5.1	100%
2006	S	C	C	6.8	S	C	C	0.2	S	C	C	6.7	98%
2007	4.8	2.1	4.4	11.2	0.0	0.0	0.4	0.4	4.8	2.1	4.0	10.8	97%
2008	4.5	5.8	5.5	15.8	0.0	0.0	1.3	1.3	4.5	5.8	4.2	14.5	92%
2009	2.2	3.6	5.3	11.1	0.0	0.0	0.7	0.8	2.2	3.6	4.6	10.4	93%
2010	5.9	5.3	7.0	18.2	0.0	0.0	0.9	0.9	5.9	5.3	6.1	17.3	95%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-124 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 2 protective option area closures

	Total catch (mt)				Catch from areas closed (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	1,568	C	S	2,937	5	C	S	70	1,563	C	S	2,866	98%
2005	S	C	C	2,794	S	C	C	1	S	C	C	2,792	100%
2006	S	C	C	3,054	S	C	C	284	S	C	C	2,770	91%
2007	1,770	751	1,639	4,160	0	0	332	332	1,770	751	1,307	3,828	92%
2008	1,898	2,495	2,330	6,723	0	6	768	774	1,898	2,489	1,562	5,949	88%
2009	1,226	1,997	2,866	6,090	0	9	546	555	1,226	1,988	2,321	5,535	91%
2010	2,659	2,426	3,146	8,231	0	0	527	527	2,659	2,426	2,619	7,704	94%

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches of Pacific cod. "C" indicates confidential data. "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-125 Estimated Alternative 2 protective option non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.2	C	S	4.2	0.0	C	S	0.1	2.2	C	S	4.1	98%
2005	S	C	C	4.4	S	C	C	0.0	S	C	C	4.4	100%
2006	S	C	C	6.1	S	C	C	0.5	S	C	C	5.6	91%
2007	4.4	1.9	4.0	10.2	0.0	0.0	0.8	0.8	4.4	1.9	3.2	9.4	92%
2008	4.3	5.5	5.2	15.0	0.0	0.0	1.7	1.7	4.3	5.5	3.5	13.3	89%
2009	2.1	3.4	5.0	10.5	0.0	0.0	0.9	1.0	2.1	3.4	4.1	9.6	91%
2010	5.7	5.1	6.7	17.5	0.0	0.0	1.1	1.1	5.7	5.1	5.6	16.3	93%
Real revenues (in 2012 dollars)													
2004	2.7	C	S	5.0	0.0	C	S	0.1	2.6	C	S	4.9	98%
2005	S	C	C	5.1	S	C	C	0.0	S	C	C	5.1	100%
2006	S	C	C	6.8	S	C	C	0.6	S	C	C	6.2	91%
2007	4.8	2.1	4.4	11.2	0.0	0.0	0.9	0.9	4.8	2.1	3.5	10.3	92%
2008	4.5	5.8	5.5	15.8	0.0	0.0	1.8	1.8	4.5	5.8	3.7	14.0	89%
2009	2.2	3.6	5.3	11.1	0.0	0.0	1.0	1.0	2.2	3.6	4.3	10.1	91%
2010	5.9	5.3	7.0	18.2	0.0	0.0	1.2	1.2	5.9	5.3	5.8	17.0	93%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-126 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 3 area closures

	Total catch (mt)				Catch from areas closed (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	1,568	C	S	2,937	5	C	S	8	1,563	C	S	2,929	100%
2005	S	C	C	2,794	S	C	C	1	S	C	C	2,793	100%
2006	S	C	C	3,054	S	C	C	0	S	C	C	3,054	100%
2007	1,770	751	1,639	4,160	0	1	0	1	1,770	750	1,639	4,160	100%
2008	1,898	2,495	2,330	6,723	0	6	0	6	1,898	2,489	2,330	6,718	100%
2009	1,226	1,997	2,866	6,090	0	9	6	15	1,226	1,988	2,861	6,075	100%
2010	2,659	2,426	3,146	8,231	0	0	0	0	2,659	2,426	3,146	8,231	100%

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches of Pacific cod. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-127 Estimated Alternative 3 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.2	C	S	4.2	0.0	C	S	0.0	2.2	C	S	4.2	100%
2005	S	C	C	4.4	S	C	C	0.0	S	C	C	4.4	100%
2006	S	C	C	6.1	S	C	C	0.0	S	C	C	6.1	100%
2007	4.4	1.9	4.0	10.2	0.0	0.0	0.0	0.0	4.4	1.9	4.0	10.2	100%
2008	4.3	5.5	5.2	15.0	0.0	0.0	0.0	0.0	4.3	5.5	5.2	15.0	100%
2009	2.1	3.4	5.0	10.5	0.0	0.0	0.0	0.0	2.1	3.4	5.0	10.5	100%
2010	5.7	5.1	6.7	17.5	0.0	0.0	0.0	0.0	5.7	5.1	6.7	17.4	100%
Real revenues (in 2012 dollars)													
2004	2.7	C	S	5.0	0.0	C	S	0.0	2.6	C	S	5.0	100%
2005	S	C	C	5.1	S	C	C	0.0	S	C	C	5.1	100%
2006	S	C	C	6.8	S	C	C	0.0	S	C	C	6.8	100%
2007	4.8	2.1	4.4	11.2	0.0	0.0	0.0	0.0	4.8	2.1	4.4	11.2	100%
2008	4.5	5.8	5.5	15.8	0.0	0.0	0.0	0.0	4.5	5.8	5.5	15.8	100%
2009	2.2	3.6	5.3	11.1	0.0	0.0	0.0	0.0	2.2	3.6	5.3	11.1	100%
2010	5.9	5.3	7.0	18.2	0.0	0.0	0.0	0.0	5.9	5.3	7.0	18.2	100%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-128 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 4 area closures

	Total catch (mt)				Catch from areas closed (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	1,568	C	S	2,937	9.059	C	S	12	1,559	C	S	2,925	100%
2005	S	C	C	2,794	S	C	C	7	S	C	C	2,786	100%
2006	S	C	C	3,054	S	C	C	0	S	C	C	3,054	100%
2007	1,770	751	1,639	4,160	1	1	0	2	1,769	750	1,639	4,159	100%
2008	1,898	2,495	2,330	6,723	0	6	0	6	1,898	2,489	2,330	6,718	100%
2009	1,226	1,997	2,866	6,090	0	9	6	15	1,226	1,988	2,861	6,075	100%
2010	2,659	2,426	3,146	8,231	0	0	0	0	2,659	2,426	3,146	8,231	100%

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches of Pacific cod. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-129 Estimated Alternative 4 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenue in areas remaining open (residual revenue)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	2.2	C	S	4.2	0.0	C	S	0.0	2.2	C	S	4.2	100%
2005	S	C	C	4.4	S	C	C	0.0	S	C	C	4.4	100%
2006	S	C	C	6.1	S	C	C	0.0	S	C	C	6.1	100%
2007	4.4	1.9	4.0	10.2	0.0	0.0	0.0	0.0	4.4	1.9	4.0	10.2	100%
2008	4.3	5.5	5.2	15.0	0.0	0.0	0.0	0.0	4.3	5.5	5.2	15.0	100%
2009	2.1	3.4	5.0	10.5	0.0	0.0	0.0	0.0	2.1	3.4	5.0	10.5	100%
2010	5.7	5.1	6.7	17.5	0.0	0.0	0.0	0.0	5.7	5.1	6.7	17.4	100%
Real revenues (in 2012 dollars)													
2004	2.7	C	S	5.0	0.0	C	S	0.0	2.6	C	S	5.0	100%
2005	S	C	C	5.1	S	C	C	0.0	S	C	C	5.1	100%
2006	S	C	C	6.8	S	C	C	0.0	S	C	C	6.8	100%
2007	4.8	2.1	4.4	11.2	0.0	0.0	0.0	0.0	4.8	2.1	4.4	11.2	100%
2008	4.5	5.8	5.5	15.8	0.0	0.0	0.0	0.0	4.5	5.8	5.5	15.8	100%
2009	2.2	3.6	5.3	11.1	0.0	0.0	0.0	0.0	2.2	3.6	5.3	11.1	100%
2010	5.9	5.3	7.0	18.2	0.0	0.0	0.0	0.0	5.9	5.3	7.0	18.2	100%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

8.11 Pacific Cod Trawl Catcher Vessels (Alternatives 2, 3, and their options)

8.11.1 Introduction

Table 8-94, based on Table 2-21 in Chapter 2, summarizes and contrasts the alternatives as they apply to vessels fishing for Pacific cod with trawl gear. Note also, as described earlier, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 8.18.2. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

Alternative 1 (the status quo) and Alternative 4 (adopting a modified version of the rules in place in 2010) were discussed in detail in Section 8.5 of this chapter, as they relate to trawl catcher vessels targeting Pacific cod with trawls. This section focuses on the impacts of Alternatives 2 and 3, and their options

These alternatives originated during 2012 meetings of the Council's Steller Sea Lion Mitigation Committee (SSLMC), and were modified by the Council at its December 2012 meeting. The Council's recommendations were reviewed by NMFS and altered where necessary to add precision, or to address regulatory or management issues. In some instances measures were considered but not further analyzed. Section 2.3 of Chapter 2 discusses these.

This sector includes trawl catcher vessels targeting Pacific cod in the Aleutian Islands, and making deliveries to shoreside processors, floating processors, or to motherships. Volumes of Pacific cod delivered to catcher/processors acting as motherships, and the ex-vessel and wholesale values of this Pacific cod, are included in the totals reported in this section, and not in the totals reported for the trawl

catcher/processor sector. This avoids the potential for double-counting if volumes or values are aggregated across sectors and preserves the confidentiality of the small numbers of catcher vessels delivering to catcher/processors acting as motherships, and the small numbers of motherships. Ex-vessel and wholesale gross revenues are not additive; the two levels of revenue have been estimated to provide some distributive information. Wholesale gross revenues are the revenues received by the processors who buy the fish from the catcher vessels; catcher vessels do not participate in this wholesale market for processed fish.

8.11.2 Pacific cod harvest limits

Alternatives 2 and 3 include provisions for the allocation of Aleutian Islands Pacific cod among Areas 541, 542, and 543, and for the creation of limits on trawl and non-trawl catcher/processor harvest in these areas. These measures treat Area 543 independently, and group Areas 541 and 542 together.

This section looks at the area allocation measures first, and then the sector limits. Although the sector limits do not apply to trawl catcher vessels, if the trawl and non-trawl catcher/processors fully harvested their area-sector limits, the trawl catcher vessel catch would also be constrained.

Area allocations

During the baseline years, Pacific cod was managed as one stock in the BSAI. The ITAC was divided among nine separate sector allocations, in addition to the CDQ allocation. As explained in Section 8.2.16, in December 2013 the Council adopted separate Pacific cod harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species. While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Alternatives 2 and 3 require the definition of area catch limits for Area 543 and for Areas 541-542 (considered jointly). The measures call for setting catch limits in proportion to the Area 543 and Area 541-542 biomasses, estimated during the annual stock assessment process.

NMFS has approached this in the following steps:

- The proportion of the annual BSAI biomass estimated to be in the Aleutian Islands from the annual Pacific cod Stock Assessment and Fishery Evaluation Report (SAFE) chapter is used to determine the overall Aleutian Islands harvest limit as a percent of the BSAI ABC. This ranged from 16 percent to 7 percent in the baseline years (2004 through 2010), and in the years under the interim final rule (2011 through 2014). [135]
- The product of this biomass proportion, and the BSAI Pacific cod ABC in a year is treated, for this analysis, as an Aleutian Islands ABC.

[135] This assumption was made for analytical purposes and provides a practical method for estimating the Aleutian Islands Pacific cod TACs and sector allocations for the different fleets as an illustrative approach for the purpose of this analysis. As noted above, the Council has now split the Aleutian Islands and Bering Sea for Pacific cod specifications. The methods used by the Council may change through time if changing biological understanding leads to changes in the tier status of Aleutian Islands Pacific cod. The results from any given method will change through time as information about the Aleutian Islands stock status changes.

- The State of Alaska has an Aleutian Islands Pacific cod GHL equal to 3 percent of the combined Bering Sea and Aleutian Islands ABCs. This is deducted from this new estimated Aleutian Islands ABC.
- The Area 543 and Area 541-542 limits are based on this Aleutian Islands ABC, minus the GHL. These limits are based on a moving average of the relative biomass sizes in these two areas as determined from the most recent four summer trawl surveys. The volumes in Area 543 range between 24.5 percent and 26.4 percent of the whole; the volumes in Area 541-542 consequently range between 73.6 percent and 74.6 percent.
- The balances in each region will cover CDQ harvests, incidental catch allowances (ICAs) and directed fishing allowances (DFAs). ICAs have not been separately identified here, since these will be determined by NMFS during the fishing year.

These rules have been applied to data from 2004 through 2014 to estimate the size of an Aleutian Islands "ABC" in each year, and to estimate how that ABC, minus the GHL, would have been allocated to CDQ, ICA, and DFA in Area 543, and in Areas 541-542 (jointly). These are hypothetical estimates, made for these years assuming the rules under consideration had been in place during those years. The estimates were summarized in Section 8.9.2, in Table 8-95, and are not reproduced here.

Sector limits

Alternatives 2 and 3 also include provisions dividing the available Pacific cod in each management area between limits for trawl and non-trawl catcher/processor sectors. These sector limits are not allocations, but restrictions on the amounts that may be harvested by the vessel classes to which they are assigned. Catcher vessels (both fixed and trawl gears), do not have similar limits, and could conceivably fully harvest the entire area allocations, leaving nothing for the sectors that do face limits. However, the opposite could not happen; a sector with its own limit could not harvest more of the area allocation than its limit permits.

However, if the catcher/processor sectors are each able to fully harvest their limits, an implicit constraint will be placed on the harvests by the two catcher vessel sectors. Since non-trawl catcher vessel harvests have been relatively small in past years, the greatest restriction on catcher vessel harvest would be placed on trawl catcher vessels. This sub-section provides estimates of the potential constraint placed on catcher vessel harvests. The approach is to subtract the catcher/processor harvest limit estimates from the area allocations in Area 543 and in Area 541-542. The remainder is the amount available to catcher vessels if the catcher/processor sectors fully harvest their limits.

The non-trawl catcher/processor limits restrict these non-trawl vessels to 32.21 percent of the area allocation in Area 543 and to 19.23 percent of the area allocation in Areas 541-542 (jointly).

The consideration of the trawl catcher/processor sector limits is more complex because the vessels in this sector can harvest and process as catcher/processors, but may also process fish as motherships, that are actually harvested by catcher vessels. However, the fleet definitions used in this analysis to group production information treat catcher vessels delivering to shoreside processors, and catcher vessels delivering to motherships, as the same sector, and group production accordingly. Therefore, in this analysis, the trawl catcher/processor limit used to calculate the remainder available for catcher vessels, is a limit that excludes deliveries to motherships. With this in mind, the trawl catcher/processor sector limits are 28.02 percent in Area 543, and 28.6 percent in Areas 541-542. While the Area 543 percent corresponds to the limit for the alternative that prohibits catcher vessels from delivering Area 543 Pacific cod to motherships, there is no similar prohibition in Areas 541-542.

Having defined the trawl catcher/processor limit as just described, the combined catcher/processor limits in Area 543 are 60.23 percent, while the combined catcher/processor limits in Areas 541-542 are 47.83 percent. Table 8-130 summarizes the estimates of potential catcher vessel harvest under Alternatives 2 and 3. As explained above, these are amounts available to catcher vessels, including both trawl and non-trawl catcher vessels. However, non-trawl catcher vessel catches have been small compared to trawl catcher vessel catches.

These catcher vessel estimates are speculative. A key assumption is that, in the absence of the mothership prohibition, the trawl catcher/processor sector would continue to process the fish it harvested, and continue to buy the fish for processing from catcher vessels, in the same percentages that it has in the past. However, the alternatives do not require this. The sector allocation is to trawl catcher/processors and applies to the round weight of the Pacific cod used for processing. In future, all of this fish could be obtained by the catcher/processors themselves, with none purchased from catcher vessels, or all of it could be obtained from catcher vessels and none of it harvested by the catcher/processors operating in mothership mode themselves, or it could be obtained by catcher/processor or catcher vessel fishing in any combination. In the first case, the table below will overstate the harvest available to catcher vessels, and in the second case, it will understate the harvest available to catcher vessels. In the third category of cases, it is not possible to say whether or not the table is an over- or under-estimate.

Table 8-130 Estimates of Constraints on Catcher Vessels if Catcher/Processors Harvest the Full Amounts Available to Them Under their Area-Sector Limits (metric tons)

	Area limits		Fixed and Trawl C/P limits					Implied catcher vessel constraint				
			Area 543			Areas 541-542		Area 543			Areas 541-542	
Year	543	541-542	A2 Opt1	A2 Opt2	A3	A2	A3	A2 Opt1	A2 Opt2	A3	A2	A3
2004	6,543	20,217	3,941	3,941	3,941	9,670	9,670	2,602	2,602	2,602	10,547	10,547
2005	6,045	18,675	3,641	3,641	3,641	8,932	8,932	2,404	2,404	2,404	9,743	9,743
2006	6,398	18,822	3,854	3,854	3,854	9,002	9,002	2,545	2,545	2,545	9,819	9,819
2007	5,805	17,075	3,496	3,496	3,496	8,167	8,167	2,308	2,308	2,308	8,908	8,908
2008	5,805	17,075	3,496	3,496	3,496	8,167	8,167	2,308	2,308	2,308	8,908	8,908
2009	6,002	17,658	3,615	3,615	3,615	8,446	8,446	2,387	2,387	2,387	9,212	9,212
2010	5,974	16,646	3,598	3,598	3,598	7,962	7,962	2,376	2,376	2,376	8,684	8,684
2011	3,724	10,376	2,243	2,243	2,243	4,963	4,963	1,481	1,481	1,481	5,413	5,413
2012	4,975	13,865	2,997	2,997	2,997	6,631	6,631	1,979	1,979	1,979	7,233	7,233
2013	3,243	9,037	1,953	1,953	1,953	4,322	4,322	1,290	1,290	1,290	4,715	4,715
2014	3,412	9,508	2,055	2,055	2,055	4,548	4,548	1,357	1,357	1,357	4,960	4,960

Notes: Trawl C/P limits are calculated only for vessels acting as C/Ps. If a vessel acts as a mothership, catcher vessel activity is automatically implied.
Sources: Calculations based on information in Table 8-95 and on the fixed and trawl catcher/processor limits described in the text.

As explained, Alternative 2 includes two options with respect to the use of motherships in Area 543. One option allows catcher vessels to deliver Area 543 Pacific cod to catcher/processors operating as motherships. This reflects the practice during the baseline years. The second alternative prohibits catcher vessels from delivering Pacific cod caught in Area 543 to catcher/processors operating as motherships. Under this option, catcher vessels would have to deliver Pacific cod to a shoreside processing plant (the nearest is in Adak), or to a shoreside floating processor.

The option that prohibits catcher vessels from delivering Pacific cod caught in Area 543 to catcher/processors acting as motherships would close an important market for this Pacific cod. The annual information on catcher vessel activity in Area 543 has not been reported in order to protect

confidential data; however, the 2006 to 2010 trawl catcher/processor allocations associated with the two options provide a rough measure of the importance of this activity in the later baseline years. If deliveries to catcher/processors acting as motherships are included, the trawl catcher/processor sector receives 67.7 percent of the Area 543 TAC, if these deliveries are not included, the sector only receives 28.02 percent. Thus, catcher vessels delivering to catcher/processors acting as motherships account for about 39.68 percent of the Area 543 production from 2006 to 2010. The wholesale value of this production under Alternative 2 was approximated in Table 8-101, and was between $3.0 million and $5.4 million a year.[136]

It may not be possible for this sector to make up the lost volume and value of Pacific cod. It is not clear that the vessels participating in this fishery during the baseline years would be able to economically substitute the processor at Adak for deliveries to trawl catcher/processors. Since the trawl and non-trawl catcher/processor sector harvest would be constrained by their sector limits, this raises the possibility that, given an Aleutian Islands-Bering Sea Pacific cod split leading to an Area 543 Pacific cod TAC, some Area 543 Pacific cod TAC could remain unharvested, if motherships are prohibited.[137]

Pacific cod Alternatives 2 and 3 incorporate separate limits on catch for trawl and non-trawl catcher/processors in Area 543, and in Areas 541-542. These limits are sector limits, but not sector allocations. As such, they do not guarantee a sector a share of the area harvest. The catcher vessel sectors in Area 543 and in Area 541-542 are not subject to similar sector limits, and could, potentially, harvest both area limits completely themselves.

Targeted catcher/processor and catcher vessel trawl fishing for Pacific cod in the Federal and parallel fisheries in the Aleutian Islands takes place primarily from mid-February through April. Catcher/processors also make incidental catches of Pacific cod in the fall. Non-trawl vessels, primarily catcher/processors, target Pacific cod early in the year during the same period as the trawlers, but also have an important targeted Pacific cod fishery again in the fall. (Figure 3-8 in Chapter 3; NMFS AKR In-season managers) Thus, the catcher/processors have been fishing simultaneously with, or after, the catcher vessels.

Since the catcher vessels could conceivably complete the harvest of all the area allocations of Pacific cod before the catcher/processor sectors could take their sector limits, Alternatives 2 and 3 could create a race for the Pacific cod, as catcher/processors harvest Pacific cod earlier in the year than they otherwise would have done so. The potential for such a race, and its costs, depends on the relative attractiveness of Aleutian Islands Pacific cod vis-à-vis Bering Sea Pacific cod. The catcher/processors are fishing against a BSAI-wide allocation (not a limit). If they fail to catch part of it in the Aleutian Islands, it is still reserved for them in the Bering Sea.

8.11.3 Critical habitat closures

In addition to the catch and participation limits discussed in Sub-section 8.11.2, the alternatives include measures that close different areas of critical habitat to directed fishing for Pacific cod with non-trawl gear. This section examines the revenues associated with the areas remaining open to directed fishing under the different alternatives. This is done first without considering the possible additional effect of the

[136] These are not estimates of actual annual values, but approximations based on the language of Alternative 2, and the trawl catcher/processor shares between 2006 and 2010.

[137] The mothership option does not guarantee that trawl catcher vessels would continue to deliver the same amounts to the catcher/processors. Under the option there is no requirement that the catcher/processors acquire Pacific cod from catcher vessels. They could harvest and process the entire amount themselves. However, as a practical matter they could have done this in the baseline years, but evidently found it more cost effective to act as motherships.

trawl catcher vessel limits discussed in the preceding sub-section. However, the impacts of critical habitat closures cannot be treated in isolation from the proposed sector limits. The second part of this sub-section discusses this interaction.

Critical habitat closures

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing activity. The impacts of these alternatives have been evaluated by identifying the volumes of Pacific cod retained from inside and from outside the closed critical habitat areas by trawl catcher vessels in the baseline period 2004 through 2010, assuming that the volumes from inside the closed areas would no longer be harvested, and that this loss in Pacific cod production would not be made up by increased fishing in the areas outside of the closed critical habitat. As a reminder, the harvest from inside the closed areas is described as "harvest at risk," while the harvest from the open areas is described as "residual" harvest. As explained in the discussion of methodology, in Section 8.2.14, these are not projections of future revenues or of the expected revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

Figure 8-20 and Figure 8-21 summarize this analysis. Figure 8-20 shows the residual wholesale gross revenues to processors for fish purchased from trawl catcher vessels after closing critical habitat in each alternative, and Figure 8-21 shows these residual revenues as a percentage of the baseline revenues.[138] The figures summarize the more detailed analysis in the processor wholesale gross revenue tables of the appendix to this section.[139]

Alternative 4 imposes the smallest relative burden on trawl catcher vessels harvesting Pacific cod and their processors; this is because the alternative is the only one that fully reverts to the pattern of critical habitat protections in place before the interim final rule (Alternative 1, the status quo) became effective in 2011. Alternative 4 may be considered a proxy for the baseline in this figure.

Alternatives 1, 2, and 3 appear to have very similar effects and are relatively more burdensome to the trawl catcher vessels and their processors than Alternative 4. Alternative 3 tends to produce marginally higher gross revenues than Alternative 2; the revenues from Alternative 1 are generally less than those from Alternative 3, and similar to those for Alternative 2, however it does exceed both in one year as well. Given the uncertainties inherent in this analysis, and the change in the relative impact of the three alternatives, depending on the year, it may not be possible to rank these alternatives with respect to their respective burdens on trawl catcher vessels and their processors (although Alternative 3 appears marginally less burdensome to the sector than Alternatives 1 or 2).

The similarity of the results of Alternatives 1, 2, and 3 with respect to residual gross revenues may seem counter-intuitive. Alternative 1, the status quo, reflects the adverse impacts on fishery production and revenues caused by the interim final rule. Alternatives 2 and 3 were designed to mitigate the adverse impact on the fisheries associated with Alternative 1. However, as noted, in aggregate, it is not clear that Alternatives 2 and 3 are substantially less burdensome to trawl catcher vessels than Alternative 1.

An examination of production data indicates that Alternative 1 performs worse for trawlers and processors in Area 543, and in Area 542, but that it often performs better in Area 541. The differences

[138] These figures summarize the residual revenues resulting from the analysis of the volumes of Pacific cod from closed critical habitat under each alternative. These figures are not adjusted to take account of the possible gross revenue impacts of area-sector, or of critical habitat, limits.

[139] Both figures have been simplified by identifying gross revenues under Alternative 4 with gross revenues under the baseline, thereby obviating the need for separate baseline and Alternative 4 revenue lines.

offset each other to some extent. The key is the recognition that in Areas 541-542 (considered jointly), Alternatives 2 and 3 prohibit trawling in critical habitat east of 174° W longitude. An examination of the location of trawl catcher vessel Pacific cod production in Figures 3-11 through 3-14 in Chapter 3, shows a large concentration of historical catcher vessel Pacific cod production in Area 541 just to the east of Atka North Cape, and just to the east of this line.

Figure 8-19 helps show why Alternatives 2 and 3 would have been associated with lower production in the baseline years. This figure provides a blowup of Area 541 to the east of Atka North Cape. The alternatives call for critical habitat to be closed to the east of the line drawn at 174° W longitude. The figure also includes information about the location of trawl Pacific cod harvests during the baseline years. These occur predominately to the east of this line. A comparison of this figure with Figure 2-24 in Chapter 2 shows that much of the critical habitat shown to the east of the 174° line, including the habitat where the harvest concentration is located, was open during the baseline years.

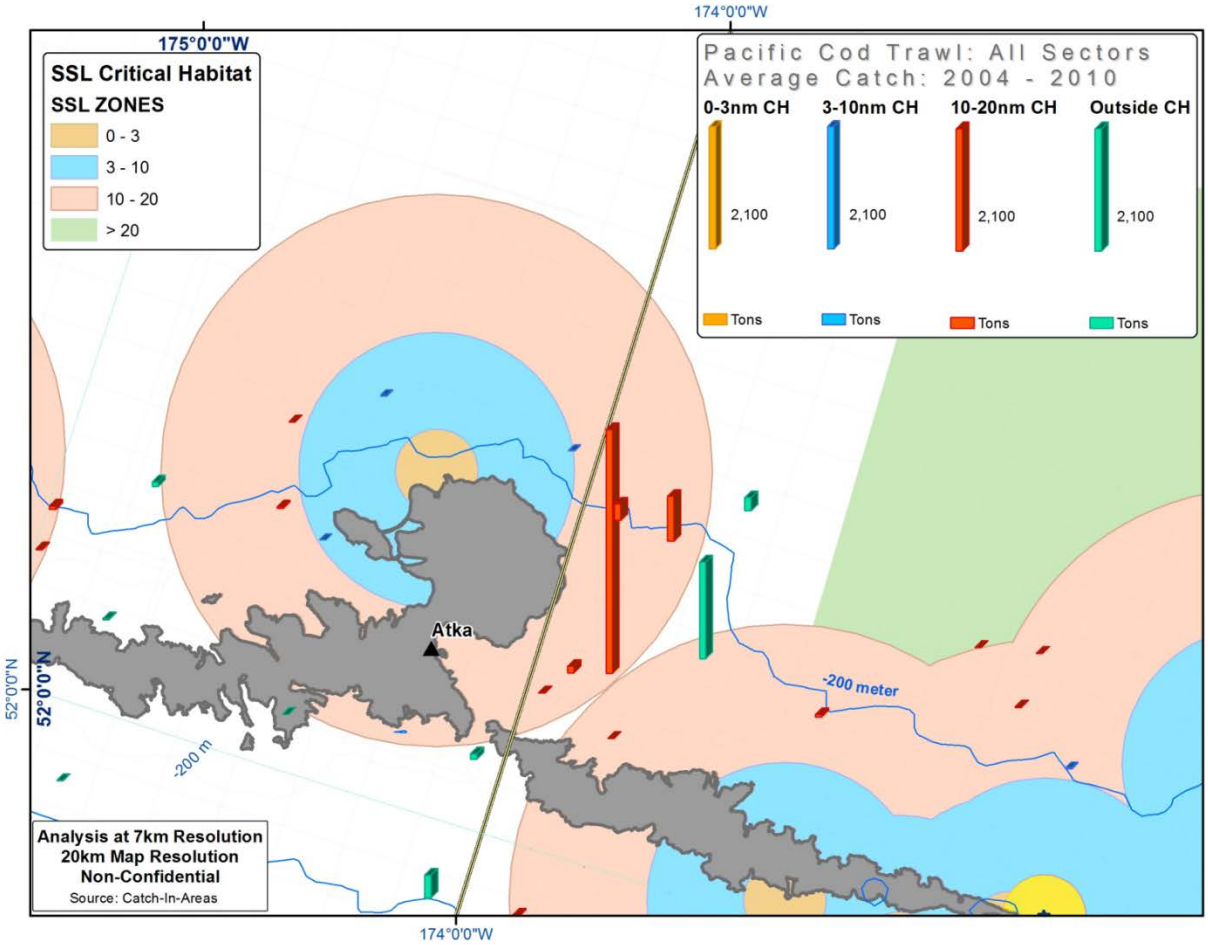


Figure 8-19 Pacific cod trawl catches in the vicinity of Atka North Cape, 2004-2010

Alternative 2, with the protective option, does appear to place a heavier burden on the vessels and processors in this sector in the later years of this period.

While residual revenue estimates may be useful indices of relative impacts, they are not, as just noted, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). This welfare measure, however, is not available. In addition, this measure focuses attention on the remaining revenues in the Aleutian Islands Pacific cod fishery, and does not take account of the ability of fishing operations to take actions in response to the alternatives so as to minimize the impact of the alternatives on their profits. Most important in this instance, is their ability to substitute into other fisheries.

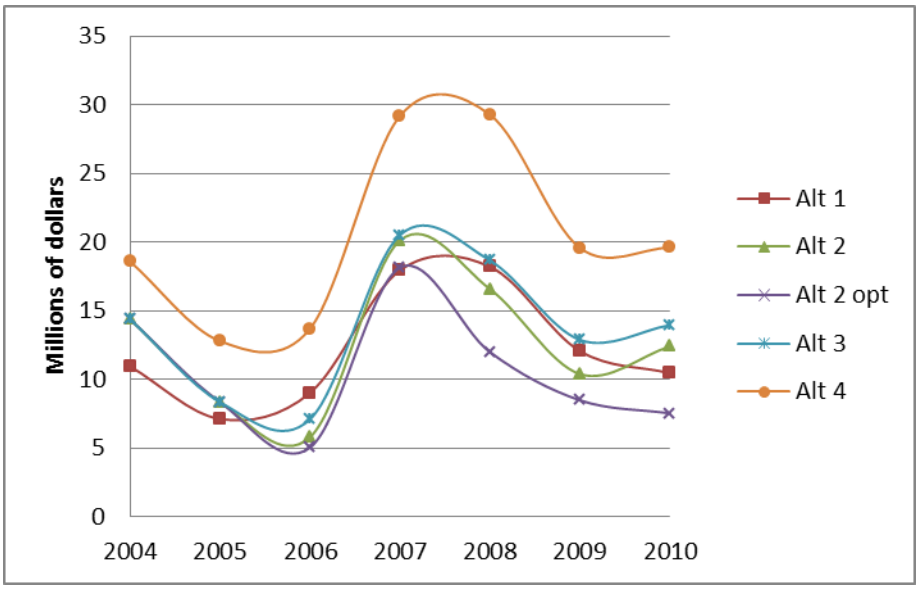


Figure 8-20 Hypothetical processor wholesale gross revenues from trawl catcher vessel Pacific cod production for the baseline years for the Pacific cod alternatives (millions of real 2012 dollars)

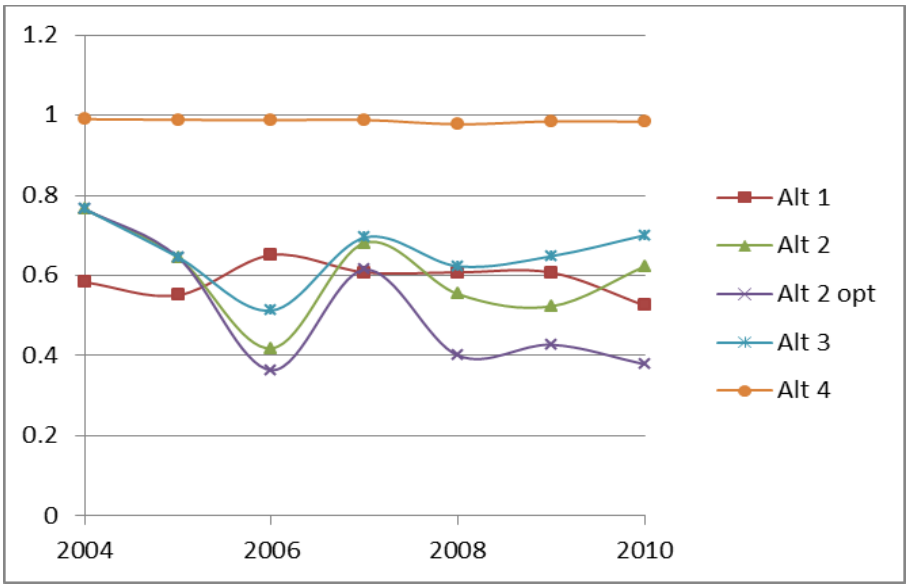


Figure 8-21 Hypothetic processor wholesale gross revenues from trawl catcher vessel Pacific cod production for the baseline years for the Pacific cod alternatives, expressed as a percentage of baseline revenues

Interaction of critical habitat limits and area-sector limits

In some years, some of the area-sector limits would have restricted Pacific cod harvests by trawl catcher vessels more than would be expected by simply closing critical habitat to fishing activity. Table 8-131 compares the residual harvest in Area 543 and Areas 541-542 (from the analysis of critical habitat closures summarized in the appendix to this section) with the area-sector limit restrictions in the alternatives and options, and calculates how much the area-sector limits restrict harvest beyond the levels associated with the critical habitat closures. Where the area-sector limits would not actually have limited harvests, the value has been set to zero.

In other years, some of the area-sector limits would have considerably exceeded the harvests from areas outside of closed critical habitat in the baseline years. If the non-trawl catcher/processor sector is successfully able to redeploy its fleet from fishing in closed critical habitat to areas that remain open, these limits may make possible increased fishing production. Table 8-131 compares the residual harvest in Area 543 and Areas 541-542 (from the analysis of critical habitat closures summarized in the appendix to this section) with the TACs associated with the percentage TAC options under Alternative 2, and calculates the additional catch that might be possible if the fleet could successfully redeploy into Pacific cod within Area 543.

Table 8-131 shows that the area-sector constraints tend to bind the most in the later years of the baseline period, when the proportion of the biomass in the Aleutian Islands was lower than the levels of former years.

Table 8-131 Potential restriction, or opportunity for expansion, of open area fishing by trawl catcher vessels within the limits imposed on potential Area 543 and Areas 541-542 open area catches (residual catches) by area area-sector limits (metric tons)

	Area 543			Areas 541 and 542			Balance
	Residual catch	Area limit	Area limit minus residual catch	Residual catch	Area limit	Area limit minus residual catch	
Alternative 2							
2004	-	2,602	2,602	10,299	10,547	248	2,850
2005	-	2,404	2,404	5,155	9,743	4,588	6,992
2006	379	2,545	2,166	2,510	9,819	7,309	9,475
2007	891	2,308	1,417	8,133	8,908	775	2,192
2008	2,124	2,308	184	5,612	8,908	3,296	3,480
2009	1,459	2,387	928	6,401	9,212	2,811	3,739
2010	3,159	2,376	(783)	4,784	8,684	3,900	3,117
Alternative 2, protective option							
2004	-	2,602	2,602	10,299	10,547	248	2,850
2005	-	2,404	2,404	5,155	9,743	4,588	6,992
2006	2	2,545	2,543	2,512	9,819	7,307	9,850
2007	2	2,308	2,306	8,135	8,908	773	3,079
2008	2	2,308	2,306	5,614	8,908	3,294	5,600
2009	27	2,387	2,360	6,427	9,212	2,785	5,145
2010	37	2,376	2,339	4,821	8,684	3,863	6,202
Alternative 3							
2004	-	2,602	2,602	10,299	10,547	248	2,850
2005	-	2,404	2,404	5,155	9,743	4,588	6,992
2006	1,031	2,545	1,514	2,510	9,819	7,309	8,823
2007	1,063	2,308	1,245	8,114	8,908	794	2,039
2008	3,099	2,308	(791)	5,612	8,908	3,296	2,505
2009	3,338	2,387	(951)	6,401	9,212	2,811	1,860
2010	4,149	2,376	(1,773)	4,784	8,684	3,900	2,127

Table 8-132 provides estimates of the processor wholesale gross revenues associated with these production shortfalls (using real 2012 dollar estimates).[140] In most area-year combinations the limits would not impose costs. Most of the costs are associated with Alternative 2 with its protective option. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

[140] This is an approximation of the revenue shortfall, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost revenues from incidental catches. Prices are BSAI-wide and may not capture the potentially higher value of larger Aleutian Islands Pacific cod. The impact of these changes in volume on price are unclear, since this is a small part of overall BSAI production. Any effect would take the form of a mitigation of revenue declines as volume reductions are offset by price rises.

Table 8-132 Shortfalls in open area processor wholesale gross revenues associated with trawl catcher vessel Pacific cod production, or potential to exceed those gross revenues, associated with area-sector limits (millions of dollars)

		Alt 2			Alt 2, P.O.			Alt 3		
Year	Value	Short	Over	Net	Short	Over	Net	Short	Over	Net
2004	1,351	0.0	3.9	3.9	0.0	3.9	3.9	0.0	3.9	3.9
2005	1,591	0.0	11.1	11.1	0.0	11.1	11.1	0.0	11.1	11.1
2006	1,792	0.0	17.0	17.0	0.0	17.7	17.7	0.0	15.8	15.8
2007	2,345	0.0	5.1	5.1	0.0	7.2	7.2	0.0	4.8	4.8
2008	2,149	0.0	7.5	7.5	0.0	12.0	12.0	(1.7)	7.1	5.4
2009	1,187	0.0	4.4	4.4	0.0	6.1	6.1	(1.1)	3.3	2.2
2010	1,506	(1.2)	5.9	4.7	0.0	9.3	9.3	(2.7)	5.9	3.2

Notes: Revenue shortfalls (reduction in revenues associated with limits) in parentheses.

Figure 8-22 shows the relationships between Alternatives 1 through 4 given the limits placed on revenues when the area-sector limits are less than residual catch from the open areas in the baseline years. Although Alternatives 1 and 4 do not formally include any area-sector components, these area-sector limit measures are, to a considerable extent, addressing an anticipated Bering Sea and Aleutian Islands Pacific cod split. Such a split would affect Alternatives 1 and 4 as well. Thus, Figure 8-22 applies these measures to Alternatives 1 and 4 as well, in order to enhance the comparability of alternatives.

The relative ranking of the alternatives from this figure is similar to that in Figure 8-20. Alternative 4 is the best, from the point of view of the trawl catcher vessels, and Alternative 2, with its protective option is the worst. Alternatives 1, 2, and 3 appear to have generally similar impacts, although their relative rankings can change from year to year. These results all have a level of uncertainty that cannot be quantified, but that is probably large.

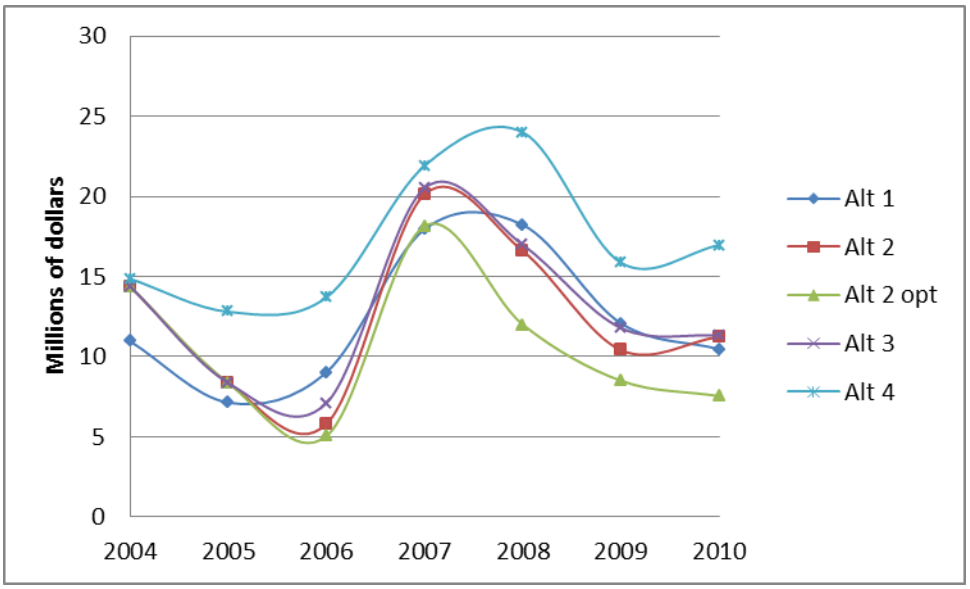


Figure 8-22 Gross revenues by alternative, taking account of the area-sector limits (millions of real 2012 dollars)

8.11.4 Seasons and ESA reinitiation triggers

In addition to opening or closing areas of critical habitat to fishing, and in addition to imposing area and sector limits on harvest, the alternatives under consideration in this action include measures to modify fishing seasons for trawl gear, and to impose ESA reinitiation triggers if harvest exceeds certain levels. The analysis of trawl catcher/processor impacts included a discussion of these issues in Sub-section 8.9.4. This was written to cover both the trawl catcher/processor and the trawl catcher vessel sectors. In the interests of economy, this discussion is not reproduced here, and the reader is referred to that earlier sub-section.

8.11.5 Redeployment

Trawl catcher vessel sector redeployment was discussed in detail with respect to Alternative 1 in Section 8.5.3 of this chapter. This section will merely summarize the comments made in more detail there.

Alternative Pacific cod trawling opportunities in the Aleutian Islands are believed to be limited. Most trawlable depths for Pacific cod exist close to shore and within the 20 nautical mile critical habitat designations. Alternatives 2, 3, and 4 lift the "no retention" requirement in Area 543, making more areas within critical habitat available.

Conversely, there are opportunities for trawl catcher vessels to redeploy and fish for Pacific cod in the Bering Sea. In the past, vessels in this fishery took important amounts of their annual Pacific cod catch in the Bering Sea. Halibut PSC rates are higher in the Bering Sea and this may be a concern and may limit the sector's ability to fully make up all lost Aleutian Islands Pacific cod in the Bering Sea. Pacific cod that this sector was unable to harvest would be rolled over to other sectors. Pacific cod in the Bering Sea may bring a lower price than those from the Aleutian Islands.

Opportunities to fish for Pacific cod in the Gulf of Alaska are likely to be limited by license limitation program endorsements, divergent timing of the Aleutian Islands and Gulf of Alaska Pacific cod fisheries, and Gulf of Alaska trawl sector allocation restrictions.

There appear to be few opportunities to expand into other groundfish species.

8.11.6 Incidental catch and PSC

The trawl catcher vessel fleet has small incidental catches of groundfish, and also of PSC. The analysis of trawl catcher/processor impacts included a Sub-section 8.9.6 that discussed these issues for the trawl catcher vessels, as well as the trawl catcher/processors. In the interests of economy, this discussion is not reproduced here, and the reader is referred to that earlier sub-section.

8.11.7 Fleet and community impacts

Trawl catcher vessels

Alternatives 1, 2, and 3 should have similar impacts with respect to reductions in sector gross revenues. The mean annual residual wholesale gross revenues to processors buying fish from this sector, associated with area closures, are 59 percent of baseline wholesale gross revenues under Alternative 1, 60 percent

under Alternative 2, and 66 percent under Alternative 3.[141] While Alternative 3 should logically have smaller adverse impacts than Alternative 2, each of these estimates is associated with a large, but not quantifiable, confidence interval, which makes it difficult to state that there is a meaningful revenue difference between these alternatives. Average residual revenues under the protective option to Alternative 2 are 51 percent of baseline revenues; this alternative does appear to be worse for this sector than the others. Alternative 4, which basically adopts the management regulations prevailing during the baseline period, does not have a discernible impact, on this sector. Vessels in this sector are believed to have relatively good opportunities for redeployment into the Bering Sea. Pacific cod harvests there may be associated with lower prices, and higher halibut PSC, however.

Adak/Atka/Unalaska

Compared to the baseline, Alternatives 1, 2, and 3 involve fewer product deliveries, less processing activity, fewer tax revenues, fewer sales of ancillary goods and services, and less potential for immigration and home porting of future vessels at Adak and Atka. Alternatives 1, 2, and 3 may reduce deliveries to that town compared to the baseline period. The protective option to Alternative 2 would have a greater adverse impact, while Alternative 4 should have no discernible impact compared to the baseline. Potential impacts on Unalaska cannot be ascertained. While the overall reduction in production could reduce deliveries of Pacific cod from the Aleutians, redeployment of catcher vessels could lead to more product deliveries in Unalaska.

Other communities

Many of the vessels in this sector have western Washington State home ports. These alternatives may affect incomes to persons living in that region and having an ownership or employment interest in these vessels. Similarly, firms in these areas, supplying this sector with goods and services, may also be affected. Some related impacts may flow, in a few cases, to communities in Alaska. In general, these changes will be small in proportion to the size and normal fluctuations of income and output in these communities.

CDQ communities/ Aleut Corporation stockholders

The alternatives under consideration here do not affect BSAI CDQ group allocations of Pacific cod, although they impose limits on CDQ group ability to harvest their Pacific cod where and when they choose. Thus, the alternatives have an unknown adverse impact on the CDQ groups, and the communities that they benefit.

The alternatives under consideration here may affect the revenues of the Aleut Corporation subsidiaries, the Aleut Enterprise LLP, and the Aleut Real Estate LLP, by reducing fuel sales, and sales of other goods and services, at Adak. Changes in activity at Adak can also affect Aleut Corporation objectives of contributing to the development of Adak.

Benefits of protecting Steller sea lions

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as

[141] These percentages are those associated with closing critical habitat compared to the baseline and do not reflect the impacts of area-sector limits. The area closure percentages have been used given the importance of the Aleutian Islands and Bering Sea Pacific cod split as a reason for the area-sector splits.

Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA analysis.

8.11.8 Summary

Table 8-133 summarizes key results from this analysis for all Pacific cod alternatives and options (including Alternative 1 and 4 results from Section 8.3). The inclusion of results for Alternative 1 and 4 provides overall context for the Alternative 2 and 3 results.

Table 8-133 Comparison of Pacific Cod trawl catcher vessel alternatives

Impact category	Alternative 1	Alternative 2		Alternative 3	Alternative 4
		No protective option	Protective option		
Trawl catcher vessels	The adverse impacts on trawl catcher vessels are similar to those under Alternatives 2 and 3. Average residual revenues are 59% of baseline revenues, ignoring area-sector impacts.	The adverse impacts on trawl catcher vessels are similar to those under Alternatives 1 and 3. Average residual revenues are 60% of baseline revenues, ignoring area-sector impacts.	The impacts of this option are similar to those of Alternatives 1, 2, and 3 in some years, but appear to be more adverse to the fleet in others. Average residual revenues are 51% of baseline revenues, ignoring area-sector impacts.	The adverse impacts on trawl catcher vessels are similar to those under Alternatives 1 and 2. Average residual revenues are 66% of baseline revenues, ignoring area-sector impacts.	This alternative does not have adverse impacts on the fleet, or on other impact categories, compared to the baseline (the baseline is the regulatory structure from 2004 through 2010; Alternative 4 adopts these regulations for this fleet).
Other fishing sectors					
Adak, Atka, and Unalaska	Compared to the baseline, at Adak and Atka, there would be fewer product deliveries, less processing activity, fewer tax revenues, fewer sales of ancillary goods and services, less potential for immigration and home porting of future vessels. The net impact on Unalaska is unclear.	Similar to Alternative 1	Adverse impacts on Adak would be greater than those for Alternatives 1, 2, and 3.	Similar to Alternatives 1	
Other communities	Impacts would be felt in the Seattle-Tacoma Region, and in some Alaskan communities. In general impacts are expected to be small in comparison with the overall economies of these communities.				
CDQ communities and Aleut Corporation stockholders	Compared to baseline, this alternative may reduce the profitability of CDQ BSAI Pacific cod quota. Aleut Corporation revenues may be reduced because of reduced fuel sales in Adak, and because of reduced leases associated with reduced processing activity at the plant in Adak.	Similar to Alternative 1.	Adverse impacts would be greater than those for Alternatives 1, 2, and 3.	Similar to Alternative 1	
Incidental catch and PSC	None of the alternatives appear to create serious issues for incidental catch or PSC.				
Steller sea lion stock	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	This option appears to remove the least prey from the prey field, and thus may have less impact on Steller sea lions than the other alternatives.	It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions.	

Impact category	Alternative 1	Alternative 2		Alternative 3	Alternative 4
		No protective option	Protective option		
Sum of producers' and consumers' surplus	The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Pacific cod products, and consumers' surpluses accruing to persons who value SSL population health. Alternatives 1, 2, and 3 decrease producers' surpluses from the baseline, while Alternative 4 does not, surpluses accruing to U.S. consumers are unlikely to change much since overall BSAI Pacific cod harvests are unlikely to change. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus the net benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion.				

8.11.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Pacific cod by trawl catcher vessels. This analysis of these measures is summarized in the catch and revenue tables in this appendix. The appendix includes a catch table, an ex-vessel gross revenue table, and a wholesale gross revenue table for each of the principal alternative-option combinations.

Wholesale revenues accrue to the processors to which catcher vessels sell their Pacific cod and incidental catches of other species; catcher vessels do not participate in the wholesale market. Revenues from the wholesale level and ex-vessel level are not additive for welfare comparison purposes. Ex-vessel gross revenues are an operating cost for the processors, selling at wholesale. The two levels of revenues have been provided because they provide the gross revenue picture from the perspectives of two separate sector participants: operators of catcher vessels and operators of processing plants.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the residual catch as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars. Each alternative and option combination is summarized in one catch and one revenue table.

Table 8-134 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 1 area closures

	Total catch (mt)				Catch from closed areas (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	10,916	2,533	0	13,449	4,040	1,566	0	5,606	6,875	967	0	7,843	58%
2005	6,731	1,239	0	7,969	2,899	690	0	3,589	3,831	549	0	4,380	55%
2006	5,185	S	C	6,907	786	S	C	2,411	4,399	S	C	4,496	65%
2007	10,847	S	C	13,228	3,484	S	C	5,214	7,363	S	C	8,015	61%
2008	10,183	S	C	13,994	1,764	S	C	5,473	8,419	S	C	8,521	61%
2009	9,676	S	C	15,025	1,943	S	C	5,895	7,733	S	C	9,131	61%
2010	8,325	S	C	12,746	1,742	S	C	6,056	6,583	S	C	6,690	52%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-135 Estimated Alternative 1 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	5.2	1.2	0.0	6.4	1.9	0.7	0.0	2.7	3.3	0.5	0.0	3.7	58%
2005	3.6	0.7	0.0	4.2	1.5	0.4	0.0	1.9	2.0	0.3	0.0	2.3	55%
2006	4.1	S	C	5.4	0.6	S	C	1.9	3.4	S	C	3.5	65%
2007	10.4	S	C	12.7	3.3	S	C	5.0	7.1	S	C	7.7	61%
2008	12.6	S	C	17.3	2.2	S	C	6.8	10.4	S	C	10.5	61%
2009	4.9	S	C	7.7	1.0	S	C	3.0	4.0	S	C	4.7	61%
2010	4.2	S	C	6.5	0.9	S	C	3.1	3.3	S	C	3.4	52%
Real revenues (in 2012 dollars)													
2004	6.1	1.4	0.0	7.6	2.3	0.9	0.0	3.2	3.9	0.5	0.0	4.4	58%
2005	4.2	0.8	0.0	4.9	1.8	0.4	0.0	2.2	2.4	0.3	0.0	2.7	55%
2006	4.6	S	C	6.1	0.7	S	C	2.1	3.9	S	C	4.0	65%
2007	11.4	S	C	13.9	3.6	S	C	5.5	7.8	S	C	8.5	61%
2008	13.3	S	C	18.2	2.3	S	C	7.1	11.0	S	C	11.1	61%
2009	5.2	S	C	8.1	1.1	S	C	3.2	4.2	S	C	4.9	61%
2010	4.4	S	C	6.8	0.9	S	C	3.2	3.5	S	C	3.5	52%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-136 Estimated Alternative 1 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	12.4	2.9	0.0	15.3	4.6	1.8	0.0	6.4	7.8	1.1	0.0	8.9	58%
2005	9.2	1.7	0.0	10.9	4.0	0.9	0.0	4.9	5.3	0.8	0.0	6.0	55%
2006	8.3	S	C	11.0	1.3	S	C	3.8	7.0	S	C	7.2	65%
2007	23.2	S	C	28.3	7.4	S	C	11.1	15.8	S	C	17.2	61%
2008	20.8	S	C	28.6	3.6	S	C	11.2	17.2	S	C	17.4	61%
2009	10.8	S	C	16.8	2.2	S	C	6.6	8.7	S	C	10.2	61%
2010	12.0	S	C	18.4	2.5	S	C	8.8	9.5	S	C	9.7	52%
Real revenues (in 2012 dollars)													
2004	14.8	3.4	0.0	18.2	5.5	2.1	0.0	7.6	9.3	1.3	0.0	10.6	58%
2005	10.7	2.0	0.0	12.7	4.6	1.1	0.0	5.7	6.1	0.9	0.0	7.0	55%
2006	9.3	S	C	12.4	1.4	S	C	4.3	7.9	S	C	8.1	65%
2007	25.5	S	C	31.0	8.1	S	C	12.2	17.3	S	C	18.9	61%
2008	21.9	S	C	30.1	3.8	S	C	11.8	18.1	S	C	18.3	61%
2009	11.5	S	C	17.8	2.3	S	C	7.0	9.2	S	C	10.8	61%
2010	12.5	S	C	19.2	2.6	S	C	9.1	9.9	S	C	10.1	52%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

Table 8-137 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 2 area closures

	Total catch (mt)				Catch from closed areas (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	10,916	2,533	0	13,449	1,854	1,296	0	3,150	9,062	1,237	0	10,299	77%
2005	6,731	1,239	0	7,969	2,248	567	0	2,815	4,483	672	0	5,155	65%
2006	5,185	S	C	6,907	3,065	S	C	4,018	2,120	S	C	2,889	42%
2007	10,847	S	C	13,228	3,415	S	C	4,205	7,432	S	C	9,023	68%
2008	10,183	S	C	13,994	4,863	S	C	6,258	5,320	S	C	7,736	55%
2009	9,676	S	C	15,025	4,732	S	C	7,166	4,944	S	C	7,860	52%
2010	8,325	S	C	12,746	3,648	S	C	4,803	4,677	S	C	7,943	62%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-138 Estimated Alternative 2 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	5.2	1.2	0.0	6.4	0.9	0.6	0.0	1.5	4.3	0.6	0.0	4.9	77%
2005	3.6	0.7	0.0	4.2	1.2	0.3	0.0	1.5	2.4	0.4	0.0	2.7	65%
2006	4.1	S	C	5.4	2.4	S	C	3.1	1.7	S	C	2.3	42%
2007	10.4	S	C	12.7	3.3	S	C	4.0	7.1	S	C	8.7	68%
2008	12.6	S	C	17.3	6.0	S	C	7.7	6.6	S	C	9.6	55%
2009	4.9	S	C	7.7	2.4	S	C	3.7	2.5	S	C	4.0	52%
2010	4.2	S	C	6.5	1.9	S	C	2.4	2.4	S	C	4.0	62%
Real revenues (in 2012 dollars)													
2004	6.1	1.4	0.0	7.6	1.0	0.7	0.0	1.8	5.1	0.7	0.0	5.8	77%
2005	4.2	0.8	0.0	4.9	1.4	0.4	0.0	1.7	2.8	0.4	0.0	3.2	65%
2006	4.6	S	C	6.1	2.7	S	C	3.5	1.9	S	C	2.5	42%
2007	11.4	S	C	13.9	3.6	S	C	4.4	7.8	S	C	9.5	68%
2008	13.3	S	C	18.2	6.3	S	C	8.1	6.9	S	C	10.1	55%
2009	5.2	S	C	8.1	2.6	S	C	3.9	2.7	S	C	4.3	52%
2010	4.4	S	C	6.8	1.9	S	C	2.5	2.5	S	C	4.2	62%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-139 Estimated Alternative 2 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	12.4	2.9	0.0	15.3	2.1	1.5	0.0	3.6	10.3	1.4	0.0	11.7	77%
2005	9.2	1.7	0.0	10.9	3.1	0.8	0.0	3.9	6.1	0.9	0.0	7.1	65%
2006	8.3	S	C	11.0	4.9	S	C	6.4	3.4	S	C	4.6	42%
2007	23.2	S	C	28.3	7.3	S	C	9.0	15.9	S	C	19.3	68%
2008	20.8	S	C	28.6	9.9	S	C	12.8	10.9	S	C	15.8	55%
2009	10.8	S	C	16.8	5.3	S	C	8.0	5.5	S	C	8.8	52%
2010	12.0	S	C	18.4	5.3	S	C	6.9	6.8	S	C	11.5	62%
Real revenues (in 2012 dollars)													
2004	14.8	3.4	0.0	18.2	2.5	1.8	0.0	4.3	12.3	1.7	0.0	13.9	77%
2005	10.7	2.0	0.0	12.7	3.6	0.9	0.0	4.5	7.1	1.1	0.0	8.2	65%
2006	9.3	S	C	12.4	5.5	S	C	7.2	3.8	S	C	5.2	42%
2007	25.5	S	C	31.0	8.0	S	C	9.9	17.4	S	C	21.2	68%
2008	21.9	S	C	30.1	10.5	S	C	13.5	11.4	S	C	16.7	55%
2009	11.5	S	C	17.8	5.6	S	C	8.5	5.9	S	C	9.3	52%
2010	12.5	S	C	19.2	5.5	S	C	7.2	7.0	S	C	12.0	62%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

Table 8-140 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 2 protective option area closures

	Total catch (mt)				Catch from closed areas (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	10,916	2,533	0	13,449	1,854	1,296	0	3,150	9,062	1,237	0	10,299	77%
2005	6,731	1,239	0	7,969	2,248	567	0	2,815	4,483	672	0	5,155	65%
2006	5,185	S	C	6,907	3,065	S	C	4,394	2,120	S	C	2,512	36%
2007	10,847	S	C	13,228	3,415	S	C	5,094	7,432	S	C	8,135	61%
2008	10,183	S	C	13,994	4,863	S	C	8,380	5,320	S	C	5,614	40%
2009	9,676	S	C	15,025	4,732	S	C	8,598	4,944	S	C	6,427	43%
2010	8,325	S	C	12,746	3,648	S	C	7,925	4,677	S	C	4,821	38%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-141 Estimated Alternative 2 protective option trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	5.2	1.2	0.0	6.4	0.9	0.6	0.0	1.5	4.3	0.6	0.0	4.9	77%
2005	3.6	0.7	0.0	4.2	1.2	0.3	0.0	1.5	2.4	0.4	0.0	2.7	65%
2006	4.1	S	C	5.4	2.4	S	C	3.4	1.7	S	C	2.0	36%
2007	10.4	S	C	12.7	3.3	S	C	4.9	7.1	S	C	7.8	61%
2008	12.6	S	C	17.3	6.0	S	C	10.4	6.6	S	C	6.9	40%
2009	4.9	S	C	7.7	2.4	S	C	4.4	2.5	S	C	3.3	43%
2010	4.2	S	C	6.5	1.9	S	C	4.0	2.4	S	C	2.5	38%
Real revenues (in 2012 dollars)													
2004	6.1	1.4	0.0	7.6	1.0	0.7	0.0	1.8	5.1	0.7	0.0	5.8	77%
2005	4.2	0.8	0.0	4.9	1.4	0.4	0.0	1.7	2.8	0.4	0.0	3.2	65%
2006	4.6	S	C	6.1	2.7	S	C	3.9	1.9	S	C	2.2	36%
2007	11.4	S	C	13.9	3.6	S	C	5.4	7.8	S	C	8.6	61%
2008	13.3	S	C	18.2	6.3	S	C	10.9	6.9	S	C	7.3	40%
2009	5.2	S	C	8.1	2.6	S	C	4.7	2.7	S	C	3.5	43%
2010	4.4	S	C	6.8	1.9	S	C	4.2	2.5	S	C	2.6	38%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

Table 8-142 Estimated Alternative 2 protective option Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	12.4	2.9	0.0	15.3	2.1	1.5	0.0	3.6	10.3	1.4	0.0	11.7	77%
2005	9.2	1.7	0.0	10.9	3.1	0.8	0.0	3.9	6.1	0.9	0.0	7.1	65%
2006	8.3	S	C	11.0	4.9	S	C	7.0	3.4	S	C	4.0	36%
2007	23.2	S	C	28.3	7.3	S	C	10.9	15.9	S	C	17.4	61%
2008	20.8	S	C	28.6	9.9	S	C	17.1	10.9	S	C	11.5	40%
2009	10.8	S	C	16.8	5.3	S	C	9.6	5.5	S	C	7.2	43%
2010	12.0	S	C	18.4	5.3	S	C	11.5	6.8	S	C	7.0	38%
Real revenues (in 2012 dollars)													
2004	14.8	3.4	0.0	18.2	2.5	1.8	0.0	4.3	12.3	1.7	0.0	13.9	77%
2005	10.7	2.0	0.0	12.7	3.6	0.9	0.0	4.5	7.1	1.1	0.0	8.2	65%
2006	9.3	S	C	12.4	5.5	S	C	7.9	3.8	S	C	4.5	36%
2007	25.5	S	C	31.0	8.0	S	C	12.0	17.4	S	C	19.1	61%
2008	21.9	S	C	30.1	10.5	S	C	18.0	11.4	S	C	12.1	40%
2009	11.5	S	C	17.8	5.6	S	C	10.2	5.9	S	C	7.6	43%
2010	12.5	S	C	19.2	5.5	S	C	11.9	7.0	S	C	7.3	38%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

Table 8-143 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 3 area closures

	Total catch (mt)				Catch from closed areas (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	10,916	2,533	0	13,449	1,854	1,296	0	3,150	9,062	1,237	0	10,299	77%
2005	6,731	1,239	0	7,969	2,248	567	0	2,815	4,483	672	0	5,155	65%
2006	5,185	S	C	6,907	3,065	S	C	3,366	2,120	S	C	3,541	51%
2007	10,847	S	C	13,228	3,434	S	C	4,051	7,414	S	C	9,177	69%
2008	10,183	S	C	13,994	4,863	S	C	5,283	5,320	S	C	8,711	62%
2009	9,676	S	C	15,025	4,732	S	C	5,287	4,944	S	C	9,738	65%
2010	8,325	S	C	12,746	3,648	S	C	3,814	4,677	S	C	8,933	70%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-144 Estimated Alternative 3 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	5.2	1.2	0.0	6.4	0.9	0.6	0.0	1.5	4.3	0.6	0.0	4.9	77%
2005	3.6	0.7	0.0	4.2	1.2	0.3	0.0	1.5	2.4	0.4	0.0	2.7	65%
2006	4.1	S	C	5.4	2.4	S	C	2.6	1.7	S	C	2.8	51%
2007	10.4	S	C	12.7	3.3	S	C	3.9	7.1	S	C	8.8	69%
2008	12.6	S	C	17.3	6.0	S	C	6.5	6.6	S	C	10.8	62%
2009	4.9	S	C	7.7	2.4	S	C	2.7	2.5	S	C	5.0	65%
2010	4.2	S	C	6.5	1.9	S	C	1.9	2.4	S	C	4.5	70%
Real revenues (in 2012 dollars)													
2004	6.1	1.4	0.0	7.6	1.0	0.7	0.0	1.8	5.1	0.7	0.0	5.8	77%
2005	4.2	0.8	0.0	4.9	1.4	0.3	0.0	1.7	2.8	0.4	0.0	3.2	65%
2006	4.6	S	C	6.1	2.7	S	C	3.0	1.9	S	C	3.1	51%
2007	11.4	S	C	13.9	3.6	S	C	4.3	7.8	S	C	9.7	69%
2008	13.3	S	C	18.2	6.3	S	C	6.9	6.9	S	C	11.4	62%
2009	5.2	S	C	8.1	2.6	S	C	2.9	2.7	S	C	5.3	65%
2010	4.4	S	C	6.8	1.9	S	C	2.0	2.5	S	C	4.7	70%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-145 Estimated Alternative 3 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	12.4	2.9	0.0	15.3	2.1	1.5	0.0	3.6	10.3	1.4	0.0	11.7	77%
2005	9.2	1.7	0.0	10.9	3.1	0.8	0.0	3.9	6.1	0.9	0.0	7.1	65%
2006	8.3	S	C	11.0	4.9	S	C	5.4	3.4	S	C	5.6	51%
2007	23.2	S	C	28.3	7.3	S	C	8.6	15.9	S	C	19.7	69%
2008	20.8	S	C	28.6	9.9	S	C	10.8	10.9	S	C	17.8	62%
2009	10.8	S	C	16.8	5.3	S	C	5.9	5.5	S	C	10.9	65%
2010	12.0	S	C	18.4	5.3	S	C	5.5	6.8	S	C	12.9	70%
Real revenues (in 2012 dollars)													
2004	14.8	3.4	0.0	18.2	2.5	1.8	0.0	4.3	12.3	1.7	0.0	13.9	77%
2005	10.7	2.0	0.0	12.7	3.6	0.9	0.0	4.5	7.1	1.1	0.0	8.2	65%
2006	9.3	S	C	12.4	5.5	S	C	6.0	3.8	S	C	6.3	51%
2007	25.5	S	C	31.0	8.0	S	C	9.5	17.4	S	C	21.6	69%
2008	21.9	S	C	30.1	10.5	S	C	11.4	11.4	S	C	18.7	62%
2009	11.5	S	C	17.8	5.6	S	C	6.3	5.9	S	C	11.6	65%
2010	12.5	S	C	19.2	5.5	S	C	5.7	7.0	S	C	13.5	70%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

Table 8-146 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 4 area closures

	Total catch (mt)				Catch from closed areas (mt) (catch at risk)				Catch from areas left open (mt) (residual catch)				Residual catch as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
2004	10,916	2,533	0	13,449	100	33	0	133	10,816	2,500	0	13,316	99%
2005	6,731	1,239	0	7,969	76	16	0	92	6,655	1,223	0	7,878	99%
2006	5,185	S	C	6,907	68	S	C	85	5,117	S	C	6,822	99%
2007	10,847	S	C	13,228	146	S	C	157	10,701	S	C	13,072	99%
2008	10,183	S	C	13,994	175	S	C	317	10,008	S	C	13,677	98%
2009	9,676	S	C	15,025	90	S	C	224	9,585	S	C	14,801	99%
2010	8,325	S	C	12,746	155	S	C	208	8,170	S	C	12,538	98%

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-147 Estimated Alternative 4 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	5.2	1.2	0.0	6.4	0.0	0.0	0.0	0.1	5.1	1.2	0.0	6.3	99%
2005	3.6	0.7	0.0	4.2	0.0	0.0	0.0	0.0	3.5	0.6	0.0	4.2	99%
2006	4.1	S	C	5.4	0.1	S	C	0.1	4.0	S	C	5.3	99%
2007	10.4	S	C	12.7	0.1	S	C	0.2	10.3	S	C	12.6	99%
2008	12.6	S	C	17.3	0.2	S	C	0.4	12.4	S	C	16.9	98%
2009	4.9	S	C	7.7	0.0	S	C	0.1	4.9	S	C	7.6	98%
2010	4.2	S	C	6.5	0.1	S	C	0.1	4.2	S	C	6.4	98%
Real revenues (in 2012 dollars)													
2004	6.1	1.4	0.0	7.6	0.1	0.0	0.0	0.1	6.1	1.4	0.0	7.5	99%
2005	4.2	0.8	0.0	4.9	0.0	0.0	0.0	0.1	4.1	0.8	0.0	4.9	99%
2006	4.6	S	C	6.1	0.1	S	C	0.1	4.5	S	C	6.0	99%
2007	11.4	S	C	13.9	0.2	S	C	0.2	11.3	S	C	13.8	99%
2008	13.3	S	C	18.2	0.2	S	C	0.4	13.0	S	C	17.8	98%
2009	5.2	S	C	8.1	0.0	S	C	0.1	5.2	S	C	8.0	98%
2010	4.4	S	C	6.8	0.1	S	C	0.1	4.3	S	C	6.6	98%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

Table 8-148 Estimated Alternative 4 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)

	Baseline gross revenues				Gross revenues in closed areas (revenue at risk)				Gross revenues in areas remaining open (residual revenues)				Residual revenue as % of historical
	541	542	543	Total	541	542	543	Total	541	542	543	Total	
Nominal revenues													
2004	12.4	2.9	0.0	15.3	0.1	0.0	0.0	0.2	12.3	2.8	0.0	15.2	99%
2005	9.2	1.7	0.0	10.9	0.1	0.0	0.0	0.1	9.1	1.7	0.0	10.8	99%
2006	8.3	S	C	11.0	0.1	S	C	0.1	8.2	S	C	10.9	99%
2007	23.2	S	C	28.3	0.3	S	C	0.3	22.9	S	C	28.0	99%
2008	20.8	S	C	28.6	0.4	S	C	0.6	20.4	S	C	27.9	98%
2009	10.8	S	C	16.8	0.1	S	C	0.3	10.7	S	C	16.6	98%
2010	12.0	S	C	18.4	0.2	S	C	0.3	11.8	S	C	18.1	98%
Real revenues (in 2012 dollars)													
2004	14.8	3.4	0.0	18.2	0.1	0.0	0.0	0.2	14.6	3.4	0.0	18.0	99%
2005	10.7	2.0	0.0	12.7	0.1	0.0	0.0	0.1	10.6	1.9	0.0	12.6	99%
2006	9.3	S	C	12.4	0.1	S	C	0.2	9.2	S	C	12.2	99%
2007	25.5	S	C	31.0	0.3	S	C	0.4	25.1	S	C	30.7	99%
2008	21.9	S	C	30.1	0.4	S	C	0.7	21.5	S	C	29.4	98%
2009	11.5	S	C	17.8	0.1	S	C	0.3	11.4	S	C	17.6	98%
2010	12.5	S	C	19.2	0.2	S	C	0.3	12.3	S	C	18.9	98%

Notes: "C" means the data are confidential. "S" means the data were suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

8.12 Pacific Cod Non-trawl Catcher Vessels (Alternatives 2, 3, and their options)

The non-trawl catcher vessel sector includes vessels targeting Pacific cod in the Federal and state parallel fisheries in the Aleutian Islands using longline, pot, and jig gear. These vessels may have delivered Pacific cod to shoreside processing plants, floating processors, or catcher/processors operating as motherships. The definition excludes vessels fishing in the state GHL fishery only. It also excludes vessels only taking incidental catches of Pacific cod. A number of catcher vessels fished in the sablefish and halibut quota share fisheries in the Aleutian Islands, and took incidental catches of Pacific cod.

Table 8-114 in Sub-section 8.10.1, based on Table 2-20 in Chapter 2, summarizes and contrasts the Pacific cod alternatives as they apply to non-trawl operations. In the interest of economy, this table is not reproduced here. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

Alternative 1 (the status quo) and Alternative 4 (adopting a modified version of the rules in place in 2010) were discussed in detail in Section 8.6 of this chapter, as they relate to non-trawl catcher vessels. This section focuses on the impacts of Alternatives 2 and 3, and their options, on this sector.

This is a small sector. Tables in Sub-section 8.2.4 indicate that an average of about two jig vessels, about three longline vessels, and one pot vessel were active each year during the baseline years. The numbers of vessels fishing during the baseline period were small enough in several years, that volume or value information cannot be provided. The largest numbers of vessels participated in the middle years in the center of the baseline period. There was no activity by this sector in Area 543 in any year.

Non-trawl catcher vessels are subject to the Aleutian Islands, and Management Areas 543 and 541-542, area catch limits. They are not explicitly subject to sector catch limits. However, if the trawl and non-trawl catcher/processor sectors take their full catch limits, non-trawl catcher vessels and trawl catcher vessels will compete for the remaining harvests. Given the small baseline harvests by this sector, and the much larger role trawl and non-trawl catcher/processors and trawl catcher vessels play in catching Pacific cod in the Aleutian Islands, it is simplest, as a practical matter and to a first approximation, to view this sector as facing limits that are determined by circumstances outside of its control. In this analysis, baseline catches from open areas (the residual catch) have not been compared to area-sector limits to determine whether they would be restricted by those limits. The impact on catches is treated as a function of the availability of open fishing areas.

Under Alternative 1, about 554 metric tons of harvest came from areas that would have been in closed critical habitat over that period; this was about 56 percent of the baseline retained catch. Ex-vessel revenues associated with fish from closed areas are estimated to have been about $690,000 in aggregate (in real “2012” dollars), or about $99,000/year. Wholesale revenues received by processors associated with fish from closed areas are estimated to have been about $1.2 million, or about $171,000 a year. Residual ex-vessel revenues under Alternative 1 are estimated to be $490,000, or $70,000 a year, while residual wholesale revenues under Alternative 1 are estimated to be $850,000, or $121,000 a year.

The impacts of the other alternatives can be described quickly. For each alternative in almost every year, 100 percent, or almost 100 percent, of the baseline catch came from within areas that would have

remained open under the alternative, and thus, using the approach discussed here, estimated residual revenues under these alternatives would all have been about equal to baseline residual revenues.[142]

Sub-section 8.10.4 discussed the seasonal elements of the alternatives non-trawl vessels. As noted there, the seasonal extension to the end of the year would have little impact on these vessels, which typically do not operate in the Aleutian Islands in the late fall months. These vessels typically deliver to processors in Dutch Harbor and Akutan after November 1. It is possible that if the fishery is still open, vessels could fish in the Aleutian Islands after November 1, but that effort was not seen during the baseline years. Sub-section 8.10.4 also discussed ESA triggers. As noted, it is possible that these will be reached under Alternative 1. There are no ESA triggers in Alternatives 2, 3, or 4. In Alternatives 2 and 3, the area-sector limits were provided as a substitute.

Section 8.6, evaluating Alternatives 1 and 4 for non-trawl vessels, included a detailed, but qualitative, discussion of the impacts of this action on the non-trawl catcher vessel sector redeployment. Alternatives 2 and 3 would have had the same effects as Alternative 4: that is, there would have been no regulation induced redeployment. Similar comments apply to incidental catch and prohibited species catch, and sector and community impacts.

Because of the confidentiality of much of the information about this sector, the relative simplicity of the analysis, and the equivalence of Alternatives 2 and 3 with Alternative 4, a summary table similar to those used in earlier sections is not provided here. Similarly, because of the confidentiality of much of the information, an appendix with critical habitat closure tables is not provided for this section.

8.13 Alternatives 5 (Preferred alternative) and 6

8.13.1 Alternative 5 (Preferred alternative)

On March 7, 2013, NMFS sent a Preliminary Draft EIS (PDEIS) to the Council for review by the SSLMC, and by the Council, its SSC, and its Advisory Panel (AP).

The SSLMC met on March 21 and 22, was briefed on the PDEIS, and provided an erratum listing the errors that had been identified in the PDEIS at that time. On March 22, the SSLMC discussed the PDEIS and recommended a preliminary preferred alternative for consideration by the Council. This built on elements of the alternatives that had been evaluated in the PDEIS.

At the April 2013 meeting, the Council AP was briefed on the contents of the PDEIS, and provided with an updated erratum. The AP recommended that the Council adopt the alternative recommended by the SSLMC with minor textual clarifications. The Council adopted the alternative for analytical purposes, as a part of its broader motion on the Steller sea lion EIS. At its December 2013 meeting, the Council recommended Alternative 5 as its preferred alternative.

A detailed description of Alternative 5 may be found in Chapter 2 of this EIS. Table 8-149 provides a summary of its key elements. In general, the different elements of Alternative 5 were adapted from elements of other alternatives, which were evaluated in detail in earlier sections. Those provisions of Alternative 5 that regulate Atka mackerel fishing were based on Alternative 3; those that regulate Pacific cod were based on Alternative 4; those that regulate pollock were based on Alternatives 3 and 4, which

[142] There is only one exception to this. In 2004 in Area 541 under Alternative 4, the relevant percentage is 88 percent.

are themselves identical). Modifications from the underlying alternatives were made in each case, and these are discussed below. Alternative 5 includes an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 8.18.2.

Table 8-149 Alternative 5 Summary Table (Preferred Alternative Recommended by the Council, October 2013)

Fishery	Seasons	Area 543		Area 542		Area 541	
		Closures	Catch and Participation limits	Closures	Catch and Participation limits	Closures	Catch and Participation limits
Atka mackerel	Trawl: A-season: 1/20-6/10 B-season: 6/10-12/31.	Critical habitat closed 0-3nm haulouts and 0-10 nm from rookeries.	Critical habitat harvest limit 60 % of TAC, distribute evenly between seasons.	Critical habitat closed 0-3 nm from haulouts and 0-10 nm from rookeries except, close critical habitat between 178°E long. to 180° and east of 178°W long.	Critical habitat harvest limit 60% of TAC west of 178° W long, distribute evenly between seasons.	Critical habitat closed except 12 nm -20 nm portion southeast of Seguam Island.	Amend. 80 and CDQ in BS: revise MRA calculation for Atka mackerel as an incidental species.
	50:50 seasonal apportionment including CDQ.						
	Rollover from A to B-season, fished outside of critical habitat.		TAC ≤ 65% ABC.			BS subarea closed to directed fishing.	
Pacific cod trawl	Amend 80 and CDQ: A-season: 1/20-4/1 B-season: 4/1-6/10 C-season: 6/10-12/31.	Critical habitat closed 0-3nm haulouts and 0-10nm from rookeries.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Critical habitat closed 0-3nm from haulouts and 0-10nm from rookeries.	None	Critical habitat closed 0-3 nm haulouts and 0-10 nm from rookeries, except a 20 nm closure at Agligadak.	None
	CVs and AFA CPs: A-season: 1/20-4/1 B-season: 4/1-6/10 C-season: 6/10-11/1.						
	Seasonal apportionments based on BSAI wide TAC level under Amend 85.					Seguam Foraging Area closed.	
Pacific cod non-trawl	Hook-and-line: A-season: 1/1-6/10 B-season: 6/10-12/31.	Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries and 0-10 nm from Buldir Island.	Catch limit in proportion to Area 543 abundance based on annual stock assessment.	Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries.	None	Critical habitat closed 0-3 nm from rookeries west of 172.59° W long.	None
	Pot: A-season: 1/1-6/10 B-season: 9/1-12/31.					Critical habitat closed east of 172.59° W long.	
	Jig: A-season: 1/1-4/30 B-season: 4/30-8/31 C-season: 8/31-12/31.					Hook-and-line and pot: Seguam Foraging Area closed.	
	Seasonal apportionments based on BSAI wide TACs under Amend 85.						
Pollock	A-season: 1/20-6/10 B-season: 6/10-11/1	Critical habitat closed, except an area outside of 0-3 nm from Shemya, Alaid, and Chirikof haulouts.	Only vessels registered with the Aleut Corporation in directed fishery.	Critical habitat closed 0-10 nm at rookeries and haulouts west of 178°W long.	Only vessels registered with the Aleut Corporation in directed fishery.	Critical habitat closed to directed fishing 0-3 nm from haulouts and 0-10 nm from rookeries.	Only vessels registered with the Aleut Corporation in directed fishery.
			50% of AI directed fishery allocation to vessels ≤ 60 ft		50% of AI directed fishery allocation goes to vessels ≤ 60 ft.		50% of AI directed fishery allocation to vessels ≤ 60 ft.
	A-season apportionment no more than 40% of ABC for AI subarea.		When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ AI ABC.	Critical habitat closed 0-3 nm haulouts and 0-10 nm from rookeries east of 178° W long., except open portions of critical habitat at: Hawadax Island Area outside of 3 nm from Tanadak, Segula, and Krysi Point and 10 nm from Little Sitkin and Ayugudak, and outside of 3 nm from Kanaga and Bobrof Island.	When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ AI ABC.	Seguam Foraging Area closed to directed fishing.	When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ AI ABC.
			A-season catch limit 5% of ABC.		A-season catch limit 15% of ABC.		A-season catch limit 30% of ABC.

CDQ= Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, CV=catcher vessel, CP=catcher processor, AFA=American Fisheries Act, MRA=maximum

Pollock

The pollock elements of Alternatives 1 through 4 are evaluated in Section 8.7. Alternative 5 is similar to Alternatives 3 and 4, which are themselves identical, except for the following modifications:

- While Alternatives 3, 4, and 5 open the same areas of critical habitat east of 178° W longitude, and in Area 543, Alternative 5 closes critical habitat from 10 nm to 20 nm from haulouts and rookeries in western Area 542, while Alternatives 3 and 4 do not.
- The addition of A-season area specific catch limits in relation to the Aleutian Island pollock ABC. This modification imposes an A-season catch limit of 5 percent of the ABC in Area 543, 15 percent of the ABC in Area 542, and 30 percent of the ABC in Area 541.

While Alternative 5 closes more critical habitat in western Area 542 than Alternatives 2 and 3, the observer data from the 1990s, summarized in Figure 3-18 in Chapter 3, suggests that, at that time, there was little fishing in this area. There was one pollock "hot spot" in this area in those years in the vicinity of Hawadax Island. This area is one of the "postage stamps" of critical habitat opened under Alternative 5, as it is under Alternatives 3 and 4.

Table 8-150 shows the catches available in each area under the 5 percent -15 percent -30 percent A-season area-limits in 2013 and 2014. The catch limits become more restrictive from east to west, consistent with the FMP biop standards to provide more protection to Steller sea lions where more decline is evident. These are catch limits, not area allocations or area-specific TACs.

Table 8-150 Pollock A-season Catch Limits under Alternative 5 in mt

Year	ABC	Area 543 Catch Limit (5%)	Area 542 Catch Limit (15%)	Area 541 Catch Limit (30%)
2013	37,300	1,865	5,595	11,190
2014	39,800	1,990	5,970	11,940

As noted in Section 8.7, this is expected to be an A-season fishery. Pollock fishing in the B-season is not expected to be economically viable under current conditions.

The pollock analysis did not provide estimates of harvests taken from within the critical habitat that would be opened under the different alternatives. Alternatives were ranked with respect to the area opened, with a subjective weighting by the observed volume of 1990s pollock catches, assuming that this provided a rough indicator of the accessibility of fishable pollock concentrations under the different alternatives. Thus, the while the limits may provide some additional protection for Steller sea lions, particularly in the western Aleutian Islands, they do not necessarily restrict pollock harvests or revenues.

The sum of these limits (50 percent of the ABC) exceeds the A-season harvest limit (40 percent of the ABC) and should not create a global Aleutian Islands constraint on harvest. However, as discussed earlier, the analysis does not make projections of the changes in Aleutian Islands pollock harvest associated with the different alternatives, or of the distributions of harvests among the three Aleutian Islands management areas. If it was optimal for the Aleut Corporation and its fishing vessels to catch 20 percent of the ABC in Area 542 in the A-season, or 40 percent in Area 541 in the A-season, the corporation would be constrained by these limits.

As discussed in Section 8.7.4, the primary incidental catch in the pollock fishery is likely to be Pacific ocean perch. The additional harvest control associated with the area-specific pollock catch limits in

Alternative 5 may make it possible to reduce incidental catch allowances (ICAs) for Pacific ocean perch below what they would have been under other action alternatives, thus potentially reducing the impacts on Amendment 80 Pacific ocean perch fishing.

Alternative 5 is very similar to Alternatives 3 and 4 for pollock (Alternatives 3 and 4 have equivalent pollock provisions). However, it does close more critical habitat in Area 542, and it includes the 5 percent - 15 percent - 30 percent area catch limit provision that might restrict harvests from some management areas under certain conditions. Discussion of the effects of these limits on catch are speculative given the lack of available information on recent pollock catches from within critical habitat. Ranking these alternatives by the potential value they may provide to the Aleut Corporation, and for Adak development, Alternative 5 ranks below Alternatives 3 and 4 because of the restrictions described above. However, it appears to be less restrictive than Alternative 2, since it allows some fishing in Area 543, near Shemya Island, and opens more critical habitat in the east.

Atka mackerel

The Atka mackerel elements of Alternative 5 are nearly identical to those of Alternative 3. Two differences between the alternatives affect Area 543:

- Under Alternative 5, the area around the rookery at Buldir Island is closed to fishing within 10 nm under Alternative 5, in comparison to the 15 nm closure (with notches in the 10 nm to 15 nm range) under Alternative 3;
- Alternative 5 includes a restriction limiting the Area 543 TAC to less than or equal to 65 percent of the ABC. The TAC limit in Alternative 5 is similar to the TAC limit in Alternative 2, which is, however, expressed as a TAC "equal to" 65 percent of the ABC, rather than "equal to or less than 65 percent."

The Atka mackerel elements of Alternatives 1 and 4 are evaluated in Section 8.3, and the elements of Alternatives 2 and 3 are evaluated in Section 8.8. The latter section also compares Alternatives 1 and 4 with Alternatives 2 and 3.

The area closure elements of Alternative 5 are almost the same as those of Alternative 3, and the analysis applicable to Alternative 3 is likewise applicable to Alternative 5. The only difference between them is the opening of increased fishing areas between 10 nm and 15 nm of Buldir Island under Alternative 5, in comparison with Alternative 3. During the baseline years, this would have had little impact on retained catch. Figure 3-5 in Chapter 3 provides a spatial analysis of Atka mackerel fishing during the baseline years, and shows that only small amounts of harvest were taken from this area. Alternative 3 already includes two "notches" in the 10 nm to 15 nm zone, where industry expects it would be most likely to harvest Atka mackerel. Other areas opened by the alternative are unavailable to non-pelagic trawl fishermen fishing for Atka mackerel because of the presence of designated habitat of particular concern. However, the baseline analysis may not provide a complete analysis of potential harvests from this area. Industry sources indicate that fishing took place in this area prior to the baseline years, and industry believes recent survey information indicates the presence of Atka mackerel stocks here. (Gauvin, personal communication, April 13, 2013; Loomis, personal communication, April 12, 2013)[143]

The 65 percent TAC limit included in Alternative 5 was evaluated in sub-section 8.8.2. with reference to Alternative 2. The 65 percent limit would not have restricted Atka mackerel fishing in Area 543 under

[143] John Gauvin. Gauvin and Associates, LLC, Burien Washington; Loomis, Todd. Government Affairs, Ocean Peace, Inc.

Alternative 2 during the baseline years. However, as shown in Table 8-151 , the TAC limit was less than the Alternative 3 residual harvest in four of the seven baseline years, particularly in the later years of the baseline period.

Table 8-151 Alternative 5 TAC limit compared to residual catch under Alternative 5

Year	Alternative 3 Residual catch (mt)	65% TAC limit (mt)	Difference (mt)	Real price $/mt	Value of difference (millions of dollars)
2004	16,511	15,834	677	733	0.5
2005	18,729	30,303	0	772	0
2006	14,370	26,884	0	675	0
2007	8,846	13,390	0	815	0
2008	15,653	10,985	4,668	759	3.5
2009	15,406	15,145	261	1,094	0.3
2010	17,418	13,390	4,028	1,202	4.8

Note: Difference set to zero when TAC limit would have exceeded residual catch, and limit would not have been binding. Residual catch from Table 8-88, 65% limit from Table 8-72, real price from Table 8-74.

Adjusting the estimated wholesale gross revenues from areas remaining open under Alternative 3 during the baseline years, which may be found in Table 8-89, by the gross revenue estimates in Table 8-151, changes the mean value of residual gross revenues from $44.7 million to $43.4 million over the baseline years.

The limit proposed for Alternative 5 differed somewhat from the limit proposed for Alternative 2, in that Alternative 2 set the limit equal to 65 percent of the ABC, while Alternative 5 sets it equal to or less than 65 percent of the ABC. The limit proposed for Alternative 5, thus, provides the Council more discretion over the choice of TAC. This could be useful to the Council if, for example, it had to reduce TACs of Pacific cod to stay within the BSAI optimum yield of 2 million metric tons. Smaller limits in the baseline years would have bound the fishery more tightly, however, those would have been policy decisions made by the Council in the specifications process.

Alternative 5 is very similar to Alternative 3 for Atka mackerel, although it does include a catch limit in Area 543 that might have restricted catch during some baseline years. Thus, depending on circumstances, it may be more restrictive than Alternative 3.

Trawl catcher/processors and trawl catcher vessels: Pacific cod

The trawl Pacific cod elements of Alternatives 1 and 4 are discussed in Sections 8.3 and 8.5, while the elements of Alternatives 2 and 3 are discussed in Sections 8.9 and 8.11. Alternative 5 is nearly identical to Alternative 4. The exception is the Area 543 catch limit that is to be set in proportion to the Area 543 Pacific cod abundance based on the stock assessment process. This could provide a limit on catch in the portion of the Aleutian Islands where Steller sea lions have experienced the greatest decline.

The Area 543 limit is a restriction on the total amount of Pacific cod that may be taken from Area 543. It is not a TAC. The indicated volume of Pacific cod does not need to be harvested within Area 543. Harvests in Areas 541 and 542 are not subject to a similar limit. It could happen that the entire Aleutian Islands TAC of Pacific cod could be harvested in Areas 541 and 542, and none in Area 543. The converse is not possible. In Section 8.9, annual Area 543 area-limits that were close to 25 percent of a hypothetical Aleutian Islands Pacific cod TAC during the baseline years were used for analysis.

This Area 543 limit could potentially restrict fishing activity in Area 543, although, because of data confidentiality, these results cannot be presented. Table 8-152 summarizes information from earlier sections on the size of the area limit during the baseline years, on residual catches by the trawl catcher/processor and catcher vessel sectors, and on residual catches by the non-trawl catcher/processor sector. The trawl catcher vessel information is either zero in the early years, or confidential in later years. Recall however, that over the period 2006 through 2010, the trawl catcher vessels delivered to motherships and accounted for about 40 percent of the total harvest. A final column in the table provides estimates of the Area 543 catch if 40 percent of it was taken by catcher vessels delivering to motherships in the years 2007 through 2010. These hypothetical harvests suggest that the limit could have been binding in these years.

Table 8-152 Potential for Alternative 5 Area 543 catch limit to constrain Area 543 catches.

Year	Hypothetical Area 543 limit (mt)	Alternative 4 Trawl catcher/processor retained catch (mt)	Alternative 4 Non-trawl catcher/processor retained catch (mt)	Alternative 4 Trawl catcher vessel retained catch (mt)	Hypothetical total area catch (mt)
2004	6,543	3,239	C	0	Not calculated due to confidential information
2005	6,045	4,099	C	0	
2006	6,398	3,016	C	C	
2007	5,805	2,227	1,639	C	6,443
2008	5,805	1,649	2,330	C	6,632
2009	6,002	1,631	2,861	C	7,486
2010	5,974	548	3,146	C	6,156

Notes: Limits from Table 8-95, trawl catcher/processor catch under Alt 4 from Table 8-112, non-trawl catcher/processor catch from Table 8-128, trawl catcher vessel catch from Table 8-146. Hypothetical total area catch is equal to the sum of the catcher/processor catches, divided by 0.6.

Alternative 5 imposes trawl Pacific cod restrictions that are very similar to those in Alternative 4. However, the area-limit in Area 543 under Alternative 5 may restrict catches there. The fleet may be able to make up lost harvest in Areas 541 and 542, which are unconstrained. Note that, during the baseline years, Area 543 trawl catches were made by catcher/processors and catcher vessels delivering to motherships, and that very little catch by this sector was delivered to shoreside plants for processing.

Non-trawl Pacific cod

The non-trawl Pacific cod elements of Alternatives 1 and 4 are discussed in Sections 8.4 and 8.6, while the elements of Alternatives 2 and 3 are discussed in Sections 8.10 and 8.12. Alternative 5 is nearly identical to Alternative 4. The exception is the Area 543 catch limit in proportion to the Area 543 Pacific cod abundance based on the stock assessment process. This would provide a limit on catch in relation to the best available information on Pacific cod harvest in the portion of the Aleutian Islands where Steller sea lions have experienced the greatest decline. The discussion of this limit in the preceding sub-section is also relevant to this fleet sector.

Alternative 5 imposes non-trawl Pacific cod restrictions very similar to those in Alternative 4. Recall, however, that there is reason to believe that the implications for the non-trawl fleet of all the alternatives, other than Alternative 1, were very similar.

8.13.2 Alternative 6

Alternative 6 would prohibit retention of the three principal Steller sea lion prey species harvested in the Alaska groundfish fisheries in the Aleutian Islands reporting areas (Statistical Areas 541, 542, and 543 and adjacent State of Alaska waters). Vessels would be prohibited from directed fishing for these species and prohibited from retaining any incidental catch of these species while directed fishing for other groundfish targets. Alternative 6 was added to the EIS in response to public comment on the draft EIS to have a more protective alternative than the status quo. Alternative 6 would provide the same protection for Steller sea lion prey resources as Alternative 1 in Area 543 and additional protection in Areas 542 and 541.

The retention prohibition removes any incentive to catch Atka mackerel, Pacific cod, and pollock in other targeted groundfish fisheries. While not eliminating removals of these Steller sea lion prey species by the groundfish fisheries in the Aleutian Islands, this alternative is the most protective action for Steller sea lions that can be taken without prohibiting other groundfish fisheries in the Aleutian Islands subarea. Though this alternative is potentially the most adverse economically to the Atka mackerel, Pacific cod, and pollock fisheries, some groundfish fisheries could continue to operate in the Aleutian Islands subarea (i.e., rockfish and flatfish), reducing potential economic impacts on these other groundfish fisheries compared to prohibiting all groundfish fishing.

To be consistent with the protection measures provided under the other alternatives, Alternative 6 would prohibit the Atka mackerel directed fishing in the Bering Sea subarea and prohibit directed fishing for groundfish within 3 nm of the Kanaga Island/Ship Rock rookery. Because retention is prohibited in the Aleutian Islands, seasons for the Atka mackerel, Pacific cod, and pollock fisheries in the Aleutian Islands are not applicable under Alternative 6. Pacific cod seasons specified for the Bering Sea directed fishery would remain unchanged. The monitoring and enforcement option for enhanced VMS operation as described for Alternatives 2 through 5 does not apply to Alternative 6, given the comprehensive prohibition on retention of the key species. Research as described in Chapter 11 is also expected to be implemented under this alternative.

The following discussion distinguishes between impacts on fisheries targeting Atka mackerel, Pacific cod, and pollock, and fisheries for other targets in which these species are taken and retained (that is, fisheries in which Atka mackerel, Pacific cod, and pollock are incidental harvests).

Directed fisheries

Under Alternative 6, it would not be legal to retain Atka mackerel, Pacific cod, or pollock. Thus the fisheries currently targeting these species would no longer be able to do so. Retained catches of these species would have been zero during the baseline years 2004 through 2010. The impacts of this action on fisheries targeting these species have been approximated by assuming that the harvests of these species in the baseline years would not have occurred. Table 8-153, which is based on estimates of baseline harvests contained in earlier tables in this EIS, provides estimates of the revenues from the baseline years that would have been lost if the fisheries in those years had not occurred. The aggregate foregone revenues exceed those of all other alternatives; mean revenues-at-risk in the baseline years were about $102 million. Residual revenues would be zero, and these are compared to residual revenues for the other alternatives for each sector in tables in Section 8.20.

Table 8-153 Alternative 6 revenue losses in targeted Atka mackerel and Pacific cod fisheries in millions of 2012 dollars

Year	Trawl C/P Atka mackerel	Trawl C/P Pacific cod	Non-trawl C/P	Trawl CV	Non-trawl CV	Aggregate revenues foregone
2004	35.8	17.1	5.0	18.2	0.2	76.3
2005	47.0	16.3	5.1	12.7	0.2	81.3
2006	42.1	19.1	6.8	12.4	0.2	80.6
2007	48.0	28.3	11.2	31.0	0.2	118.7
2008	47.7	12.5	15.8	30.1	0.2	106.3
2009	82.7	6.7	11.1	17.8	0.2	118.5
2010	89.1	6.5	18.2	19.2	0.2	133.2
Mean	56.1	15.2	10.5	20.2	0.2	102.1
Median	47.7	16.3	11.1	18.2	0.2	106.3

Notes: revenues in real 2012 dollars; average seven year estimate is reported for non-trawl CV to protect data confidentiality;
Sources: Tables 8-51, 8-52, 8-56, 8-61, and page 8-112.

As discussed in Section 8.7, although directed fishing for pollock has been authorized by the Aleut Corporation and its agents, and by CDQ groups, in recent years, Steller sea lion protection measures existing during the baseline years, and continued under the status quo (Alternative 1), have effectively precluded significant directed fisheries. Fishing efforts following the creation of the Aleut Enterprise allocation in 2005 led to fishing which culminated in 1,411 metric tons of directed harvest in 2007. Harvests subsequently fell off rapidly, and there have been no directed harvests in the years since 2010. Alternative 6 is, thus, likely to produce little or no adverse impact on the pollock fishery.

Earlier sections of this analysis described the potential ways in which the directly regulated fleets might alter their operations and redeploy into other fisheries so as to minimize the overall impact of this action. This alternative creates greater incentives for redeployment than other alternatives. However, the redeployment opportunities remain unchanged. Therefore, the fleets are expected to offset smaller proportions of their foregone revenues under this alternative, and to create greater impacts on other fleets.

Alternative 6 prohibits retained catches of Atka mackerel in the Area 541, but Area 541 shares a single TAC with the Bering Sea. While directed fishing for Atka mackerel is prohibited in the Bering Sea, incidental catches may be retained, and a top off fishery is possible as Atka mackerel fishing vessels redeploy and seek new fishing opportunities. Top-off fishing for Atka mackerel is also possible in the Gulf of Alaska.

Top off fishing in the Bering Sea can be limited by the Council by adjustments in the Area541/Bering Sea TAC level. As explained in Section 8.3.3, top-off fishing in the Gulf of Alaska is limited by the availability of basis species. Should top-off fishing in the Gulf exceed the TAC, the Regional Administrator would prohibit retention of Atka mackerel.

This alternative will reduce fishing mortality of Atka mackerel and Pacific cod to levels that will be lower than those in the past, and eliminates uncertainty about potential directed fishing mortality on those stocks. It is possible that in these circumstances, the Council will reduce Aleutian Islands TACs to the minimum necessary to account for incidental mortality. This would make it possible to increase other TACs in the Aleutian Islands or the Bering Sea while staying within the BSAI optimum yield limit of 2 million metric tons. Directed fishing for Atka mackerel in the Bering Sea would not be possible, but directed fishing for Pacific cod would be. It is possible that, when the Bering Sea Pacific cod ABC would otherwise have been above the Bering Sea Pacific cod TAC, the Council might offset the reduced Pacific cod TACs in the Aleutian Islands with increased TACs in the Bering Sea.

Incidental harvests

Under the status quo, no retention of Atka mackerel or Pacific cod is currently permitted in Area 543. Thus, Alternative 6 does not change the regulations in Area 543, and would not have any impact on fishing activity in that management area. However, Alternative 6, by extending the no retention requirement to management areas 541 and 542, would prevent fishing operations in those areas, for example operations fishing for IFQ sablefish or halibut, from retaining Atka mackerel or Pacific cod taken incidentally in those fisheries.

Alternative 6 would prevent the retention of Atka mackerel and Pacific cod taken incidentally by fishing operations in Areas 541 and 542. The impacts on trawl catcher/processors and on trawl catcher vessels delivering Atka mackerel to catcher/processors acting as motherships, have been incorporated into the analysis of trawl catcher/processor operations because both targeted and incidental catches count against Amendment 80 quotas.

Non-trawl catcher/processors and catcher vessels, and trawl catcher vessels targeting species other than Atka mackerel all take incidental catches of either Atka mackerel and Pacific cod during the baseline years (and they have continued to do so under the status quo).

- During the baseline years 17 separate fixed gear catcher/processors took incidental catches of either Atka mackerel or Pacific cod during 39 separate vessel-years of fishing activity. The vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest during the baseline years was about $19,000, about $3,000 per year, or about $500 per vessel-year of fishing.
- During these years, 62 separate fixed gear catcher vessels took incidental catches of these species during 169 separate vessel-years of fishing activity. These vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest was about $335,045, about $48,000 per year, and about $2,000 per vessel-year.
- During these years five separate trawl catcher vessels, owned by two separate companies, took incidental catches of these species during 17 separate vessel-years of activity. Because these vessels were operated by only two unique firms, data on fishing activity and revenues is confidential.

On the basis of this activity level, the estimated cost of Alternative 6 in terms of foregone incidental values of Atka mackerel and Pacific cod harvests is above $51,000 a year.

The action will also prevent the retention of pollock taken as incidental catch by trawlers in the rockfish, and Arrowtooth and Kamchatka flounder fisheries.[144] Most of this, (94 percent) was taken by catcher/processors) Incidental pollock harvests in these fisheries averaged 644 metric tons a year from 2004 through 2013. In 2012, the gross average wholesale value per metric ton of catcher/processor retained round weight of pollock was about $1,206 in the BSAI and $668 in the GOA. Given that incidental catches of pollock include relatively little pollock with valuable roe content, and that incidental catches will often be directed to lower valued markets, the lower GOA value is used to approximate the order-of-magnitude of the revenue losses associated with a loss of incidental pollock catches. Using the GOA value a rough approximation of the possible gross value of this production, would be about $400,000.

[144] Pollock is also taken as incidental catch in the Atka mackerel and Pacific cod trawl fisheries, but has been accounted for with other incidental catches in the analyses of these fisheries. Some pollock is taken incidentally in other fisheries, but the volume is very small. These volumes are, however, included in the totals cited in this paragraph.

8.14 Benefits from Steller sea lion stock health

This section analyzes the economic benefits to the public of improved protection for the western stock of Steller sea lions. As discussed in Sections 8.2.9 and 8.2.10, these may accrue to subsistence hunters taking Steller sea lions, and to members of the general public placing a value on the health of the Steller sea lion population.

While survey-based evidence suggests that an improvement in the WDPS population growth rate could have a large value, the reasonable and prudent alternative (RPA) does not predict that the action will necessarily lead to an increase in the rate of population growth of Steller sea lion populations, nor does it make probabilistic statements about the range of potential outcomes.

The FMP biological opinion states that "While effects of the RPA on the response of the Steller sea lion population cannot be projected with certainty with the available information, NMFS has determined that conserving important prey species to foraging Steller sea lions in the areas and seasons commensurate with the rate of decline observed in each fishery management area will be adequate to reduce the effects of the fisheries such that they would not be likely to suppress the survival and recovery of the species to an appreciable extent." (NMFS 2010a:374).

Uncertainty about the effect of this action on the rate of Steller sea lion population recovery make it impossible to determine whether there would be a positive net impact on subsistence households or households obtaining other types of benefits, or to estimate the size of possible benefits.[145]

8.15 Impacts on other ecosystem resources

Section 10.4 discussed the benefits the action alternatives may create by reducing possible conflicts between commercial fishing vessels and Steller sea lions. The action alternatives may also impact other environmental resources. The following resources are discussed in separate chapters in the EA:

- Fish stocks
- Marine mammals (in addition to Steller sea lions)
- Seabirds
- Habitat; ecosystem resources

The impacts of this action on fish stocks are discussed in Chapters 3 and 4. Alternatives 2, 3, 4, 5, and 6 will change harvests of Atka mackerel, Pacific cod, and pollock stocks in the Aleutian Islands, and possibly increase harvests from yellowfin sole, and Pacific cod stocks in the Bering Sea. Catches of some groundfish species taken as incidental catch or bycatch to these targets may change. Atka mackerel may be especially affected, since it is a localized species, and harvests under Alternatives 2, 3, 4, 5, and 6 would increase. Changes in Atka mackerel stock size in the Aleutian Islands could have implications for future ABCs, TACs, and catch rates for the remaining fishery. Prohibited species impacts would remain limited, in an absolute sense, by current PSC limits, although halibut PSC may increase, risking earlier closures of Bering Sea yellowfin sole fisheries.

[145] The survey discussed elsewhere in this section did not include Alaskans in the survey frame and did not include any questions designed to elicit information about the valuation of subsistence uses. To the extent that residents of the United States value subsistence uses and the existence of subsistence communities, the survey results may be interpreted as including this source of value.

These actions could affect human welfare through human interest in stock health in and of itself, through changes in the costs of harvest associated with changes in stock size, and through the role some fish species play in supporting bird and marine mammal populations that provide value. The alternatives are not expected to reduce any stock to below its minimum stock size threshold. The status of these stocks with respect to overfishing is not expected to change because the current harvest specifications process for setting TACs and managing harvests within the limits would continue. The change in the fisheries harvest is not likely to impact prey availability and habitat in a way that would affect the sustainability a stock. In general, it is likely that costs or benefits from this source will be small.

The impacts of this action on marine mammals are discussed in Chapter 5. The economic impacts on Steller sea lions are discussed in Section 8.14. Non-consumptive and consumptive values exist for marine mammals, including subsistence harvests of some marine mammals. The non-consumptive benefits for other marine mammals found off Alaska have not been studied to the extent that Steller sea lion non-consumptive benefits have been studied (Lew, personal communication, August 1, 2010).[146] With respect to other marine mammals, this EIS found little reason to believe that any of the actions under consideration would have a substantial impact on incidental take or disturbance, or reduced prey availability, although in the Aleutian Islands, it is possible that shifting fishing away from near-shore areas may reduce potential disturbance of near shore mammals (e.g., harbor seals and northern sea otters). The actions under consideration here are unlikely to have a large impact on values associated with these resources.

The impacts of this action on seabird populations were discussed in Chapter 6. Non-consumptive values exist for seabirds. One of them, value from bird-watching trips, could even have an economic impact within the Aleutian Islands. Seabirds are also harvested for sport and subsistence purposes. Chapter 6, however, suggests that the action alternatives may have relatively small impacts on seabird populations. Under the status quo, seabird takes, disruptions to benthic habitat, and changes in prey availability are not estimated to be at a level that would reduce survival or reproductive success, and are mitigated to some degree by current spatial restrictions in the Aleutian Islands fisheries. The analysis found that there would be an insignificant impact to seabirds from additional open fishing grounds or from shifting fleets under the action alternatives. Thus, it is likely that the action alternatives will have little impact on economic benefits from seabird populations.

In the late summer and fall of 2010, two endangered short-tailed albatross were taken with longline gear in the Bering Sea. Then another was taken in the same fishery in October of 2011. These are the first takes of this species since 1998; including these, there have been a total of nine takes since 1983. The short-tailed albatross is protected in U.S. waters by the Endangered Species Act (ESA). As a result of consultation with the U.S. Fish and Wildlife Service (USFWS) under the ESA, USFWS issued an incidental take statement of four birds during each 2-year period for the BSAI and Gulf of Alaska hook-and-line groundfish fisheries. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending reinitiation of consultation with the USFWS. NMFS may choose to reinitiate consultation if/when the level of authorized incidental take is met, but not exceeded, in order to avoid potential delays in federally authorized fishing operations. To date, the incidental take levels have not been reached during the current or any previous biological opinions.

Most of these short-tailed albatross takes were made with hook-and-line gear on the Bering Sea shelf break. While the proposed action may lead to a shift of fishing effort from the Aleutian Islands to the Bering Sea, due to the historical rarity of takes, this action is not expected to have implications for the short-tailed albatross population. NMFS would reinitiate consultation with USFWS if/when the

[146] Daniel Lew, Ph.D. Economist. NMFS Alaska Fisheries Science Center. Seattle, Washington.

incidental take statement is reached, before it is exceeded. That has not happened under this biological opinion, and is unlikely to happen in the foreseeable future. (Mabry, personal communication)[147]

The physical impacts of these alternatives on the ecosystem, including those on habitat, predator prey, and fishing effects interactions, are discussed in Chapter 7. Alternative 1 (the status quo) tended to decrease fishing activity in the Aleutians, compared to the 2004 through 2010 baseline. Alternatives 2 through 6 could potentially increase from status quo the amount of bottom trawling, longlining, pot deployment, and other activities that may impact bottom habitat in the Aleutian Islands. Alternative 4 may lead to levels similar to those during the baseline years.

Habitat may provide non-consumptive benefits to persons who enjoy learning about, thinking about, and, in some cases, viewing unique subsea habitats, such as coral gardens (although trawl impacts on coral gardens are believed to have been small, considering the trawl closures currently implemented). Habitat may also provide consumptive benefits, by contributing to the productivity of fish and shellfish stocks. Humans could benefit if healthier fish stocks contributed to the health of bird, or marine mammal populations, or of fish stocks harvested for human use.

However, as noted elsewhere in Chapter 7, the alternatives are not expected to have significant impacts on these. Increases in fish removals under Alternatives 2 through 5 could potentially increase the adverse impacts of fisheries in the Aleutian Islands and thereby reduce benefits provided by Aleutian Islands habitat, while reductions under Alternative 6 may have the reverse effect; however, there are no anticipated discernible effects on habitat attributable to adoption of Alternatives 2, 3, 4, 5, or 6. Actual physical impacts, and economic benefits and costs, are likely to be small, since much of the habitat is already protected by various measures and for the reasons discussed above.

The impact of the alternatives to the predator-prey and fishing effects interactions described in the Aleutian Islands Fishery Ecosystem Plan (NPFMC 2007) are unknown, due to the need for additional information and research. Therefore, it is difficult to determine environmentally significant ecosystem function impacts following from the alternatives.

Due to the nature of this action, the Atka mackerel, Pacific cod, and pollock fisheries, as modified by the alternatives, are not predicted to have additional impacts on the ecosystem or change the ecological impacts described in the Aleutian Islands Fishery Ecosystem Plan. Therefore, the impacts of the alternatives on the Aleutian Islands ecosystem are insignificant. Because Chapter 7 did not find environmentally significant ecosystem function impacts following from the alternatives, associated costs and benefits, other than those discussed elsewhere in the economic analysis, are likely to be relatively small.

8.16 Community economic impacts

The following communities and classes of communities have been selected for detailed examination in this community economic impact analysis: Adak, Atka, Unalaska, Other Alaskan communities, Pacific Northwest communities, CDQ communities, and Aleut Corporation shareholders.

It is not possible to make explicit or detailed estimates of the employment or income impacts of these actions on communities. Our ability to evaluate the changes in vessel activity is limited, and useful

[147] Kristin Mabry, National Marine Fisheries Service, Alaska Regional Office. Juneau, Alaska. Personal communication, October 20, 2010.

models to connect these changes to specific community impacts, should it be possible to estimate the changes with reasonable accuracy, are not available.

The approach taken here has been to examine each community, identify the key fishing sectors relevant to the community, and use the rough estimates of wholesale gross revenue changes associated with the different alternative and option combinations presented in earlier sections as an index of the likely relative impact of the different alternatives. In some cases, the estimates of wholesale gross revenue impacts are not precise enough to discriminate among the alternatives, but in other cases it is possible to do so.

Adak

Adak is a small and remote community. The U.S. Census reported there were 326 residents in April 2010. Commercial fisheries are important here; the community's economy and its engagement with the fisheries are described in detail in Chapter 10. There is a fish processing plant at Adak that has processed Pacific cod in the past. The Adak Cod Cooperative LLC has made arrangements to process cod there in the future.[148] The opening of a pollock fishery could lead to pollock processing as well. Large amounts of Atka mackerel are unlikely to be processed at the plant.

Adak also serves as a home port for two small fixed gear vessels. The Adak profile in Chapter 10 identified two unique vessels in the data for the period 2004 through 2011, with an annual average of 0.6 Adak resident-owned vessels per years for 2004 through 2010 in Area 541 and 0.4 in Area 542. Adak-resident owned trawl or catcher/processor vessels were not identified.

Port visits to Adak, associated with Atka mackerel, Pacific cod, and pollock fishing, by both catcher/processors and catcher vessels, may create demand for goods and services in the community. Vessel services may include support for crew rotations, fuel supplies, and emergency medical services at the local clinic. The local fuel distributor has indicated that the large volume of fuel sold to fishing vessels allows the firm to sell fuel to residential and commercial customers in Adak at lower prices than it otherwise would be able to. Actions that reduce port visits may, thus, increase living costs and the costs of doing business in the community (Tsukada 2010).[149]

A review of catch and VMS records, summarized in Table 10-12 and Table 10-13 of Chapter 10 of this EIS shows a decline in Adak port visits by catcher/processors and catcher vessels that targeted Atka mackerel or Pacific cod immediately before or after the visit, at the time the interim final rule became effective. The average number of visits by catcher/processors fishing for Atka mackerel in the Aleutian Islands, either before or after the visit from 2004 through 2010, was about 44, while the number of visits in 2011 was 28. The average number of visits by catcher/processors fishing Pacific cod from 2004 through 2010 was about 29, while the number in 2011 was 13.[150]

Even more striking was a decline in the numbers of catcher vessels fishing for Pacific cod in the Aleutian Islands, either before or after visiting Adak. These declined from about 118 a year from 2004 through

[148] In mid-April 2013, Icicle Seafoods, which operated the processing plant at Adak in 2011 through 2013, announced that it would close its operation there. Icicle representatives reportedly cited several reasons for its decision, including (a) regulatory uncertainty, (b) concern over the Pacific cod stock in the region, and (c) high operating costs at Adak. At the end of 2013, Adak Cod Cooperative LLC planned to begin operations at Adak. (Shedlock 2013; Paulin 2013)

[149] This may be a source of agglomeration economies discussed in Section 8.2.12.

[150] These changes were large and took place at the time the interim final rule became effective, but they may have been influenced by other factors as well. In 2010 the TAC in Area 541 was increased proportionately to the TACs in Areas 542 and 543, reflecting changes in biomass distribution identified by trawl surveys. This may increase the likelihood of catcher/processors traveling to Dutch Harbor for port calls.

2010, to 11 in 2011. However, this decline in catcher vessel visits may be due in part to difficulties at the processing plant at Adak. This makes it difficult to identify the direct impact of the interim final rule. The firm operating the plant went bankrupt in late 2009, and the successor firm did not begin operations until after the important March-April Pacific cod fishery in 2011.

Implicit in parts of the following discussion is the assumption that Pacific cod processing is economically viable at Adak. However, this assumption may not hold. Processing margins at Adak may be smaller than elsewhere, given its remote location; at least one operation went bankrupt trying to operate in Adak prior to the date the interim final rule went into effect. In addition, the Aleutian Islands and Bering Sea Pacific cod split has led to initial reductions in Aleutian Islands Pacific cod harvests. Furthermore, a CDQ group has been working to establish Pacific cod processing at Atka; if this is successful, Atka could compete with Adak for Pacific cod.

Because of Adak's small size, its residents must import a large proportion of the goods they consume. Moreover, a large part of the processor work force is made up of temporary workers who come to town for the season and who leave when it is over. They spend money in the town while they are there, but a large part of their income would be spent elsewhere. Other sources of personal income and induced impacts may be so limited, however, that induced impacts (sales at the local grocery store for home consumption, for example) may have importance. Adak shares in the State's fisheries business tax revenues and its fishery resource landing tax revenues may vary with the alternatives, and any reduction in landings or offload in the municipal limits, or in the unorganized borough (Aleutians West census area) are likely to impact Adak city revenues. The loss of part of these municipal revenues could reduce municipal expenditures, and be an additional source of induced effects.

Adak may be affected by the alternatives in a number of ways:

- Changes in Atka mackerel availability may lead to changes in port visits by trawl catcher/processors targeting Atka mackerel.
- Changes in Pacific cod availability may lead to similar changes in port visits by trawl and non-trawl catcher/processors, and by trawl and non-trawl catcher vessels delivering product to Adak.
- Changes in pollock availability may lead to changes in Aleut Corporation revenues to be used for Adak development, to increases in trawl catcher/processor visits to Adak, and to increases in trawl catcher vessel deliveries in Adak.
- Changes in availability of all these species may lead to changes in revenues to Adak from its raw fish tax, other taxes it imposes (for example on fuel sales), and to fisheries resource and fisheries business taxes that may be shared with it by the State of Alaska.
- Increased sales in Adak, and increases in income to its residents, may lead to growth at Adak through indirect and induced impacts.
- Adak may experience agglomeration benefits which may contribute to its growth.

These are distributional impacts. They are not parts of an overall cost-benefit analysis from a national perspective. Changes that may benefit Adak, may create offsetting costs in other places.

Investments in promoting a civilian community in Adak contribute to maintaining a port, an airfield capable of servicing large jets, and infrastructure such as warehouses, a bulk fuel tank farm, and a clinic, in a remote region of the Aleutian Islands. These may have benefits in an air, maritime, or military emergency, or with respect to long-term national security interests. For example, the 24 crew of the *Cougar Ace* were brought to Adak when that 600-foot ship rolled on her side in shipping lanes 200 miles to the south in July 2006 (Terry 2006). Currently, a tow package has been pre-positioned at Adak, and some Department of Defense overseas flights land at Adak to refuel and secure other services

(Lockett, City Manager, City of Adak, personal communication, August 15, 2013). Adak was the site of various military commands from World War II through the Cold War, but the installation closed in 1997, and reverted to private use. This suggests a limited value with respect to national security needs.

Assuming the current services provided by Adak are optimal, the benefit of maintaining the civilian community at Adak would be the difference between the current cost of providing these services, and the cost of providing them in the absence of the civilian community. This difference is not known. Section 8.18.5 explains that Federal and state governments have taken steps to promote the creation of a civilian community at Adak, including the air travel subsidies provided by the Federal Essential Air Service Program (Restino 2012), Federal allocations of fish to support a fishing community and processing at Adak, and the State of Alaska's creation of a state-waters fishery for Pacific cod in the region. The Essential Air Service subsidy represents a cost to the nation in the form of resources no longer available for other purposes; fish allocations represent a transfer of resources from one party to another without net costs, except for any that might be generated by increased costs of transferring harvesting rights or costs of constraints imposed on resource use.

Alternative 1: Aside from Alternative 6, Alternative 1 has the greatest adverse impacts on Atka mackerel revenues (Figure 8-5), and on non-trawl Pacific cod catcher/processor revenues (Figure 8-16). The impacts of Alternative 1 on Pacific cod trawl revenues, both for catcher/processors (Figure 8-13) and catcher vessels (Figure 8-20) are adverse compared to the baseline, and comparable to those for Alternatives 2 and 3. The adverse impacts on Pacific cod trawl gross revenues are not as severe as those for the protective option of Alternative 2.

On balance, it is likely that the adverse impacts of Alternative 1 on port visits to Adak are worse than those for the other alternatives, except for those of Alternative 6, and possibly excepting those for the protective option of Alternative 2. They are worse because, despite the similarities of the Alternative 1, 2, and 3 impacts on trawl vessels, Alternative 1 has more severe impacts on trawl catcher/processor Atka mackerel revenues and non-trawl catcher/processor Pacific cod revenues. These factors would adversely affect the likelihood of port visits to Adak, and associated purchases of goods and services there, compared to the baseline, and to the other alternatives.

The adverse impact on trawl catcher vessel gross revenues would also be associated with a reduced volume of Pacific cod deliveries to the processing plant in Adak, compared to the baseline. This would adversely affect economic activity at the plant, and income streams generated for Adak residents by this activity. Such revenue streams would be associated with purchases of goods and services by the plant, the lease of the processing plant, and fisheries tax revenues paid to the city of Adak by fishermen delivering product in Adak. These impacts would be comparable to those under Alternatives 2 and 3, worse than those under Alternative 4, and not as bad as those under Alternative 6, and the protective option to Alternative 2.

As discussed in Section 8.7, this alternative does not remove restrictions on pollock fishing in critical habitat in the Aleutian Islands. Thus, this alternative has no pollock-fishing-mediated impact on Adak in comparison with the baseline years. However, Alternatives 2, 3, and 4 do lift some restrictions on pollock fishing and this could have a positive impact on Adak in comparison to the baseline[151] and to Alternative 1.

[151] Recall that the baseline years are 2005 through 2012 for pollock, and 2004 through 2010 for Atka mackerel and Pacific cod. Alternative 4 adopts most, but not all of the regulations in effect during the baseline period and so is similar to, but not exactly equivalent to, the baseline.

Alternative 2 is likely to be associated with more catcher/processor port visits to Adak, and associated sales of goods and services, than Alternative 1, but less than the baseline. These increases are more likely to come from trawl vessels fishing for Atka mackerel and from non-trawl vessels fishing for Pacific cod, than from trawl vessels fishing for Pacific cod. For both of the first two sector-species combinations, the estimated production and revenues associated with Alternative 2 are greater than those associated with Alternative 1. The impacts associated with port visits by trawl vessels targeting Pacific cod may not be very different from those under Alternative 1. As noted in Figure 8-13 and in Figure 8-20, Pacific cod trawler gross revenue streams during the baseline period are very similar for Alternatives 1 and 2. Pollock production under this alternative may also contribute to port visits. Alternative 2 includes options to allow catcher vessels fishing for Pacific cod in Area 543 to deliver their harvest to motherships, and prohibiting these catcher vessels from delivering to motherships. A prohibition of mothership activity in Area 543 under this option could reduce port visits to Adak by catcher/processors that might have acted as motherships, and by catcher vessels that might have delivered to them.

Although Alternative 2 gross revenues are similar to those for Alternative 1, the relative impact of Alternative 2 on Pacific cod deliveries to the processing plant in Adak, in comparison to those under Alternative 1, is not clear. Overall gross revenues for trawl catcher vessels during the baseline years are not very different from those under Alternative 1, Alternative 2 tends to produce its results by restricting fishing area in the eastern half of Area 541, while lifting restrictions to a great extent in the western half of Area 541, where Adak is located. In addition, Alternative 2 includes options to allow catcher vessels fishing for Pacific cod in Area 543 to deliver their harvest to motherships, and prohibiting these catcher vessels from delivering to motherships. The impact of these options on Adak is unclear. If catcher vessels are unable to deliver Area 543 harvest to motherships, they may have no alternative except to deliver to Adak. However, the prohibition on mothership deliveries of Pacific cod caught in Area 543 may increase the operating costs for catcher vessels in Area 543, and discourage any catcher vessel activity there. This may reduce the overall attractiveness of the region to catcher vessels and discourage the use of the port of Adak.

Since there has been so little fishing for pollock in recent years, it is difficult to project how pollock production will change with the alternatives. In general, it is assumed in this analysis that increasing the amount of open area will increase opportunities for pollock fishing, and will likely be associated with increases in harvests. Alternative 2 creates more opportunities for fishing pollock than during the baseline years, or under Alternative 1.

Alternative 2 has options that would close waters in Kanaga Sound to pollock fishing within 6 and 10 nautical miles of Ship Rock in the southern sound. Both of these options would reduce the potential benefits of the action to Adak; the 10 nautical mile closure reduces benefits to a greater extent than the 6 nautical mile closure.

Alternative 2 includes an option to prohibit directed fishing for pollock in Kanaga Sound by vessels greater than or equal to 60 feet LOA. While this measure may be intended to increase opportunities for pollock fishing by vessels likely to deliver in nearby Adak, it is not clear that this measure would benefit Adak. The Aleut Corporation can control the way the directed fishing allocation (DFA) in the Aleutians is fished, and could introduce this measure on its own if it thought that this would provide the most benefit to Adak. It would have more flexibility to modify its decision through time if the measure were not written into regulations.

Alternative 2 includes a protective option defining seasonally-changing closure areas for pollock around rookeries and haulouts in Areas 541 and 542. Since an examination of harvest data from protected areas in the 1990s suggests that somewhat more production came from the areas opened under Alternative 2

than under its protective option, the protective option is expected to reduce the benefits of the action to Adak compared to Alternative 2; however, the benefits would be greater than under Alternative 1.

Alternative 3 may be associated with more port visits to Adak than Alternatives 1 and 2, but fewer than Alternative 4, or the baseline years. As shown in Figure 8-5, Atka mackerel wholesale gross revenues under Alternative 3 and its option to close Area 543 west of 174.5° E longitude are somewhat higher than Alternative 2 and its options, and much higher than Alternative 1. The Alternative 3 option that closes all Area 543 critical habitat and closes the area around Buldir Island from 0 to 15 nautical miles (except for certain areas from 10 to 15 nautical miles) has estimated gross revenues that are similar to, and not worse than, those of Alternative 2 and its options. Port visits associated with Pacific cod production would be similar to those under Alternatives 1 and 2, greater than those under the protective option to Alternative 2, but less than those for Alternative 4. Pollock production under this alternative may also contribute to port visits.

Estimated catcher vessel gross revenues by alternative in the baseline years were summarized in Figure 8-20. As discussed above, there are not large differences in catcher vessel Pacific cod production and gross revenues between Alternatives 1, 2, and 3. If deliveries to Adak are correlated with the availability of Pacific cod to catcher vessels, this alternative should have similar effects to Alternatives 1 and 2. Production should be smaller than during the baseline years, or than under Alternative 4. However, production may also tend to be higher than under the protective option to Alternative 2.

In general, Alternative 3 and Alternative 4, which are discussed briefly below, should increase opportunities for pollock harvests, compared to Alternative 2. However, each of these alternatives contains the same protective option that is provided for Alternative 2. If the Alternative 3 protective option were adopted, the benefits from the action would be similar to those associated with the Alternative 2 protective option.

Alternative 4 is the best alternative from the point of view of the current residents of Adak. Under this alternative, Atka mackerel and Pacific cod management return to most of the regulations in place in 2010, before the interim final rule became effective on January 1, 2011. Port visits by catcher/processors, and deliveries by catcher vessels, should return to levels similar to baseline levels, assuming processing is available and reliable. In fact, catcher vessel deliveries may exceed baseline levels, because, while the Adak plant had financial difficulties and went bankrupt in the later baseline years, the plant began operating again in 2011.

In addition, areas of critical habitat, which were closed during the baseline years, are made available for pollock fishing. Because of this latter measure, Alternative 4 provides net benefits to Adak residents when compared to those under the baseline conditions. Alternative 4 pollock benefits are similar to those in Alternative 3 and greater than those under Alternatives 1 and 2.

Alternative 4 contains the same protective option proposed for Alternative 2; if the protective option to this alternative were adopted, the results for Adak would be similar to those that would have occurred had the Alternative 2 protective option been adopted.

Alternative 5, discussed in detail in Section 8.13.1, is the Council's preferred alternative. As discussed in Section 8.13.1, the different elements of Alternative 5 were adapted from elements of other alternatives, which were evaluated in detail in earlier sections. Those provisions of Alternative 5 that regulate Atka mackerel fishing were based on Alternative 3; those that regulate Pacific cod were based on Alternative 4; those that regulate pollock were based on Alternatives 3 and 4, which are, themselves, identical. Modifications from the underlying alternatives were made in each case. Alternative 5 impacts for Adak, better than those of Alternatives 1, 2, 3, and 6, and not as good as those of Alternative 4.

Alternative 6, which prohibits the retention of Atka mackerel, Pacific cod, and pollock has greater adverse impacts on Adak than all other alternatives.

Atka

Fishing vessels from Atka have primarily targeted halibut and sablefish, and not Pacific cod and Atka mackerel. Atka has not been an important logistical support base and is not impacted by transfers of product from catcher/processors to tramp steamers. There may be some impact from changes in the number of crew rotations carried out through Atka in connection with fishing operations. However, there are not currently many of these a year, and each involves small numbers of persons, interacting minimally with the community (Snigaroff, Lokanin, Wood, personal communications).[152] Atka shares in the State's fisheries business tax and fishery resource landing tax revenues, and the loss of these revenues may be an additional source of impact. Atka has a 2 percent raw fish tax, and planned increases in Pacific cod deliveries may create new revenues. In the past, Atka Pride Seafoods did not take deliveries of, or process, Pacific cod; however it began to do so in the summer of 2012, and plans to expand production in the future. (Cotter, personal communication, September 10, 2012)[153]

Atka may be affected by the alternatives in a number of ways:

- Changes in Pacific cod availability may lead to increased catcher vessel deliveries to the Atka Pride plant at Atka, providing jobs and community income.
- Changes in availability of all these species may lead to changes in revenues to Atka from its raw fish tax, other taxes it imposes (for example on fuel sales), and to fisheries resource and fisheries business taxes that may be shared with it by the State of Alaska.
- Increased sales in Atka, and increases in income to its residents may lead to growth at Atka through indirect and induced impacts.

Based on the past, this action is unlikely to have much impact on Atka from changes in port visits unconnected with deliveries of Pacific cod to the Atka Pride processing plant. Changes in trawl catcher vessel revenues associated with the action may be a useful proxy for the impact of the action on Atka. This measure can be evaluated using Figure 8-20. Alternative 4 would be the most beneficial for residents of Atka, while Alternative 6, and the protective option of Alternative 2 would be the least beneficial. Given the uncertainties inherent in the estimates, and the similar patterns for the gross revenue estimates for Alternatives 1, 2, and 3, it is difficult to discriminate between the alternatives on this basis. Alternative 5 is very comparable to Alternative 4.

As noted in the discussion of Adak, Alternatives 2 and 3 close the critical habitat in Area 541 from the approximate position of the village of Atka to the eastern border of Area 541, leaving much of the waters to the west of this point open. This may adversely affect Atka's ability to exploit some nearby Pacific cod grounds, in comparison with Alternative 1. Figure 3-11 and Figure 3-12 show the locations of catcher vessel harvests of Pacific cod in the periods 2004 through 2010 and 2011 through 2012. Both of these figures show concentrations of harvests in critical habitat from 10 to 20 nautical miles from shore, just to the east of Atka North Cape.

[152] Mark Snigaroff, Atka. Personal communication, September 3, 2010. Leonty Lokanin, Mayor of Atka. Personal communication, September 24, 2010.

[153] Larry Cotter, President of the Aleutians Pribilof Islands Development Association. Personal communications, 2012.

Unalaska

Catcher vessel deliveries of Aleutian Islands Pacific cod and pollock to Unalaska have been relatively small. Moreover, Chapter 10 points to relatively little involvement by Unalaska-owned vessels in the Aleutian Islands Atka mackerel and Pacific cod fisheries. While local resident direct income from the fisheries cannot be determined, it may be relatively limited.

However, numbers of catcher vessels and catcher/processors visit Unalaska either before or after fishing for Pacific cod in the Aleutian Islands areas. As shown in Table 10-13 in Chapter 10, from 2004 to 2010 an average of 32 catcher/processors visited Unalaska either before or after targeting Atka mackerel in the Aleutians, while in 2011, there were 48. From 2004 to 2010, an average of about 37 catcher/processors visited Unalaska before or after fishing for Pacific cod in the Aleutians, while in 2011, there were 15. Similarly, numbers of catcher vessels visit Unalaska before or after targeting Pacific cod in the Aleutians; from 2004 to 2010 there were an average of about 33, while in 2011 there were 17.

Vessels entering port may require a variety of logistical services. Catcher/processors may offload product to a tramp steamer in the harbor or deliver product across the dock to local cold storage. Even deliveries in the harbor will generate impacts within the community, because of a requirement to use longshore workers. Unalaska is a base for logistical support for the fishing industry in the Aleutian Islands. The range of services includes support for crew rotations, repairs, gear storage, refueling, and watering. The demand for these services could be reduced by this action, generating indirect impacts.

It has been pointed out that fisheries support businesses in Unalaska are diversified, and support operations in different fisheries. This diversification provides some income stability from year to year, as different fisheries are more or less lucrative for fishermen and as participation in them rises and falls. Within the course of a year, the different seasonality of fisheries can help stabilize demand and cash flow. Moreover, having a multi-fishery base could allow some businesses to justify a presence in Unalaska. Restrictions on fishing activity in the Aleutian Islands may reduce this diversification for shoreside firms (Benton 2010). The potential impacts of the fishing restrictions in the Aleutian Islands may also affect other fisheries in the Bering Sea. If increased harvest of PSC by trawler catcher/processors operating in rock sole, yellowfin sole, and Pacific cod fisheries, for example, led to earlier closures of some of these fisheries, the seasonal pattern of demand, and perhaps aggregate demand, for shoreside services in Unalaska could be affected (Kelty 2010).

Unalaska is larger than the communities to the west, and the local economy is more developed. Indirect impacts may be larger here, although as before, goods and services are probably imported from outside the community in larger proportions than they would be from a similarly sized community, say, in the Puget Sound area. Induced impacts would depend on the extent to which persons earning incomes in the fisheries live in, and would make personal purchases in, Unalaska. The extent of this is unknown, but is probably not great.

Unalaska shares in the State's fisheries business tax and fishery resource landing tax revenues, and the loss of these revenues may be an additional source of impact. While Unalaska has a 2 percent raw fish tax, little Aleutian Islands Pacific cod is delivered there, so this is not likely to create a large impact. Unalaska also has a 2 percent sales tax, a 5 percent bed tax, and a 1 percent capital tax. Reduced support activity associated with reduced fishing in the Aleutian Islands may affect this source of revenue and create additional induced effects.

Unalaska may be affected by the measures in several ways:

- Changes in Atka mackerel, Pacific cod, and pollock availability in the Aleutian Islands may have implications for catcher/processor port visits that are difficult to ascertain. Visits may drop, as they are likely to do in Adak, if availability is reduced; or they may increase, if redeployment involves vessels in fisheries closer to Unalaska's Port of Dutch Harbor.
- Increased pollock availability in the Aleutians may mean somewhat less availability in the eastern Bering Sea; the Aleut Corporation may seek to engage catcher/processors and catcher vessels that become active in the fishery with the Port of Adak. This could promote some deployment away from Dutch Harbor. Given the small amounts of pollock in the Aleutian Islands, compared to typical harvests in the Bering Sea, impacts on Unalaska are likely to be small.
- Changes in the availability of Atka mackerel, Pacific cod, and pollock, or the locations from which they are harvested, may affect revenues from Unalaska's raw fish tax, as well as the fishery resource and business taxes shared with it by the State of Alaska.
- In general, the economy of Unalaska is comparatively large with respect to the potential impacts it may face from this action.

The net effect of the alternatives on Unalaska is unclear because they may depend directly on overall fisheries output, or on shifts in fishing activity associated with redeployment. These effects do not pull in the same direction, and their relative sizes are unclear. To the extent that a reduction in fishing activity in the central and western Aleutian Islands reduces vessel port visits in Unalaska, and associated purchases of goods and services and sales of unprocessed product, Unalaska may be hurt. However, to the extent that fishing operations redeploy into Bering Sea fisheries, and shift port visits to Unalaska from ports further west, Unalaska may be benefitted by an alternative. This analysis cannot discriminate among the impacts of the alternatives sufficiently to determine whether Unalaska will be adversely affected or not.

Other Alaskan communities

Other Alaskan communities, from Ketchikan to Sand Point, may have limited involvement in the Atka mackerel and Pacific cod fisheries. Home port and residence information from administrative sources may be imprecise. Communities not listed may be involved, and the reports may provide a misleading picture of the relative importance of the fisheries to the different communities.

In general, these communities receive some direct income from the earnings of crew members, vessel owners, and fishing privilege owners, and enjoy some indirect incomes from the provision of support services to the fishing operations, and induced incomes as direct and indirect income earners spend locally. However, as noted in Chapter 10, the involvement is limited. Anchorage is listed as a home port, but the fishery would also generate income for Anchorage, since Anchorage is a transit point for crew rotations and the shipment of supplies for operations in the Aleutian Islands and the Bering Sea. While this action could affect incomes in these communities, in most of these "other" Alaskan communities, this impact should be relatively small.

Sub-section 8.7.5 of this chapter discussed the potential impacts of providing more pollock fishing opportunities. Fifty percent of the Aleut Corporation allocation must be fished by vessels less than or equal to 60 feet LOA. No LLP licenses are required by trawl vessels directed fishing for pollock in the Aleutian Islands (50 CFR 679.2, definition of license limitation groundfish). The increased access to pollock grounds in the Aleutian Islands may provide a new fishing opportunity for owners and operators of small trawlers. An examination of vessels in this size class using trawl gear off of Alaska from 2005 through 2012 identified as many as 38 unique vessels (this may be an overestimate if vessels were renamed, or obtained new Federal Fishery Permits). There was an average of about 26 vessels involved in each year. These vessels fished for pollock in the Gulf of Alaska, predominately (92 percent) in Area 610, but also in Areas 620 and 630. These vessels did not fish pollock in the Bering Sea. Vessels with

home ports in the Western and Central Gulf of Alaska were an especially important part of this fleet. There was an average of 10 vessels a year from Sand Point, four vessels a year from King Cove, and two vessels a year from Kodiak. The remaining vessels reported Girdwood, Juneau, Petersburg, and Seattle home ports.

Other Alaskan communities may be affected by these alternatives in the following ways:

- In general, impacts on communities outside of the central and western Aleutian Islands will be small. Relatively few of the vessels active in the Aleutian Islands are based in these ports; the ports provide relatively small direct support for these fisheries.
- If the pollock fisheries in the Aleutian Islands are stimulated by the alternatives, the Alaska Peninsula ports of Sand Point and King Cove may be impacted. These ports provide home ports and bases for a number of trawl vessels under 60 feet LOA that have experience in the Aleutian Islands and in fishing for pollock.

The impacts associated with changes in the Atka mackerel and Pacific cod regulations may be relatively small in Alaskan communities outside of the Aleutians, given their limited involvement in the fisheries, and the relatively small proportion of their fishing income believed to be derived from the fisheries.

Impacts of changes in pollock regulations may be more focused in King Cove and Sand Point. If so, Alternative 4 would have the greatest positive impact on residents of these communities, Alternative 1 would have no impacts relative to the baseline, and Alternatives 2 and 3 would have intermediate levels of impact. Alternative 5 may have impacts that are similar to, but possibly not quite as good as those of Alternatives 3 and 4. Alternative 6 prohibits retention of pollock, however, given the limited pollock fishing activity outside of critical habitat in recent years, this is likely to have small impacts on these communities.

Pacific Northwest

The Pacific Northwest, and especially the Seattle-Tacoma area, is an important locus for any employment and income impacts of this action. However, while the absolute impacts are probably relatively large here, compared to other communities such as Adak, Atka, and Unalaska, the large size of the Seattle-Tacoma area, and its diverse economy, mean that the impacts are smaller, proportionately, than in other communities.

As described in Chapter 10, important components of the fleets fishing for Atka mackerel and Pacific cod, especially the trawl catcher/processors, the fixed gear catcher/processors, and the trawl catcher vessels are owned by residents of the Seattle-Tacoma area. It is also likely that many of the crew members come from this region. The incomes accruing to local vessel owners and crews are a direct impact of the fishery. The incomes spent by owners and crew will generate induced effects in other businesses, as owners and crew spend their incomes on personal purchases of goods and services.

The region is an important supplier of logistical services to the fleet, including corporate headquarters support, shipyard services, other repairs and maintenance, supplies, and services support, including the provision of financial, legal, and other services, marketing, and product shipment and storage. The region has seafood reprocessing plants that receive and reprocess catcher/processor deliveries from BSAI fisheries. Many crew rotations originate in the Pacific Northwest. These expenditures would represent direct impacts of the fishery. Firms supplying the fleet will, themselves, make regional purchases, generating additional, indirect, impacts through employment and income multipliers.

The restrictions associated with the status quo, and the potential for reductions in revenues from the fishery will thus have direct, indirect, and induced impacts in the Seattle-Tacoma area.

This regional economy is a large one, and persons with direct and indirect sources of income associated with the fishery probably spend a larger proportion of it regionally than do persons in smaller Alaskan communities. In addition, persons living in Alaska and earning incomes associated with the fishery spend a relatively large proportion in the Pacific Northwest, as well, as they travel through the region, purchase goods and services produced in the region, and purchase goods and services that transit the region. Thus, this area probably receives a large proportion of the induced impacts associated with the action.

The Pacific Northwest may be affected by the alternatives in the following ways:

- A large part of the trawl and non-trawl catcher/processor and catcher vessel fleet is based on the Puget Sound area. Changes in the profitability of this fleet, associated with fluctuations in Atka mackerel and Pacific cod availability in the Aleutian Islands may affect fleet expenditures on goods and services.
- Similarly, changes in the profitability of the fleet may affect incomes accruing to vessel owners, crew members, and other fleet stakeholders.
- Expenditure and income changes will have indirect and induced effects in the region. These effects will be large in comparison to those in Alaskan communities. However, these impacts will be small in relation to the overall Puget Sound economy.

As in the preceding discussions, the relative impacts of the alternatives on sector and species wholesale-level gross revenues during the baseline years have been used as an index of the relative impacts of the alternatives on the Pacific Northwest community. Here, for convenience, the discussion is organized by the three species regulated by this action.

Atka mackerel: Atka mackerel is important to seven Amendment 80 trawl catcher/processors with Puget Sound connections. All alternatives drop the HLA requirement that was in place during the baseline years. The increased operational flexibility this provides, with reduced costs and potential revenue increases, cannot be identified using the gross revenues methodology here. All alternatives provide this benefit when compared to the baseline period.[154] The relative gross revenue impacts of the alternatives may be seen in Figure 8-5. Alternative 1 imposes the greatest costs on these vessels relative to the baseline years. Alternative 4, which drops the HLA requirements, but otherwise returns the sector to the management rules prevailing before the interim final rule was adopted, is actually likely to provide benefits to the vessels, in comparison to the record of the baseline years. After Alternative 4, the ranking of alternatives from the point of view of the annual gross revenues they provide the fleet during the baseline period is, 3 and 3b, 3a, 2 (65%), 2 (50%), and 2 (40%). The differences between 3a and the different variants of 2 are small. Given the uncertainties inherent in this analysis, they may not be meaningful. Alternative 5 is better for communities than Alternatives 1, 2, 3, and 6, and not as good as those of Alternative 4. Alternative 6 has the greatest adverse impacts.

Pacific cod: The impacts of the alternatives on the three key sectors targeting Pacific cod, trawl and non-trawl catcher/processors and trawl catcher vessels, are summarized in Figure 8-13, Figure 8-16, and Figure 8-20. The impacts on the trawl fleets are very similar: Alternatives 1, 2 (excluding its protective option), and 3, have very similar results, and it is difficult to discriminate among them. All of these alternatives reduce wholesale gross revenues compared to the baseline years. Alternative 4 returns gross

[154] Recall that none of the alternatives exactly corresponds to the baseline years of 2004 through 2010. Alternative 4 is very similar, but differs in that it adopts the repeal of the Atka mackerel HLA program in the interim final rule.

revenues to baseline year levels, and, thus, promises the greatest potential benefits when compared to the status quo. The protective option to Alternative 2 reduces gross benefits below status quo levels, and, thus, would be less attractive to the Puget Sound region than the other alternative/option combinations. Alternative 5 impacts are similar to those of Alternative 4. Alternative 6 has the greatest adverse impacts.

The pattern of impacts of the alternatives on the Pacific cod non-trawl catcher/processors are different. These are summarized in Figure 8-16. Alternative 1, the status quo, has a large impact on sector wholesale gross revenues in all of the baseline years. The other alternatives have very similar impacts, once area-sector considerations are applied to Alternative 4 to normalize it and make it comparable to the other alternatives. In some years there are differences among these alternatives, with Alternatives 3 and 4 producing the best (and very similar) results for the sector, while Alternative 2 ranks next, and the protective option to Alternative 2 ranking lowest. However the differences among these alternatives are small compared to the difference between them and Alternative 1, and given the uncertainties inherent in these estimates, it may not be appropriate to discriminate among them on the basis of wholesale gross revenues. Alternative 5 impacts are similar to those of Alternative 4. Alternative 6 has the greatest adverse impacts.

Pollock: Alternative 1 does not change pollock availability from baseline year levels. Thus, Alternative 1 provides no additional benefit to the AFA fleet, or to trawl catcher vessels from the Puget Sound area that may be attracted to a pollock fishery. Alternative 2 provides some additional opportunities, while Alternatives 3 and 4, which are equivalent with respect to pollock, provide more opportunities than Alternative 2. The protective option to Alternative 2 lies between Alternatives 1 and 2. The benefits from pollock fishing will depend on policy decisions made by the Aleut Corporation or CDQ groups with respect to how the pollock should be fished. Alternative 5 are similar to, but possibly not quite as good, as those of Alternative s 3 and 4. Alternative 6 has the greatest adverse impacts.

CDQ communities

CDQ groups receive 10 percent of the pollock TAC in the Aleutian Islands, 10.7 percent of the BSAI Pacific cod, and 10.7 percent of the Atka mackerel TACs in each of the three Aleutian Islands management areas. These CDQ allocations are divided, unevenly, among the six CDQ groups. The allocations of these species among CDQ groups are summarized in Table 8-37.

The CDQ groups use these allocations to benefit their member communities. They may earn royalties from leasing the CDQ to other fishing companies, or they may arrange to fish it themselves. In addition to holding CDQ for species regulated by this action, the groups hold CDQ quota for other BSAI species that might provide alternative fisheries for fishing firms and vessels that find their Atka mackerel and Pacific cod fishing opportunities in the Aleutian Islands limited. The interim final rule might affect the CDQ groups in several ways.

CDQ communities may be affected by the alternatives in different ways:

- Persons living in CDQ communities may be affected by changes in the royalties received by their CDQ group from leases of Atka mackerel, Pacific cod, and pollock. Community resident impacts would be indirect, and they would depend on policy decisions by CDQ groups, translating increased changes in revenue flows into revenue, service, and investment flows in their communities.
- Persons living in the APICDA CDQ community of Atka may be particularly affected by increased job opportunities and income associated with increased deliveries of Pacific cod to the Atka Pride processing plant.

The methodology used here to rank alternatives with respect to community impacts is based on estimated changes in gross revenues attributable to sectors and species during the baseline years 2004 through 2010. The discussion of revenue flow changes to the Pacific Northwest provides a summary that appears applicable to the CDQ communities as well (at least with respect to the first bulleted point above), and is not repeated here. The impact on APICDA associated with the flow of product to its Atka Pride plant in Atka was summarized in the discussion of Atka, and, also, is not repeated here.

CDQ groups will be affected differently by the changes in species-specific revenues because they receive varying percentages of the species allocations (as noted above, these percentages are summarized in Table 8-37).

The residents of the APICDA CDQ group communities would be most affected by changes in Atka mackerel availability; APICDA received 30 percent of the 2012 CDEQ program quota for this species in each of the three management areas. The residents of the CBSFA communities would be least affected by changes; CBSFA holds 9 percent of the quota. The other four CDQ groups receive from 14 percent to 18 percent of the quota.

The residents of the CBSFA group communities would also be least affected by changes in Pacific cod fishing; this CDQ group holds 9 percent of the BSAI quota. The remaining CDQ quota is divided relatively evenly among the other CDQ groups, with allocations ranging between 15 percent and 21 percent.

The residents of CSFBA group communities would also be the least affected by changes in Aleutian Islands pollock fishing. This group holds only 5 percent of the pollock CDQ quota. The residents of the CVRF and NSEDC groups could be most affected, since these groups hold 24 percent and 22 percent of the quota. APICDA and YDFDA each hold 14 percent of this pollock quota.

Aleut Corporation stockholders

Sub-section 8.2.8 provided background on the Aleut Corporation, and on its relationship to Adak. Aleut Corporation stockholders may be affected by the fisheries management actions through two principal ways: (1) the actions may affect the profitability and net wealth of the Aleut Corporation, and, thus, its ability to serve stockholders (who are Alaska Natives although not necessarily residents of Alaska) by providing dividend payments, and charitable donations; and (2) as an Alaska Regional Native Corporation, the Aleut Corporation serves its stockholders by its support for Aleut communities and culture; it thus has objectives that go beyond providing income to its stockholders.

The actions under consideration may affect the profitability of the Aleut Corporation by; affecting the profitability of its wholly owned subsidiaries, the Aleut Enterprise, LLC, and the Aleut Real Estate, LLC. Income from these firms may be affected by deliveries of Pacific cod and pollock for processing at the seafood processing plant at Adak. These would affect the profitability of processing at Adak, and the present value to the Aleut Enterprise Corporation the processing plant, which it owns and leases to the processing company. Income may also be affected by the potential for fuel sales to visiting catcher vessels and catcher/processors, sales and leases of real estate, lease of worker housing to the processing firm operating the plant at Adak, income from visitors to the Adak Island Inn, and potential associated growth in the community.

The Aleut Corporation shareholder interest in the economic development of Adak may also be affected by these alternatives. The ways the alternatives may affect the development of Adak were discussed earlier in the section on Adak, and will not be repeated here, except to note that alternatives that increase the availability of pollock in the Aleutian Islands should increase Aleut Corporation income, since the Aleut

Corporation has the rights to all directed fishing allowances that may be created (this does not apply to CDQ fishing rights). The corporation is responsible for using these for the development of Adak, although the ways this is to be done are not specified in statute.

The Aleut Corporation is a large diversified corporation, and income from the Aleut Enterprise LLC, and Adak income from Aleut Real Estate LLC represent only a part of its income, although the amounts are non-trivial. It is not clear how the alternatives will affect these revenue flows, and how these changes would compare to normal year-to-year fluctuations in Aleut Corporation income.

Aleut Corporation stockholders may be affected by the alternatives in several ways:

- The Aleut Corporation earns revenues from sales of goods and services to fishing and processing operations at Adak, including income from fuel sales, processing plant leases, and lodging service sales. Vessels may visit Adak to deliver Pacific cod or pollock to the processing plant or for logistical support services only.
- The Aleut Corporation owns real estate at Adak, whose value may be affected by the level of economic activity at Adak.
- The Aleut Corporation stockholders may benefit in a non-pecuniary sense from the development of an Aleut community at Adak. The Corporation has been allocated the Aleutian Islands directed fishing allowance for the purpose of development at Adak. Measures that increase the availability of pollock for harvest may contribute to this development. Economic development alone, however, can only contribute indirectly to the development of an Aleut community at Adak. Immigration of ethnic Aleuts would also be necessary.

The potential of the alternatives to contribute to the economic development of Adak were discussed earlier in this section. This discussion is relevant here, with the additional note that the benefits to Aleut Corporation shareholders will be indirect, since they depend on policy decisions made by the corporation's management.

The potential of the alternatives to contribute to the Aleut Corporation's revenues are also related to the impacts of the Alternatives on the community at Adak, because Aleut Corporation subsidiaries operate businesses, including fuel sales, real estate sales, processing plant leases, and hospitality, that are dependent on the health of the economy in Adak.

8.17 Consumers[155]

As discussed in Section 8.8, the regulatory restrictions in Alternatives 1,2, 3, 5, and 6 are likely to reduce Atka mackerel production compared to baseline years. The Aleutian Islands are the primary source for Atka mackerel in the United States and almost all the catch of this species is believed to be exported. The production of Pacific cod may decrease, if fishing vessels are unable to offset their loss of Aleutian Islands fishing opportunities with catches in the Bering Sea. Even if the industry is able to offset the production in aggregate volume, industry sources indicate that, because of different average sizes of the fish in the harvest, Bering Sea and Aleutian Islands Pacific cod are not perfect substitutes, have different markets, and bring different prices. If the status quo leads to changes in the size composition of Pacific cod entering market channels the different markets may be affected differently. The production of rock sole and yellowfin sole may increase, compared to what it would otherwise have been. Overall production of BSAI pollock is not likely to change much, as production in the Aleutian Islands is small

[155] This section draws on background material summarized in Section 8.2.13.

compared to overall BSAI production, and may be offset to some extent by reduced production in the Bering Sea.

Changes in the quantities of these species of fish supplied to the market may affect consumer welfare. The appropriate measure of this welfare change is consumers' willingness to pay to get an outcome that they consider a benefit, or to pay to avoid an outcome that they would consider a harm. As a practical matter, in many cost and benefit analyses, consumers' surplus is used as a proxy for the theoretically correct measure (Boardman, Greenberg, Vining, & Weimer, 2011: Chapter 3). In order to calculate the change in consumers' surplus, it is necessary to have an estimate of the consumers' demand curve, usually obtained as part of a larger multi-equation econometric model. Because models of this sort are not available for these species, the analysis in this section is necessarily qualitative.

Atka mackerel

Since most Atka mackerel is believed to be exported to consumer markets in East Asia, and relatively little is said to be consumed in the United States, the reductions in the harvest of this species projected in this analysis would have little impact on U.S. consumers' surplus. Since a cost-benefit analysis conducted from a national accounting stance focuses on impacts experienced by U.S. domestic consumers, the relevant consumers' surplus impact of the reduction in Atka mackerel supplies is probably close to zero.

Pacific cod

As discussed in Sections 8.3 to 8.6, the status quo may change aggregate Pacific cod production in the United States, as well as the size composition of output. The non-trawl catcher/processors should be able to make up a large part, or all, of the reduction by fishing more intensively in the Bering Sea. The trawl catcher vessels and catcher/processors may be hobbled to a greater extent by the lack of a history of Bering Sea activity, and by higher halibut PSC rates in the Bering Sea. However, they may be able to make up part of their Aleutian Islands harvests. It is possible that, if catcher vessels are unable to harvest their Pacific cod allocations, the cod may be reallocated to other sectors. This is not the case for catcher/processors.

Since Pacific cod products are consumed in the United States, as well as exported, U.S. consumers' surplus may be affected. While a change in consumers' surplus in foreign markets does not enter into the calculations in a cost-benefit analysis conducted from a national accounting perspective, the change in U.S. markets does. Increased product may flow to markets requiring smaller Pacific cod, while less flows to markets requiring larger Pacific cod.

Pollock

This action is likely to have a relatively small impact on U.S. consumers. The volumes of pollock that may become available are small in comparison with volumes currently produced in the BSAI. The potential TAC in the Aleutian Islands is 19,000 metric tons. Meanwhile, the TACs in the Eastern Bering Sea have ranged between 813,000 and 1,492,000 metric tons between 2000 and 2012; the median was 1,394,000 metric tons. Thus, maximum potential Aleutian Islands production has been just over 1 percent of the median eastern Bering Sea production. In fact, in many years, when the eastern Bering Sea TAC has been less than the ABC, the foregone Aleutian Islands production has been rolled over to the eastern Bering Sea. An important characteristic of the Aleutian Islands pollock fishery is the large roe sacs that the pollock in the region are believed to have. The market for this roe is in East Asia and not in the United States. Thus, changes in the availability of this product are expected to have small impacts on U.S. consumers' surplus.

Other species

Both rock sole and yellowfin sole appear to enter foreign and U.S. markets. Increases in production of these species under the status quo may lead to increases in U.S. consumers' surplus. Potential benefits are impossible to estimate.

8.18 Additional impacts

8.18.1 Safety

In general, quantitative comparisons of fishery resource management effects on vessel safety are difficult. The reasons for this are many: casualty investigations have missing or inconsistent data on fishery management, accurate denominator data[156] are not available, and there is considerable disagreement on the magnitude and relevance of fishery management effects on accident causality. For this reason, this analysis will introduce and compare safety impacts of the six alternatives in a qualitative discussion.

The authors used five principle factors to evaluate risk to commercial fishing vessels operating in the BSAI. Note that these are generalizations, based on U.S. Coast Guard analysis across all fishery types and geographic areas. There are obviously exceptions to these assumptions: the purpose here is to examine general trends among large groups of vessels.

The following are not listed in any order that implies a ranking of the magnitude of either the probability of a vessel casualty or the consequences of a vessel casualty.

A. Increasing distance westward increases risk to fishing operations. This is due to greater distance to U.S. Coast Guard search and rescue (SAR) resources.

   The U.S. Coast Guard maintains seasonal search and rescue support facilities at Cold Bay in the late fall, and at St. Paul Island at the start of the year. Otherwise, aircraft responding to a distress call in the Western or Central Aleutian Islands would have to start from the U.S. Coast Guard base in Kodiak. Operational restrictions on the distance unescorted aircraft are allowed to fly over open water mean that planes originating from any of these locations would probably travel by way of Unalaska and Adak. Travel time from Kodiak to Kiska could be eight hours for a C130, and 12 hours for a helicopter. Thus, both alternatives would tend to shorten travel times to vessels that shift their operations to waters closer to these bases.

   The U.S. Coast Guard also endeavors to maintain a SAR cutter with embarked helicopter in the Bering Sea 365 days a year. The presence of this cutter is often dependent on exigent circumstances, such as weather, casualties, and marine incidents. The high concentration of fishing activity in the Eastern and Central Bering Sea typically dictate the cutter's presence there for both law enforcement and SAR purposes.

B. Decreasing fishing density increases risk. Fishing density may be considered from a spatial or temporal perspective. In this discussion, the density of fishing vessels is considered from a spatial perspective and the increased risk is related to reduced proximity to other fishing vessels

[156] The National Institute for Occupational Safety and Health expresses injury and death rates in multiple ways, for example: injury/mortality per unit time by industry or per worker day or month. The denominator could also be expressed as the amount of fishing effort. These denominators are difficult to standardize for the fishing industry.

that could act as "Good Samaritans" until the arrival of U.S. Coast Guard SAR resources. The Coast Guard estimates that in 70 percent to 80 percent of serious fishing vessel casualties in the BSAI, there is another fishing vessel on-scene prior to SAR arrival.

C. Increasing the number of fishing vessels less than 60-foot length overall increases risk. Generally, these vessels as a class lack detailed stability information, have less system redundancy, smaller and unlicensed crews, and less adherence to construction and condition standards (such as enrollment in the U.S. Coast Guard's Alternate Safety and Compliance Agreement and /or classification/loadline).

D. A "race to fish" or other increase in fishing pressure increases risk. The adverse safety impacts of the "race to fish" are well documented in other fisheries, and include fatigue and greater tolerance for increased risk (such as operating in poor weather) during limited fishing openings. In this discussion, fishing pressure is considered in temporal terms.

E. Increasing the amount of fishing in "winter" increases risk. This follows from the generally harsher weather patterns that predominate in the region during the months of November through March.

The following analysis will examine the six alternatives in light of these assumptions in a qualitative manner, drawing inferences about the safety impacts of each.

It is notable that an analysis of any single alternative using the assumptions stated above may result in both increases and decreases in safety. For example, an alternative may involve movement westward to areas of less fishing density, yet increase profitability and relieve fishing pressure. In addition, a precise estimate of the fleet's redeployment and adaptation to any alternative's unintended consequences is not available. It is the objective of this analysis to identify where safety risk is anticipated to increase, with the understanding that a precise measurement of the net effect may not be possible to predict.

Increasing fishing effort in Areas 543 and 542 (Factors A and B):

Alternative six is characterized by comprehensive prohibitions on retention of Atka mackerel, Pacific cod, and pollock in all three management areas. Alternative 1, or the status quo, is characterized by sweeping area and species closures for the most remote areas (543 and 542). The second, third, fourth, and fifth alternatives are characterized by elimination of the retention prohibition in Area 543 for Atka mackerel and Pacific cod, and an increase in access to these species in Area 542. These alternatives are also associated with relaxation of critical habitat restrictions on pollock fishing, which may lead to increased fishing for pollock in all three areas during the pollock A-season.

Should additional fishing pressure take place in Areas 542 and 543, these vessels will be further away from traditional U.S. Coast Guard search and rescue assets. Due to this distance, any prospective search and rescue response from these assets will take longer, potentially putting mariners at additional risk. If as a result of fleet redeployment to these areas vessels are operating in closer proximity to each other, safety could potentially be improved due to Good Samaritan assistance, although this could not be guaranteed. By reducing vessel activity in the western Aleutians, Good Samaritan assistance for vessels that continue to target unaffected species in the region, would be reduced.

Fishing by small vessels (Factor C)

The pollock allocation in the Aleutian Islands is divided between the ICA, the CDQ groups, and the Aleut Corporation. The Aleut Corporation has considerable authority to organize the pollock fishery in the

region, but it is subject to certain constraints. An important regulatory constraint requires the Aleut Corporation to allocate 50 percent of its own allocation for fishing by catcher vessels under 60 feet LOA. Thus, if productive pollock grounds are in fact opened in Aleutian Islands critical habitat under Alternatives 2, 3, 4, or 5, small trawl catcher vessels may have an increased incentive to operate within the Aleutian Islands. Alternative 6 prohibits pollock retention, and could have the effect of limiting small vessel activity, but this activity has not been authorized by the Aleut Corporation in recent years, and the impact of this would be non-existent or small.

Race for fish (Factor D)

The Council has separated Aleutian Islands and Bering Sea Pacific cod TACs in 2014. This is expected to be a permanent change. This split has the potential to create a race for Pacific cod in the Aleutian Islands as operations with different gears and in different processing sectors compete for the available Pacific cod. Several of the alternatives include area limits on harvest that may reduce the available supply of Pacific cod in some areas, and which may exacerbate this race for fish. Alternatives 2 and 3 include measures to limit harvests by some sectors, while leaving other sectors unlimited. These may be associated with a race for fish. Alternatives 4 and 5 do not limit any of the sectors below the area limits defined for Area 543. These alternatives may also be associated with races for fish. The Atka mackerel and pollock fisheries are not likely to be associated with a race for fish, as each of these has been rationalized (by Amendment 80 for Atka mackerel, and with the Aleut Corporation allocation for pollock).

Winter fishing (Factor E):

The extension of some fishing seasons beyond November 1 may increase the level of activity that will occur in winter months, while also effectively lengthening the seasons that allow for temporal dispersion of activity, thereby reducing likelihood of increased risk-taking to achieve TAC in shorter timeframes. Analysis by the criteria above indicates that an increase in fishing activity during these months could decrease safety as the likelihood of fishing during adverse weather increases, or increase safety as dispersion of fishing activity over longer periods occurs. All Atka mackerel and Pacific cod alternatives employ various options for season length and may affect fishing during November and December. The Atka mackerel season is extended from November 1 to December 31 in Alternatives 2, 3, 4, and 5; the non-trawl Pacific cod season is effectively extended in comparison to the status quo by Alternatives 3, 4, and 5.[157] While trawler seasons are extended under some alternatives, trawlers do not target Pacific cod in November and December, so an extension is unlikely to lead to increased fishing (although it may provide for an MRA and reduce regulatory discards). Alternative 6, which prohibits retention of all species, would eliminate any winter fishing.

The opening of a pollock A-season roe fishery under Alternatives 2 through 5 could increase fishing activity in the winter months during the early part of the year and may also contribute to more winter fishing in the Aleutian Islands.

[157] The non-trawl season extension is not based on a change in the formal season itself, but on the lifting of a prohibition on directed fishing after November 1 under these alternatives.

8.18.2 Enforcement

Introduction

Alternatives 1 through 5, and the protective option, contain management measures that require (or would require) monitoring by the NOAA Office of Law Enforcement (NOAA OLE) and the U.S. Coast Guard for their effective enforcement. The management measures considered under the alternatives include variations in fishing seasons, critical habitat closures, and restrictions on groundfish retention. Enforcement of these measures, such as critical habitat no-fishing and directed fishing closures, is heavily reliant on use of vessel monitoring systems (VMS), information from vessel reporting/eLandings, aerial/surface patrols and at sea boarding, and audits of product offloads.

VMS: need and limitations

VMS is the primary enforcement tool for groundfish management in the Aleutian Islands and it is likely to become more important in the future. Use of VMS is likely to increase because the Aleutian Islands are a challenging environment to implement any other form of compliance monitoring. It is an expansive area, with low commercial fishing vessel densities. The management strategies for limiting catch of Steller sea lion prey species in proximity to Steller sea lion habitat, apply numerous and complex area closures. This vast management area is supported by a limited Coast Guard and NOAA OLE presence.

Enforcement resources are limited in both of the Federal enforcement agencies charged with monitoring and compliance in the fisheries of the North Pacific. NOAA OLE currently has six staff dedicated to investigative efforts for the Gulf of Alaska west of Kodiak, and the BSAI. In the North Pacific, fisheries enforcement is only one of many missions the U.S. Coast Guard is currently tasked with. The Coast Guard maintains a one-cutter presence in the BSAI for law enforcement and SAR purposes. Using this high-endurance cutter, along with occasional buoy tenders that transit the Aleutian Islands to service aids to navigation, the U.S. Coast Guard patrols the Aleutian Islands with surface assets only 4 to 8 weeks per year. The U.S. Coast Guard also maintains four fixed-wing aircraft with the range to conduct patrols of the Aleutian Islands from their home station in Kodiak. Given the operational and logistical demand for these aircraft throughout Alaska, aerial patrols of the Aleutian Islands occur only once or twice per month. The U.S. Coast Guard's myriad responsibilities, coupled with a restrained budget climate, suggest that it will be increasingly difficult to free up additional resources for Aleutian Islands enforcement for implementing any of the alternatives.

Considering the current fiscal limitations, VMS has become a critical tool for monitoring and enforcement of area closures across all of the alternatives. VMS systems are small, tamper-resistant, transmitter-GPS combinations that send regular signals identifying the vessel and its location to ground stations via overhead satellites. These signals make it possible for NOAA OLE to monitor the locations of fishing vessels. The information helps NOAA OLE identify vessels that may have fished inside closed areas, permitting the targeting of investigative resources.[158] VMS information is also used by NMFS in-season fishery managers to monitor fishing effort in a region or area, and plays an important role in determining when to close a fishery to avoid exceeding a TAC or an ABC, and when it can safely be left open or must be closed.

All federally permitted vessels fishing for groundfish in the Aleutian Islands sub-area have been required to carry a VMS since 2006 (71 FR 36694, June 28, 2006). The current practice is for vessel VMS units to

[158] For more details, see the Council's recent (December 2012) discussion paper on the use of VMS in Alaska Fisheries (NPFMC 2012f).

report every thirty minutes, although NOAA OLE can increase this "polling" rate if a vessel appears to be operating near a no-transit or no-fishing zone. (NPFMC 2012f).

An important consideration with respect to the enforceability of the alternatives considered in this discussion is that the reliability of VMS service in the BSAI may vary substantially from vessel to vessel or between VMS service providers. In the Aleutian Islands, approximately 30 percent of the VMS units used in the Atka mackerel and Pacific cod fisheries are not currently compliant with the rate of 2 transmissions per hour. The reliability of VMS service is defined as the proportion of the vessel transmissions actually received. Service quality is observed as a loss of a large number of vessel transmissions ("polling"), after the signal is transmitted from the vessel and not received or translated at the satellite and transmitted to the surface receiver, or by potential errors in the software used by a VMS provider. The result is that the ground station receiver may receive incomplete or intermittent information on vessel movements. Location information in transmissions that are actually received from the western Aleutian Islands is as accurate as that from transmissions originating further east.

VMS provides intermittent, rather than continuous, reports of vessel location. This can limit its usefulness for compliance purposes. For example, at times VMS can give rise to a phenomena enforcement staff refer to as "scalloping." This occurs when a trawler repeatedly crosses a critical habitat boundary immediately after a location transmission, sweeps through critical habitat, leaving it just before the time of the next transmission. Thus, scalloping occurs when a vessel, fishing along the boundary of a closure, momentarily crosses the boundary in between VMS transmissions. Periodic transmissions of location from VMS make it possible for a vessel operator to attempt to time the entry and exit to a closed area within the 30-minute window. A vessel operator may also make assumptions regarding the number of times a position is registered inside a Steller sea lion protection area boundary and the probability of a formal inquiry into the vessel's activity. Intermittent transmissions may result in a lower probability of an inquiry.

The utility of VMS for the enforcement of these measures in the Aleutian Islands could be enhanced through stricter adherence to the regulatory performance standards currently in place for VMS and the addition of geo-fencing.[159] While, geo-fencing may be investigated further in the future, one related performance standard involves increasing the rate of VMS polling. This is discussed in the following section. Increased polling rates would have deterrence effects as well as facilitating subsequent investigations. In addition, increased polling is likely to increase the annual cost to vessel owners of operating VMS.

The enforcement of the alternatives varies primarily by the complexity of the closures. Enforcement of vessel activities is necessary for tracking compliance with the opening or closing of A-season or monitoring and auditing of allowable retention of groundfish species when a species (such as Atka mackerel, Pacific cod or other groundfish) is closed to directed fishing. Therefore, this discussion will focus on the difference among the alternatives in the enforcement of the area closures.

Increase VMS polling rate for trawl vessels: Applies to Alternatives 2 through 5

As previously described in Chapter 2, NMFS will propose the following FMP amendment requiring an increase in VMS polling rates to the Secretary of Commerce for alternatives 2 through 5:

> Operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, must ensure their VMS is

[159] Referred to as "geo-fencing" (NPFMC 2012f)

transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions.

This option consists of two independent elements: (1) increasing the frequency of VMS transmissions, and (2) clarifying the trawl vessel owner is the responsible party for resolving issues, with the provider and on the vessel, that could provide unreliable VMS transmissions. This option would improve the accuracy and precision of VMS for all the alternatives and throughout the Aleutian Islands, and is considered to be necessary and feasible under all of the alternatives.

The amendment would apply to trawl vessels only, because these vessels deploy mobile gear that may be fished at speeds of 3 to 6 knots. Typically, a trawl vessel in the BSAI traveling at 4 knots per hour , with a 2 per hour poll rate, could enter critical habitat and transit or fish for up to 2 miles into critical habitat without detection. The VMS transmission rate of 10 per hour would increase the precision for locating a vessel to less than ½ nm. Fixed gear operations such as jig, pot, and longline do not have the same capability for entry, and exit from critical habitat without detection, though some gear (such as jig gear) may move during fishing at relatively slow speeds. The amendment would not be specific to trawl vessels engaged in directed fishing. The broader application to all vessels engaged in trawling for groundfish as opposed to vessels using trawl gear in a specific directed fishery is necessary because of the difficulty for NOAA OLE or U.S. Coast Guard to determine the target fishery for a vessel.

Under Alternatives 2 through 5, trawl vessels fishing for groundfish (including Steller sea lion prey species) must comply with extensive, complex closures in the Aleutian Islands subarea. Particularly under Alternatives 2 and 3, Steller sea lion closure areas are dominated by very small and irregularly shaped Steller sea lion critical habitat areas. The closures under all alternatives are further complicated by the overlap of the Aleutian Islands Habitat Conservation Area. Increasing the frequency of polling will provide NOAA OLE and the U.S. Coast Guard with an efficient method for tracking accidental or intentional incursions into critical habitat.

In implementing this option, NMFS would provide information to vessel owners to assist in ensuring the owner's vessel is complying with VMS regulation; they must contact NOAA OLE to request information on the frequency and consistency of transmissions received from VMS. NOAA OLE may experience more frequent contacts by vessel owners, to provide this verification in comparison with current communications regarding VMS. If NOAA OLE identifies VMS reception issues, the vessel owners will be expected to work with the VMS service providers to resolve these issues. In some cases, this would be an iterative process to inform vessel owners that they are achieving a satisfactory transmission rate. NOAA OLE would also reach out to the fleet on an ad-hoc basis to request information on intermittent VMS transmissions, but the responsibility for ensuring compliance with VMS regulations would be placed on the vessel owners.

Improvement in the detection of any vessel operatory that chose to chronically scallop into Steller sea lion protection areas, would assist in the deployment of specific U.S. Coast Guard resources to deter these practices. Under the status quo polling requirements, a vessel that is reporting multiple positions that are adjacent to a closed area, may trigger costly visual inspection by U.S. Coast Guard air observation resources. The increase in position data to 10 transmissions per hour, could inform agents that a fly-over is either warranted or not warranted.

The option to increase the polling rate would also assist with spatial analysis with the Catch in Areas (CIA) database, derived from VMS data. The CIA analysis has become essential for evaluating management actions to protect Steller sea lions. Current technology allows for haul-specific catch data to be merged with vessel location tracks to estimate groundfish catch by management area or smaller Steller Sea Lion protection areas. Increasing the polling frequency will decrease errors in these estimates.

For Alternatives 2 through 5, the incremental costs to Aleutian Islands trawl vessels associated with this option to increase polling rates would be small compared with the current VMS hardware, software and programing. All vessels required to have a Federal fisheries permit (FFP), and fishing in the Aleutian Islands, are required to have and operate VMS. Thus, the alternatives do not require investment in new VMS units or software, unless it is warranted to provide the required transmission reliability.

NMFS is unable to estimate the number of VMS units that may require replacement to provide the required reliability. All units installed since 2008 have been required to be "enhanced mobile transmitting units" capable of meeting the standard. However, units installed earlier may or may not be capable of meeting the standard, and other units may be faulty and unable to meet the standard. Moreover, regulatory proposals are under consideration which may change the set of acceptable units. A 2012 VMS discussion paper estimated the cost of VMS replacement (including installation) as about $3,500 (NPFMC 2012).

Increasing polling rates to 10 per hour from 2 per hour is likely to increase the average monthly cost of VMS service provider agreements by approximately $200 per month. This rate of $200 per month was established in the draft EA/RIR/IRFA for Habitat Areas of Particular Concern (HAPC) for Areas of Skate Egg Concentration (NPFMC 2013b). Table 8-154, provides data on the estimated total annual increase in cost of VMS to a trawl catcher vessel targeting any groundfish species is approximately $400. For trawl catcher/processors targeting Atka mackerel, the average cost increase is estimated to be approximately $1,200 per year, and for catcher/processors targeting groundfish species other than Atka mackerel, the average cost increase per year is estimated to be approximately $400 (Table 8-154).

Table 8-154 Estimated Cost to Trawl Vessels by increasing Polling rate in the Aleutian Islands based on 2010 data

	Estimated hours and costs in dollars: Trawl Gear by Species		
	CV (all target species)	CP (Atka mackerel)	CP (fishing other than Atka mackerel)
Estimated months for projecting costs*	2 months	6 months	2 months
Estimated cost per Month	$200	$200	$200
Estimated total Cost per year	$400	$1,200	$400

*Based on fishing activity by relevant vessels and adjusting upwards as necessary to account for VMS billing practices.

From 2004 through 2010, from 11 to 16 trawl catcher/processors a year (of which from 8 to 12 targeted Atka mackerel), and from 16 to 38 trawl catcher vessels a year, that were fishing for groundfish in the Aleutian Islands, would have been subject to the requirement for increased polling rates. (AKRO In-season management)

Alternative 1, the status quo

The status quo management measures in the Aleutian Islands groundfish fisheries implemented by the interim final rule (75 FR 77535, December 13, 2010) included selected closures to directed fishing for Atka mackerel and Pacific cod. When a directed fishing closure is activated, these actions typically would reduce fishing effort in Areas 541, 542, and 543 for Atka mackerel and Pacific cod. Because status-quo closures apply to large areas, this type of closure regime has been relatively straight forward to

enforce compared with more complex, multiple, geographically small or isolated closure regimes. The status quo reduced areas open to Atka mackerel and Pacific cod fishing, tended to shift vessel effort eastward from the more western regulatory areas. This has increased the likelihood of vessels fishing in closer proximity to each other, and may have increased self-policing of existing closures compared to the pre-interim final rule. Since implementation of Alternative 1 closures, NOAA OLE has observed fewer overall vessel-days in the more westward areas, possibly reducing the time spent by enforcement staff on monitoring and investigation of incidents in the area, and, thus, enforcement costs in comparison to the 2010 interim final rule. An eastward shift in fishing effort has likely resulted in reduced transit times for U.S. Coast Guard aerial and surface patrol units, and resulted in increased patrol coverage in areas to the east. In aggregate, the status quo has decreased enforcement input needs, decreased costs, presented a more straightforward closure regime, and presents fewer enforcement difficulties compared to the measures that existed prior to implementation of the 2010 interim final rule. By definition, the status quo does not include any changes to the existing management regime. Thus, this alternative does not include a VMS option.

Alternatives 2 through 5, and their options

Alternatives 2 through 5 and their options provide fishermen access to more areas of critical habitat. In that sense, they are less restrictive to fishermen than Alternative 1. However, in many cases, this increased access is created by defining specific areas within critical habitat that are open, while leaving other areas closed. The increased access is achieved by increasing the complexity of the system of open and closed areas. The number of boundary lines that must be enforced may be increased. As a result of the increased complexity of the open and closed areas in Alternatives 2 through 5, there is a higher likelihood of inadvertent as well as intentional violations. Many of the open areas are wholly contained within areas that are closed to the same fishing activity. This creates a challenge for enforcement, as vessels will be constantly traveling into and through closed areas to reach imbedded open areas. VMS position reports do not indicate what the vessel is doing at the time of the report, and it becomes difficult to validate that fishing activity is not occurring within surrounding closed areas. Due to the small size of some of the open areas contained within larger closed areas, there exists a very real possibility that VMS position data of vessels legally operating within the open area will show excessive activity in the surrounding closed area. As a result there would be an increased need for enforcement to monitor and investigate positions showing a vessel within the closed areas. This would be problematic due to the lack of resources available to NOAA OLE at this time. This situation would be partially ameliorated by increasing the polling rate of VMS in these fisheries, but many of the sources of error for enforcement of Alternatives 2 and 3, and to some extent Alternatives 4 and 5, will still persist.

Many of the open areas have complex boundaries that do not follow straight latitude lines or longitudinal meridians, but rather, curved range lines from, in some cases, multiple geographic positions corresponding to designated critical habitats (see Figures 2-8 and 2-11 in Chapter 2). From the perspective of detection of incursions by aerial or surface patrols, incursions into closed areas with straight line and meridian boundaries are the simplest to detect and verify with onboard radars and electronic position fixing equipment. Straight boundaries minimize the uncertainty of the incurring vessels position relative to the boundary, therefore facilitating quick action by the patrolling unit to validate the illegal activity and conduct timely and proper evidence collection while the illegal activity is taking place.

Conversely, complex boundaries, or those derived from other than straight lines or meridians, can make it more difficult and time consuming for aircraft commanders and cutter commanding officers to verify that illegal activity is taking place, therefore delaying appropriate action. Such delays allow vessels engaged in illegal pursuits to alter their activity (i.e., change course, release gear, abandon catch) prior to sufficient evidence collection by the patrolling unit. It becomes much easier to detect, investigate and prosecute

these position-critical cases when there are straight line boundaries or range boundaries based on a single geographical position.

The option to increase polling rates for VMS for trawl vessels fishing in the Aleutian Islands, would improve the quality of time, area and location data for enforcing these protection measures should this alternative be selected by the Secretary of Commerce.

Alternatives 2 through 5, and their options, would provide additional access to Atka mackerel and Pacific cod fishing as well as new opportunities for pollock fishing in the Aleutian Islands sub-area. While increasing transmission rates of VMS will assist with compliance under these alternatives, enforcement of protection measures is most cost-effective if an area is completely closed or completely open. Establishing the complex series of open and closed areas associated with Alternatives 2 through 5 would create additional enforcement responsibilities.

Alternative 6

Alternative 6 prohibits retention of Atka mackerel, Pacific cod, and pollock in Areas 541, 542, and 543. It does not require enforcement of closed areas, and does not create a requirement for enhanced VMS coverage.

8.18.3 In-season management

Alternatives 2, 3, 4, 5 and 6 generally involve standard NMFS management measures, and generally do not impose new requirements on the Alaska Regional Office of NMFS. Elements of the alternatives will increase management work load as the number of TAC limits to manage are increased under Alternatives 2 and 3. Also the TAC limits are further divided into smaller amounts. When compared to potential fishing effort, some of the projected TAC limits may be too small to open for directed fisheries. This may result in more closures as NMFS management will not be able to mitigate the risk of exceeding the TAC limit.[160] The potential increase in pollock directed fishing as a result of relaxed closures in Alternatives 2, 3, 4, and 5 may result in increased monitoring of the Aleutian Islands pollock TAC. The alternatives will likely require no change in staffing requirements, though increased workload from these alternatives may mean delays in other tasks (NMFS In-season management, personal communication, 2013).

8.18.4 Science

Introduction

Chapter 11 of this EIS provides a detailed description of data gathering in the Aleutian Islands to support groundfish fishery management, and to improve understanding of groundfish fishery interaction with Steller sea lions. Chapter 11 explains that, while groundfish stock assessments rely on fisheries independent data from biennial trawl surveys, and other sources, they also rely on fishery dependent data such catch size and composition, and the results of biological sampling.

Alternatives that reduce fishing activity in the Aleutian Islands tend to reduce opportunities to collect fisheries dependent data, while activities that increase fishing activity tend to increase these opportunities.

[160] The interim final rule eliminated the HLA platoon registration and lottery for Atka mackerel and eliminated other tasks for the Alaska Regional Office of NMFS. None of the current alternatives include these provisions.

Since research to facilitate fishing activity derives its value from the value of the fishing output, circumstances that require reduced fishing activity and fishery production, may tend to reduce the value of the associated research, while circumstances that permit increased fishing activity and production may tend to increase it.

Alternative 1

Alternative 1, the status quo, eliminated fishing for Atka mackerel and Pacific cod in Area 543, and reduced it in Areas 542 and 543. In general, this limitation of fishing reduces the availability of fishery dependent data from these fisheries compared to the baseline.[161] Alternative 1 may affect the amount and quality of information on the condition of Atka mackerel and Pacific cod stocks in the Aleutian Islands, particularly in the central and western Aleutian Islands, and it may affect availability of information on other aspects of the ecosystem. Local sources have indicated that if the action affects future Pacific cod production sufficiently at Adak, there may be adverse impacts on the availability of support services there. This may affect the cost of surveys. The loss of fishery dependent data may be offset by increased expenditures on fisheries independent data collection, and if it is not, it may be reflected in more conservative fisheries management.

The reduction in harvests would mean a reduction in the amount of observer information on Atka mackerel and Pacific cod age and length. This would make it harder to interpolate biomass estimates between survey years, and may increase the uncertainty associated with biomass estimates and short-term projections. The stock assessment would be less informed and less precise, and may lead to more conservative ABC recommendations as a result of uncertainty about stock status (Lowe, personal communication).[162]

The cost of the loss of fisheries dependent data would be the reduction in the net benefits associated with potentially more conservative ABC and TAC determinations, and smaller harvests. It is not possible to estimate this potential cost, given limited information about how the information loss would affect, for example, the tiers used for Atka mackerel and Pacific cod in the Aleutian Islands in the annual specifications process, and given the limited information on how levels of fishing activity, operating costs, and fish prices might change in response.

The action may also reduce the amount of information on interactions between the fisheries and Steller sea lions. For example, tag recovery studies of Atka mackerel and Pacific cod play an important role in studying the impact of fisheries on localized depletion of stocks and on the efficacy of trawl exclusion zones. To conduct these studies, however, fish need to be tagged and recovered both inside and outside closure areas. In the past, commercial fisheries have been a source of recovery of tagged Atka mackerel and Pacific cod. With the closure of critical habitat, tagged fish must be recovered within critical habitat by scientific tag recovery cruises. To ensure recovery of adequate numbers of tags, catches during these cruises are higher than typical for surveys such as the groundfish bottom trawl surveys. This loss of scientific information could increase future costs of Steller sea lion protection by requiring more conservative fisheries restrictions to protect sea lion prey resources than would otherwise be necessary. (Chapter 11 of this EIS)

The action may lead to loss of scientific information related to other ecosystem elements. For example, observer-collected information on stomach contents provides valuable information on the way different species feed on each other. This information is valuable for modeling energy flows through the

[161] The biennial summer trawl survey would not be interrupted by the status quo.
[162] Dr. Sandra Lowe. Alaska Fisheries Science Center, Seattle, Washington. Email dated August 8, 2012.

ecosystem (Aydin, personal communication).[163] The impact of this ecosystem information loss is even harder to estimate, even in qualitative terms.

Alternatives 2 through 5, and their options

In general, Alternatives 2, 3, 4, and 5 and their options, increase fishing activity for Atka mackerel and Pacific cod compared to Alternative 1. The relative increases follow the order in which the options and alternatives have just been listed, with Alternative 4 representing a return to the approximate regulatory conditions prevailing in 2010 before the interim final rule was implemented.

Alternatives 2, 3, 4, and 5 also open up new areas for potential pollock fishing. These options and alternatives thus represent a liberalization of pollock fishing activity beyond that existing in the baseline period 2004 to 2010. The re-introduction of a pollock fishery in the Aleutian Islands creates opportunities for gathering new information on pollock stocks and other ecosystem resources in the region. American Fisheries Act pollock vessels carry 100 percent observer coverage. Trawl vessels less than 60 feet length overall will also carry observer coverage, albeit at lower coverage rates. Observers will collect data on pollock, other species taken as bycatch or incidentally, and on other ecosystem resources encountered, such as seabirds and marine mammals.

In 2006, the Alaska Fisheries Science Center, in combination with the Aleut Enterprise Corporation, the owners and operators of the F/V *Muir Milach*, and Adak Fisheries, LLC, tested the feasibility of using small (under 35 meters) commercial fishing vessels to conduct acoustic surveys on pollock in the central Aleutian Islands. The study found that small commercial vessels could be used to conduct high quality acoustic surveys of pollock in this region. Alternatives that increase the number of pollock vessels visiting the Aleutian Islands, and increase the number of operators familiar with pollock fishing in this area, may reduce the cost and increase the effectiveness of this source of information about pollock stocks should it be considered for use in the future. (Barbeaux and Fraser 2009)

Management of pollock harvests that apply the results of these acoustic surveys could provide harvest opportunities that are based on more precise estimates of available biomass in time and area. This method would improve knowledge of the pollock stocks and the likelihood that harvest levels are appropriate and sustainable.

The discussion in this section generally points out to the possibility of improving available scientific information under some alternatives, but it is not possible to know at this time how important the improvements or the economic value of the improved information would be.

Alternative 6

Alternative 6 will reduce fishing opportunities in all three management areas in the Aleutian Islands, and will decrease the opportunity to gather fisheries dependent stock data. The analysis of Alternative 1 will be applicable, but to a greater extent.

8.18.5 Federal mandates and grants

In 2007, NMFS approved and implemented a $35.7 million fishing capacity reduction loan program for the Longline Catcher/Processor Subsector, which represented the full amount authorized for that

[163] Dr. Kerim Aydin, Alaska Fisheries Science Center, Seattle, Washington. Phone call October 4, 2010.

subsector. The initial program removed three fishing vessels and 12 fishing licenses and permits for a loan amount of $35 million. All longline catcher/processors harvesting non-pollock groundfish were required to pay and forward a fee to NMFS to repay the loan. The original fee assessment was $0.02 per pound caught, with payment and collection beginning on October 24, 2007, which has since been reduced to $0.0145 (77 FR 58775, September 24, 2012).

In September 2012, NMFS published a final rule to implement a second fishing capacity reduction program (also commonly known as "buyback") and an industry fee system to repay a $2.7 million loan for a single latent permit within the Longline Catcher/Processor Subsector of the Bering Sea and Aleutian Islands (BSAI) non-pollock groundfish fishery (Reduction Fishery) (77 FR 58775, September 24, 2012).

This action may affect the ability of the freezer longline catcher/processors to repay the loan, but not in a clear-cut way. Industry sources indicate that a shift of production into the Bering Sea may reduce revenues as Bering Sea fish tend to be smaller, and to bring a lower price. On the other hand, if the action makes it impossible for the trawl catcher vessel fleet to fully harvest its Pacific cod allocation because of higher halibut PSC in the Bering Sea, end of the year reallocations to Coalition members may increase.

The Federal and State governments have taken steps to support the creation of a civilian community at Adak. These steps include transportation subsidies to under the Federal Essential Air Service Program (Restino 2012), and Federal allocations of pollock and crab to support fishing and processing at Adak, and the State of Alaska's creation of an Aleutian Islands GHL fishery for Pacific cod. This action may adversely affect Adak's economy in important ways, potentially making it harder to achieve community development objectives of the support.

8.18.6 U.S. balance of trade

The balance of trade in goods and services is equal to the difference between exports and imports. The factors that determine the size of the trade deficit or surplus are much broader than production in any one industry. They include all the factors that determine aggregate employment and production, decisions to divide income between consumption and savings, and similar decisions in other countries. A reduction in Atka mackerel or Pacific cod production in the United States would be one factor entering into this determination, but there would be many others, and there would not be a clear-cut, dollar-for-dollar change in the trade deficit associated with the reduction.

8.19 Cumulative Effects

NEPA requires the analysis of cumulative impacts of human actions (Federal, state, and private) that may affect environmental components that are potentially impacted by the alternatives. Cumulative effects may result from past, present, and reasonably foreseeable future actions in addition to direct and indirect effects of the action and alternatives analyzed. Sub-section 1.10.4 of Chapter 1 describes the past, present, and reasonably foreseeable future actions that may affect environmental components analyzed in this EIS. This section reviews the elements described in Sub-section 1.10.4 that are relevant to Chapter 8.

Table 1-1 in Sub-section 1.10.4 summarizes past and present actions and potential effects to consider in a cumulative effects analysis. As the sub-section explains, "past and present effects are reflected in the baseline environmental conditions described in the background section for each environmental component in this EIS" (Chapter 1). In Chapter 8, these past and present effects are reflected in Section 8.2, which provides background on the socio-economic dimensions relevant to the impact of the alternatives on the social-economic communities, and in the baseline conditions (2004 through 2010 for

Atka mackerel and Pacific cod, 2004 through 2012 for pollock) against which the impacts of the alternatives are measured. The harvest and gross revenue baseline conditions are summarized quantitatively in the impact tables in Sections 8.3 to 8.12. Additional background information of particular relevance to Chapter 8 may be found in Chapters 3 and 4, which provide background on fisheries management, and in Chapter 10, which provides background on the communities that interact with these fisheries.

As discussed in Section 1.9.3 of Chapter 1, in 2005, NMFS and the Council completed the EIS for Essential Fish Habitat Identification and Conservation in Alaska. The Council's preferred alternatives from the EIS were implemented through Amendments 78/65 to the BSAI groundfish FMP. NMFS approved the amendments, and regulations implementing essential fish habitat and habitat areas of particular concern protective measures became effective July 28, 2006 (71 FR 36694, June 28, 2006). These habitat measures restrict available areas outside of closed Steller sea lion critical habitat into which fishing operations may redeploy when Steller sea lion critical habitat is no longer available to them. The implications of this for the interpretation of estimates of production from areas remaining open, and for the potential redeployment of fishing operations, have been discussed in Chapter 8.

Most of Sub-section 1.10.4 reviews reasonably foreseeable future actions that may interact with the actions being considered here to affect their outcomes. Actions are understood to be human actions as distinguished from natural events. The Council on Environmental Quality regulations require a consideration of actions, whether taken by a government or by private persons, which are reasonably foreseeable. This is interpreted as indicating actions that are more than merely possible or speculative. In this EIS, actions have been considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or the publication of a proposed rule. Actions simply "under consideration" have not generally been included because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen.

Sub-section 1.10.4 summarizes reasonably foreseeable future actions under five categories: (1) ecosystem-sensitive management; (2) fishery rationalization; (3) traditional management tools; (4) actions by other Federal, state, and international agencies; (5) private actions.

Ecosystem-sensitive management

In December 2013, the Council split the BSAI Pacific cod ABC and TAC into separate Aleutian Islands and Bering Sea Pacific cod ABCs and TACs in the 2014 and 2015 specifications. This will be a permanent change in management This is discussed in greater detail in Section 3.3.4 of Chapter 3, and in Section 8.2.16, and is taken into consideration in the alternatives and analysis in Chapter 8.

The Council and NMFS are continuing to support methods to reduce the pollock fishery impact on salmon. Industry has experimented with salmon excluder devices on trawls, and the Council is considering management measures to further reduce chum salmon PSC catch in the Bering Sea pollock fishery. The use of salmon excluder devices by industry, and additional PSC management measures would further reduce potential impacts of the fisheries on the ecosystem by reducing catch of salmon in the pollock fisheries. Little salmon is taken in the Aleutian Island fisheries compared to the Bering Sea and Gulf of Alaska fisheries; these measures may reduce any impacts that might occur if effort shifts between the Aleutian Islands and the Bering Sea or Gulf of Alaska as a result of these alternatives.

Pribilof Islands blue king crab protection measures in Council-recommended Amendment 103 to the BSAI groundfish FMP may restrict ability of non-trawl pot vessels to move into the Bering Sea near Pribilof Islands (see Chapter 1). This could affect redeployment of the pot segment of the non-trawl catcher vessel and catcher/processor sectors.

Fishery rationalization

Past rationalization actions in Federal fisheries have led to reductions in the number of actual fishing vessels, greater efficiency in harvest, and more opportunities for fishing sectors to coordinate their responses to events in the fisheries. The program resulting from the American Fisheries Act has affected the catcher/processor and catcher vessels fishing for pollock, and to some extent for Pacific cod. The Amendment 80 program has had an important impact on the trawl catcher/processor sector fishing for Atka mackerel and Pacific cod. A private cooperative among non-trawl catcher/processors using hook-and-line gear was made possible by management measures limiting access to the fisheries, and allocating Pacific cod fisheries to different fisheries sectors. These programs are discussed in Chapter 3 and in the sections of this chapter describing the fishery sectors (Sub-sections 8.2.1 to 8.2.4). The LLP program can limit vessel redeployment.

As noted in Section 1.10.4, the Council and NMFS Alaska Region are pursuing comprehensive rationalization of fisheries off Alaska. The Council's preferred alternative in the Alaska Groundfish Programmatic Supplemental EIS maintains the "LLP program and modif[ies] as necessary and further decrease[s] excess fishing activity and overcapitalization by eliminating latent licenses and extending programs such as community or rights-based management to some or all groundfish fisheries" (NMFS 2004).

Existing rationalizations directly affecting fisheries in the Aleutian Islands include the AFA program, the allocation of pollock to the Aleut Corporation, the Amendment 80 rationalization, the Pacific cod sector allocations implemented in 2008, and the private freezer longline cooperative that became fully effective in the BSAI in 2010. These programs have been described in Section 8.2, and have been discussed in the text when they may affect the results of the analysis.

The fisheries in which these rationalization programs were implemented are still evolving, and the effects of the programs, and especially of the more recent programs such as the Amendment 80 non-AFA trawl catcher/processor program, and the freezer-longliner program, may not have been fully felt. These programs should tend to reduce the number of fishing operations, increase the profitability of those that remain, and offer opportunities for better harvest and bycatch and PSC control, although they can also increase incentives to misreport landings.

The Council is currently considering alternative management approaches to rationalize the GOA groundfish fisheries, focusing on areas of greatest need first (Central GOA trawl fishery). However, the Council has not taken action to implement a comprehensive rationalization program, although it has implemented a partial rationalization with the Central Gulf of Alaska Rockfish Program, which became effective in 2011, and the exact form any program may take is unclear at this time. This program does not cross the reasonably foreseeable threshold at this time. Rationalization of GOA groundfish fisheries could affect the economics of fishing for Atka mackerel, Pacific cod, or pollock in the Aleutian Islands, but not in ways that can be predicted at this time. (see Chapter 1)

There has also been an expansion of community participation in rationalization programs (see Chapter 1). The case most applicable to the Aleutian Islands is the Council's allocation, pursuant to statutory requirements, of the pollock DFA in the Aleutian Islands to the Aleut Corporation for use in promoting the development of the community of Adak. This was discussed in Section 8.7.

Traditional management tools

The measures described in Sub-section 1.10.4 include the authorization of groundfish fisheries in future years, increasing enforcement responsibilities, and technical and program changes that will improve enforcement and management.

The specifications process, as applied to Atka mackerel, Pacific cod, and pollock was described in detail in Chapter 3, and discussed where necessary in the sector sections of Chapter 8. The specifications process is dynamic, in that species OFL, ABC, and TAC levels evolve from one year to another to take account of the most recent information from fishery independent, and fishery dependent sources. The specifications process is also dynamic, in that the definitions of the species and species-groups to which the OFL, ABC, and TAC apply may change from year to year.

These dynamic changes may lead towards improved management and conservation of the species, which may result in short and long term economic impacts. A reduction in harvest in the short run, may reduce revenues and profits in the short run, but may be offset in the longer run by an improvement in sustainability and in economic returns.

As discussed in more detail in Sub-section 3.3.2 of Chapter 3, and in Section 8.2.16, the Council split the BSAI Pacific cod specifications into separate specifications for the Aleutian Islands and the Bering Sea for the 2014 and 2015 fishing years. This is will be a permanent change. Alternatives 2 and 3 explicitly include area and sector limits designed to account for this action.

Enforcement responsibilities may reasonably be expected to increase in the future as fisheries management measures continue to evolve. Despite the likely increase in enforcement responsibilities, it is not clear that resources for enforcement will increase proportionately. Uncertainties about Congressional authorization of increased enforcement funding preclude any prediction of trends in the availability of resources to meet increased enforcement responsibilities. Thus, while an increase in responsibilities is reasonably foreseeable, a proportionate increase in funding is not. (see Chapter 1)

Actions by other Federal, state, and international agencies

The State of Alaska has an Aleutian Islands guideline harvest level (GHL) for Pacific cod equal to 3 percent of the BSAI ABC. In 2013 the Alaska Board of Fisheries established an additional Bering Sea Pacific cod GHL, also equal to 3 percent of the BSAI ABC. The State could change its Aleutians Islands Pacific cod GHL, but such a change is not reasonably foreseeable at this time.

The State of Alaska makes decisions about the Steller sea lion protection measures to implement in its waters. Because most of the 0 nm to 3 nm waters are designated as critical habitat for Steller sea lions, any petition to the Board of Fisheries related to Pacific cod, Atka mackerel, and pollock fisheries that would be different from the Steller sea lion protection measures implemented under the current FMP biop must be reviewed by NMFS to determine if the action would result in formal consultation under the ESA based on a change in the Federal action (in the case of a parallel fishery) or based on new information (in the case of the State-managed GHL fishery). A formal consultation may result in a new biological opinion. If a new biological opinion found that the action is likely to result in jeopardy or adverse modification of critical habitat, reasonable and prudent alternatives for the Federal fishery may be required to minimize impacts from the State-waters fishery. (see Chapter 1) Such an action by the State of Alaska is not reasonably foreseeable at this time.

In 2012 the State of Alaska authorized a Commissioner's permit to conduct a limited experimental purse seine fishery for Atka mackerel in State waters. No harvest was reported from test fishing in August.

However the operator reported that seine fishing for Atka mackerel could be practical and expressed an interest in a future fishery. (see Chapter 1) Such a fishery is not reasonably foreseeable at this time.

Private actions

Actions by oil companies, or other resource companies exploring, developing prospects, or producing, in Western Alaska, on Alaska's North Slope, or in the waters of the Bering Sea or Arctic, may create a demand for logistical services that might be supplied using infrastructure at Unalaska or Adak. This could create alternative economic opportunities in those communities. As noted in Section 1.5.4, in June 2012, Offshore Systems Inc. signed an agreement with the Aleut Enterprise and Aleut Real Estate companies to operate a logistics support terminal at Adak to support oil and gas industry activities. It is too early yet, however, to know if this will result in economic development at Adak. (see Chapter 1)

In addition, private use of the Great Circle Routes north and south of the Aleutian Islands, or of the Northwest Passage and Northern Sea Route, may create a demand for logistical support from Adak (see Chapter 1). This possibility, however, does not cross the reasonably foreseeable threshold at this time.

8.20 Summary

Trawl catcher/processor sector

The analysis of the trawl catcher/processor sector may be found in the following sections and sub-sections:

- 8.2.1 Trawl catcher/processor background
- 8.3 Trawl catcher/processors, Alternatives 1 and 4
- 8.7 Pollock, Alternatives 1, 2, 3, and 4
- 8.8 Atka mackerel, Alternatives 2 and 3
- 8.9 Trawl catcher/processors, Pacific cod Alternatives 2, 3, and their options
- 8.13.1 Alternative 5
- 8.13.2 Alternative 6

The impacts of the alternatives on Atka mackerel production were evaluated in Sections 8.3, 8.8, and 8.13. Table 8-155 summarizes the estimates of wholesale gross revenues from Atka mackerel fishing from areas remaining open under each alternative ("residual" revenues). Since this sector includes trawl catcher vessels delivering Atka mackerel to catcher/processors acting as motherships, these wholesale estimates include the value of these deliveries. Table 8-155 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues for each alternative-option combination, estimated both with and without considering the impact of the area limits imposed in Area 543 under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual gross revenues for Alternative 1 were $27.4 million, while the average annual gross revenues for Alternative 4, which approximate those actually earned during the baseline years, were $56 million. These two alternatives provide bookends for the other alternatives. The gross revenue estimates for most of the other alternatives were reasonably close together, ranging from $39 million to $44.7 million. Only Alternative 6, with virtually no revenues, stands apart. Given the uncertainty

associated with these point estimates, it may not be possible to discriminate among the Alternatives 2, 3, 4, and 5.

Table 8-155 Estimated residual trawl catcher/processor Atka mackerel wholesale gross revenues by alternative and option, with and without closure limits, during the baseline years (millions of real 2012 dollars)

	Closure only			Closure and area limits		
	Minimum	Average	Maximum	Minimum	Average	Maximum
1	13.8	27.9	43.6	13.8	27.4	43.6
2 (40%)	26.0	40.6	61.8	21.7	39.0	58.9
2 (50%)	26.0	40.6	61.8	23.5	39.8	59.6
2 (65%)	26.0	40.6	61.8	26.0	40.6	61.8
3	26.8	44.7	69.3	26.8	44.7	69.3
3a	26.0	40.9	62.4	26.0	40.9	62.4
3b	26.5	44.6	69.3	26.5	44.6	69.3
4	35.8	56.0	89.1	35.8	56.0	89.1
5	26.8	44.7	69.3	26.3	43.4	65.8
6	0	0	0	0	0	0

Note: Revenues include estimates of incidental catches (other than Pacific cod). Alternative 5 revenues are assumed equal to Alternative 3 revenues, except for Alternative 5-specific adjustment in Area 543. These adjustments are based on those in Table 8-152. Alternative 6 revenues would likely have been approximately zero; some small revenues might have been produced by topping-off in a Bering Sea MRA fishery.

Alternative 1 and an option to Alternative 3 provide the same Atka mackerel season dates as the fishery had in 2011 and 2012. By allowing for summer fishing, these season dates will likely result in similar fishing behavior and allow vessels to more efficiently harvest their allocations of groundfish in the BSAI than under the baseline. There may be some benefits to ports that support these fisheries, such as Adak and Dutch Harbor, as these vessels are operating in the Aleutian Islands for longer periods of time than they did prior to 2011. Alternatives 2 through 5 seek to relax the B-season end date of November 1 to December 31 for all vessels. Extending the B-season to December 31 may provide the fleet with even more flexibility to temporally spread Atka mackerel fishing and operate more efficiently. Seasonal regulations are not applicable to Alternative 6.

Alternatives 2 through 5 include measures to relax the maximum retainable allowance (MRA) requirements for fishing Atka mackerel in the eastern Bering Sea (the eastern Bering Sea and management Area 541 share a single TAC). A shift from instantaneous calculation to calculation at the end of each offload should make it easier to retain Atka mackerel taken as incidental catches in other targets in the eastern Bering Sea.

The impacts of the alternatives on trawl catcher/processors targeting Pacific cod were discussed in Sections 8.3, 8.9, and 8.13. Table 8-156 summarizes the wholesale gross revenues accruing to the trawl catcher/processors from their harvests of Pacific cod in the Aleutian Islands. These vessels would also earn wholesale revenues from selling the Pacific cod delivered to them for processing by catcher vessels; however, those revenues are summarized with the catcher vessel shoreside deliveries, and are not included in these totals for confidentiality reasons. Table 8-156 shows the gross value of estimated

production from areas remaining open under each alternative (called residual production), and shows those estimates modified by potential constraints associated with the area-sector limits included in the alternatives. When area-sector limits actually exceed historical harvests from the open areas, it is possible that operations could shift from the closed areas to the open areas and increase their harvests from those open areas. Estimates of revenues from this source are speculative and have not been included here.

Focusing on the results for the closure and area limits, taken together, the average annual gross revenues for Alternative 1 were $8 million, while the average annual gross revenues for Alternatives 4 and 5 were $13.3 million. Gross revenues for Alternative 3 come third at $7.4 million, followed by Alternative 2 at $6.9 million the protective option for Alternative 2 at $5.0 million, and Alternative 6 with no revenues. The revenues for Alternatives 1 and 3 are similar (and similar to those for Alternative 2 in the absence of the area-sector limits). As discussed in the text, this reflects an element in both Alternatives 2 and 3 that closes critical habitat to fishing east of 174° W longitude. This closes an important Pacific cod fishing ground to the east of Atka North Cape.

Table 8-156 Estimated residual trawl catcher/processor Pacific cod gross revenues by alternative and option, with and without closure limits (millions of real 2012 dollars)

	Closure only			Closure and area-sector limits		
	Minimum	Average	Maximum	Minimum	Average	Maximum
1	3.5	8.0	18.2	3.5	8.0	18.2
2	3.0	7.4	14.1	3.0	6.9	14.1
2, P.O.	2.3	5.0	11.2	2.3	5.0	11.2
3	3.4	8.7	16.0	3.4	7.4	14.6
4	6.4	15.1	28.2	6.4	13.3	22.7
5	6.4	15.1	28.2	6.4	13.3	22.7
6	0	0	0	0	0	0

Notes: Revenues include estimates of value of incidental catches (other than Atka mackerel). Alternative 5 gross revenues have been set equal to the Alternative 4 revenues given the similarity between the measures in these alternatives. The Alternative 5 Area 543 limit does not affect revenues in a way that can be estimated here, since it is not globally binding in the Aleutians. Alternative 6 revenues have been set equal to zero.

Alternative 2 prohibits directed fishing for Pacific cod using trawl gear after April 30 in Area 543. This should not affect directed trawl Pacific cod fishing; during the baseline years all trawl Pacific cod harvests in the area took place prior to April 30. However, this may affect retention of Pacific cod after April 30 as vessels will be required to discard Pacific cod in excess of the 20 percent MRAs.

Alternatives 2, 3, 4, and 5 extend the C-season end date for Amendment 80 trawl vessels and those fishing Pacific cod CDQ, from November 1 to December 31. This has been proposed to address potential regulatory discards after November 1; however, regulatory discards have been small during this period. This change in closing dates under Alternative 4 may affect reallocation of Pacific cod later in the year, if a trawl catcher/processor fishery becomes viable at that time. This extension is not applicable to Alternative 6.

Alternatives 2, 3, 4, and 5 relax the C-season end date from November 1 to December 31 in Areas 541 and 542 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian

Islands. Alternatives 2, 4, and 5 relax the C-season end date from November 1 to December 31 in Area 543 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. This relaxation of the season date would not apply to other vessels or the Bering Sea subarea. Limiting this to Amendment 80 and trawl vessels fishing for CDQ Pacific cod has been proposed to address potential regulatory discards of Pacific cod after November 1, however, regulatory discards have been relatively small in this period. If this season extension does lead to the start of a directed Pacific cod fishery in November and December, it may affect annual Pacific cod reallocations among gear groups. Seasonal modifications are not applicable to Alternative 6.

Table 8-157 combines the information on trawl catcher/processor revenues associated with areas remaining open for both Atka mackerel and Pacific cod. Taken together, the results suggest that the trawl catcher/processors would benefit the most from Alternative 4 and the least from Alternative 6. The ranking of benefits from the other alternatives, from most attractive to the sector to least attractive, is Alternative 5, Alternative 3, Alternative 2, and Alternative 2 with the protective option, and Alternative 1.[164] The margin for error in these estimates is large, however.

Table 8-157 Estimated residual Atka mackerel and Pacific cod gross revenues for trawl catcher/processors by alternative and option during the baseline years (millions of 2012 dollars)

		Atka mackerel average revenue	Pacific cod trawl alternatives						
			1	2	2 Pro. Opt.	3	4	5 (PPA)	6
Pcod average revenue			8.0	6.9	5.0	7.4	13.3	13.3	0
Atka mackerel alternatives	**1**	27.4	35.4						
	2 (40%)	39.0		45.9	44.0				
	2 (50%)	39.8		46.7	44.8				
	2 (65%)	40.6		47.5	45.6				
	3	44.7				52.1			
	3a	40.9				48.3			
	3b	44.6				52.0			
	4	56.0					69.3		
	5 (PPA)	43.4						56.7	
	6	0							0

Values are average values for closure and area sector limits together, taken from Table 8-155 and Table 8-156.

Alternatives that reduce fishing opportunities for trawl catcher/processors in the Aleutian Islands will prompt redeployment of the vessels, as they try to offset the adverse impacts of the alternatives on their profits. Trawl catcher/processors could shift into rock sole and yellowfin sole fisheries, Bering Sea Pacific ocean perch, and arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, or other flatfish. Amendment 80 vessels could obtain some species for processing by acting as motherships for trawl vessels. Amendment 80 trawl catcher/processors may fish their Pacific cod allocations in the Bering Sea, as well as the Aleutian Islands, although the advent of a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these opportunities. Industry sources indicate, however, that Bering Sea Pacific cod tend to be smaller and bring a lower price, than Aleutian Islands Pacific cod. AFA

[164] These rankings do not constitute a cost-benefit ranking of the alternatives. As discussed in Section 8.2.14 on the "revenue-at-risk" methodology, these are not projections of revenues in future years under the alternatives. They are estimates of revenues that were associated with areas that would have been left open for fishing in the baseline years, if the alternatives had been effective in those years. They are provided as an index of relative impacts.

trawl catcher/processors and vessels fishing CDQ Pacific cod quota, likewise fish against a BSAI-wide allocation, and could shift their operations. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience.

The analysis of the pollock measures in all the alternatives may be found in Section 8.7, and in Section 8.13. Alternatives 2 through 5 include measures to open up areas of critical habitat in the Aleutian Islands to fishing for pollock. This may provide more fishing opportunities for CDQ groups. In addition, the directed fishing allocation in the Aleutian Islands is allocated to the Aleut Corporation, which must assign half of its allocation to AFA vessels. These new opportunities may, therefore, benefit trawl catcher/processors fishing for CDQ groups or for the Aleut Corporation. It is not possible to estimate the additional volumes of fish or revenues that may be generated, given the limited fishing that has taken place in the critical habitat that may be opened. The benefits to trawl catcher/processors will also depend on policy decisions to be made by the CDQ groups and the Aleut Corporation, about how their allocations should be fished (the Aleut Corporation, for example, could assign its pollock allocation to AFA catcher vessels for delivery to the port at Adak). Alternative 6 prohibits the retention of pollock, reducing fishing opportunities below those available under the status quo (Alternative 1). However, pollock fishing activity has been extremely limited in the baseline years, and in the years since the interim final rule was adopted.

Non-trawl catcher/processors

The analysis of the non-trawl catcher/processor sector may be found in the following sections and sub-sections:

- 8.2.2 Non-trawl catcher/processor background
- 8.4 Non-trawl catcher/processors, Alternatives 1 and 4
- 8.10 Non-trawl catcher/processors, Alternatives 2, 3, and their options
- 8.13.1 Alternative 5
- 8.13.2 Alternative 6

Table 8-158 summarizes the estimates of wholesale gross revenues from Pacific cod fishing from areas remaining open under each alternative ("residual" revenues). Table 8-158 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues to the sector for each alternative-option combination, estimated both with and without considering the impact of the area-sector limits imposed in Area 543 and in Areas 541-542 (jointly) under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual gross revenues for Alternative 1 were $3.3 million. The average gross revenues for the remaining alternatives and options, however, were very similar, ranging from $8.4 million to $8.8 million. These differences in average gross revenues are not enough to make it possible to discriminate between these alternatives with respect to their impact on this sector.

Table 8-158 Estimated residual non-trawl catcher/processor wholesale gross revenues by alternative and option, with and without closure limits, during the baseline years (millions of dollars)

	Closure only			Closure and area limits		
Alternative	**Minimum**	**Average**	**Maximum**	**Minimum**	**Average**	**Maximum**
1	1.7	3.3	5.2	1.7	3.3	5.2
2	4.9	10.0	17.3	4.9	8.6	12.0
2 PO	4.9	9.7	17.0	4.9	8.4	11.5
3	5.0	10.5	18.2	5.0	8.8	12.2
4	5.0	10.5	18.2	5.0	8.8	12.2
5	5.0	10.5	18.2	5.0	8.8	12.2
6	0	0	0	0	0	0

Note: Revenues include estimates of incidental catches. Alternative 5 gross revenues have been set equal to the Alternative 4 revenues given the similarity between the measures in these alternatives. The Alternative 5 Area 543 limit does not affect revenues in a way that can be estimated here, since it is not globally binding in the Aleutians.

This fleet is prohibited from directed fishing for Pacific cod in the Aleutian Islands after November 1 under Alternative 1 (the status quo) and Alternative 2. Alternatives 3, 4, and 5 relax this November 1 season end date and allow directed fishing until the end of the year. The freezer-longline portion of this sector operates under a voluntary cooperative and directed fishing for Pacific cod in the BSAI lasts all year. The relaxation of this season end date would allow some of this fishing to occur after November 1 in the Aleutian Islands. This is unlikely to be of advantage to the pot portion of this sector, as these vessels typically close directed fishing prior to November 1. Seasonal regulations are not applicable to Alternative 6.

This sector has limited opportunity to redeploy into other Pacific cod fisheries in the Aleutian Islands or in the Gulf of Alaska, but has relatively good opportunities to redeploy into Pacific cod fisheries in the Bering Sea, although the advent to a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Industry sources indicate that Pacific cod are larger, and that prices are better in the Aleutian Islands than in the Bering Sea, so a shift to the Bering Sea may have adverse revenue impacts, even if the overall harvest remains the same. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience. The action may lead the freezer-longline component of this fleet to target increasing amounts of Greenland turbot in the BSAI.

Trawl catcher vessels

The analysis of the trawl catcher vessel sector may be found in the following sections and sub-sections:

- 8.2.3 Trawl catcher vessel background
- 8.5 Trawl catcher vessels, Alternatives 1 and 4
- 8.11 Trawl catcher vessels Alternatives 2, 3, and their options
- 8.13.1 Alternative 5
- 8.13.2 Alternative 6

Table 8-159 summarizes the estimates of processor wholesale gross revenues from Pacific cod fishing by trawl catcher vessels in areas remaining open under each alternative ("residual" revenues). Table 8-159

includes processor wholesale gross revenues associated with trawl catcher vessel deliveries to catcher/processors acting as motherships, as well as gross revenues associated with trawl catcher vessel deliveries to shore-based processors and shoreside floating processors. Table 8-159 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues to the sector for each alternative-option combination, estimated both with and without considering the impact of the area-sector limits imposed in Area 543 and in Areas 541-542 (jointly) under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual gross revenues for the protective option of Alternative 2, the least attractive option for the sector aside from Alternative 6, under which there are no revenues, were $10.4 million, while the average annual revenues for Alternatives 4 and 5, the most attractive, were $16.7 million. Alternatives 1, 2, and 3 had very similar gross revenue estimates ($12.0 million, $12.2 million, and $12.6 million) and it is difficult to discriminate among them on the basis of the wholesale gross revenue criterion.

Table 8-159 Estimated residual wholesale gross revenues to processors from catcher vessel catches by alternative and option, with and without closure limits, during the baseline years (millions of 2012 dollars)

	Closure only			Closure and area limits		
Alternative	**Minimum**	**Average**	**Maximum**	**Minimum**	**Average**	**Maximum**
1	7.0	12.0	18.9	7.0	12.0	18.9
2	5.2	12.3	21.2	5.2	12.2	21.2
2 PO	4.5	10.4	19.1	4.5	10.4	19.1
3	6.3	13.4	21.6	6.3	12.6	21.6
4	12.2	19.9	30.7	12.2	16.7	24.1
5	12.2	19.9	30.7	12.2	16.7	24.1
6	0	0	0	0	0	0

Note: Revenues include estimates of incidental catches. Alternative 5 gross revenues have been set equal to the Alternative 4 revenues given the similarity between the measures in these alternatives. The Alternative 5 Area 543 limit does not affect revenues in a way that can be estimated here, since it is not globally binding in the Aleutians.

Alternative 2 prohibits directed fishing using trawl gear after April 30 in Area 543. Alternatives 2, 3, 4, and 5 extend the C-season end date for Amendment 80 trawl vessels and those fishing Pacific cod CDQ, from November 1 to December 31. These changes were discussed earlier for trawl catcher/processors; that discussion is applicable to trawl catcher vessels and is not repeated here.

This sector has limited opportunity to redeploy into other Pacific cod trawl fisheries in the Aleutian Islands or in the Gulf of Alaska, but has had relatively good opportunities to redeploy into Pacific cod fisheries in the Bering Sea, although the advent of a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Here again, industry sources indicate that Pacific cod are larger, and that prices are better in the Aleutian Islands than in the Bering Sea, so a shift to the Bering Sea may have adverse revenue impacts, even if the overall harvest remains the same. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience.

Non-trawl catcher vessels

The analysis of the non-trawl catcher vessel sector may be found in the following sections and sub-sections:

- 8.2.4 Non-trawl catcher vessel background
- 8.6 Non-trawl catcher vessels, Alternatives 1 and 4
- 8.12 Non-trawl catcher vessels Alternatives 2, 3, and their options
- 8.13.1 Alternative 5
- 8.13.2 Alternative 6

While there are not enough observations to report harvest and gross revenue information, even across all management areas in a given year (primarily because of the small numbers of processors), there are enough to report summary information for the whole period 2004 through 2010. During that time a total of 26 vessels and 4 separate processors operated in this sector (NMFS AKR In-season management staff). Over the seven years, these vessels retained almost 1,000 metric tons of Pacific cod, for a mean weight of about 150 metric tons a year. (AKR report, February 7, 2013)

Estimated average aggregate annual processor wholesale gross revenues from non-trawl catcher vessels in open areas would have been about $120,000 under Alternative 1, and about $290,000 under Alternative 4. For each of the other alternatives, in almost all years, 100 percent, or almost 100 percent of the baseline catch came from within areas that would have remained open under the alternative, and thus, using the approach discussed here, estimated residual harvests under these alternatives would all have been generally equal to baseline harvests.

The extension of the fishing season until the end of the year would have little impact on this sector, which typically does not operate in the Aleutian Islands in the late fall.

This fleet has opportunities to fish in the State GHL fishery and in the Bering Sea, although the advent to a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Opportunities in the Gulf of Alaska are limited.

Incidental catches

The preceding discussion addresses Atka mackerel, Pacific cod, and pollock taken in target fisheries. The discussion of trawl catcher/processors also includes these species taken incidentally in fisheries targeting other species. Fishing operations in the other gear groups, targeting other species, also take Atka mackerel, Pacific cod, and pollock as incidental catches. Two of the alternatives may affect these incidental catches. These are Alternative 1, which prohibits the retention of Atka mackerel and Pacific cod in Area 543, and Alternative 6 which prohibits retention of these species in all three management areas. Alternative 1 may have reduced incidental catch revenues during the baseline years by about $33,000 a year, while Alternative 6 may have reduced incidental catch revenues by about a sum in excess of $51,000 a year.

Benefits of protecting Steller sea lions

The analysis of the impacts on the benefits of protecting Steller sea lions may be found in the following sections and sub-sections:

- 8.2.10 Background
- 8.14 Benefits from Steller sea lion stock health

While there is evidence that people place a positive value on improvements in Steller sea lion population health, uncertainty about the reemergence of sea lion hunting in response to a population recovery, and limitations in available research, make it impossible to determine whether sea lion populations will improve, and consequently, whether there would be a positive net impact on subsistence households or on households receiving passive-use benefits.

Impacts on other ecosystem resources

The actions under consideration may affect ecosystem resources such as fish stocks, seabirds, marine mammals other than Steller sea lions, habitat, and ecosystem function. The analysis of the impacts on other ecosystem resources may be found in the relevant resource chapters of this EIS, and in Section 8.15 of this chapter. The impacts of the alternatives on these resources are expected to be small, and to have limited, if any, economic impacts.

Community economic impacts

The analysis focused on the following important communities or classes of communities: (1) Adak, (2) Atka, (3) Unalaska, (4) Other Alaskan communities, (5) Puget Sound communities, (6) CDQ communities, and (7) Aleut Corporation shareholders.[165] Community economic impacts are distributional impacts. They are not parts of an overall cost-benefit analysis from a national accounting stance. Changes that may benefit any of the groups defined here may hurt other groups. The analysis of the impacts on the action on communities may be found in the following chapters, sections and sub-sections:

- 8.2.7 CDQ groups background
- 8.2.8 Aleut Corporation background
- 8.2.9 Subsistence background
- 8.2.11 Public finance background
- 8.2.12 Community economic impact background
- 8.7 to 8.12 Fleet specific chapters include community impact discussions
- 8.16 Community economic impact analysis
- 10.0 Community impacts chapter

Adak[166] is the community likely to be most impacted by the alternatives. Adak's fishing economy is large relative to the community size, and the alternatives can have relatively large impacts on production from nearby fishery resources. The alternatives may affect purchases of goods and services during port

[165] In Chapter 10, the Aleut Corporation shareholders are described as a "community of interest" rather than a "place-based community."

[166] In mid-April 2013, as the draft EIS was being completed, Icicle Seafoods, which operated the processing plant at Adak in 2011 through 2013, announced that it would close its operation there. Icicle cited several reasons for its decision, including (a) regulatory uncertainty, (b) concern over the Pacific cod stock in the area, and (c) high operating costs at Adak. (Shedlock 2013)

visits, may affect economic impacts associated with the delivery of, and local processing of, Pacific cod and pollock, may affect local tax revenues or shared state fishery taxes, and may affect pollock-derived financial resources available to the Aleut Corporation and designated by law for the development of Adak.

Alternative 1 ranks lowest with respect to benefits for Adak, except for Alternative 6, and, possibly, for those of the protective option for Alternative 2. Alternative 1 ranks lower than 2, 3, 4, and 5, with respect to potential Adak port visits by Atka mackerel trawl catcher/processors. The impacts of Alternative 1 on deliveries of Pacific cod to Adak for processing are likely to be similar to those for Alternatives 2 and 3, but worse than those of Alternative 4. Alternative 1 has no pollock fishing benefits for Adak, as it continues the baseline management regime.

Alternative 2 is likely to be associated with more port visits to Adak, and associated sales of goods and services, than Alternative 1, but less than the baseline. These would be particularly likely among Amendment 80 trawlers fishing for Atka mackerel, non-trawl vessels fishing for Pacific cod, and AFA or other vessels fishing for pollock. Although Alternative 2 trawl catcher vessel gross revenues are similar to those from Alternative 1 (these are used as a proxy for deliveries of product to Adak for processing), its relative impact on Adak is unclear for two reasons. Area 541 revenues are restricted by the closure of critical habitat to the east of Atka North Cape, and relatively open in the western area of Area 541 nearer to Adak. Second, Alternative 2 includes options allowing and prohibiting catcher vessels from delivering to motherships in Area 543. This may either encourage catcher vessels there to deliver to Adak, or, by increasing costs for catcher vessels in Area 543, discourage catcher vessels from operating there. Alternative 2 relaxes restrictions on pollock fishing in critical habitat near Adak, and may provide for more pollock deliveries than Alternative 1. Options in Alternative 2 that may limit fishing in Kanaga Sound may offset part of this impact.

Alternative 3 may be associated with more port visits to Adak than Alternatives 1 and 2, but fewer than Alternative 4, or the baseline years. Deliveries of Pacific cod to Adak under this alternative may be similar to those under Alternatives 1 and 2; the prospect for pollock deliveries is greater than under Alternatives 1 and 2.

Alternative 4, which returns most management regulations to those prevailing in 2010, and opens critical habitat to pollock fishing, will produce the most benefits for Adak, from port visits, Pacific cod and pollock deliveries, tax revenues, and Aleut Corporation support for Adak development.

Alternative 5, the Council's preferred alternative, is likely to provide benefits comparable to, or more than, Alternative 3, but less than Alternative 4.

Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock, ranks lowest with respect to benefits for Adak.

Atka was not involved with the Atka mackerel, Pacific cod, or pollock fisheries in the baseline years. However, the Atka Pride plant (owned by a partnership of the Atka Fisherman's Association and APICDA) began processing Pacific cod in 2012. APICDA has invested in a new dock to provide deep water vessel access, and is planning an investment in the plant and in worker housing to permit an increase in Pacific cod processing. To the extent that the measures under consideration limit catcher vessel production of Pacific cod, this action may interfere with community and APICDA efforts to diversify the village economy through increased Pacific cod processing. In this regard, although Alternatives 1, 2, and 3 have broadly similar impacts on gross revenues at the regional level, Alternatives 2 and 3 close Area 541 critical habitat to the east of Atka, and may limit its ability to exploit the popular fishing grounds just to its east (the grounds east of Atka North Cape). Atka may also be affected by

changes in shared state fishery taxes. Alternatives 4 and 5 will probably create the most benefits for Atka; benefits from the two alternatives may be comparable. Alternative 6 will prohibit retention of Pacific cod in waters near Atka, and would eliminate the supply of Aleutian Islands Pacific cod for processing at Adak.

Unalaska may be impacted by changes in port visits by vessels targeting Atka mackerel, Pacific cod, or pollock, either before or after the visit. The port visits would be associated with purchases of goods and services by visiting vessels. Unalaska may also be impacted by changes in shared state fisheries taxes, or by changes in deliveries of Pacific cod or pollock for processing by vessels active in the Aleutian Islands that are associated with the alternatives. The net effect on Unalaska is unclear, because it may depend directly on overall output from Aleutian Islands fisheries; but it may also be affected by redeployment of vessels displaced from Aleutian Islands fisheries into Bering Sea fisheries closer to Unalaska. These impacts could offset each other, and their relative sizes cannot be determined in advance.

In general, other Alaskan communities have relatively little involvement in the Aleutian Island Atka mackerel and Pacific cod fisheries, and will likely experience relatively small effects from the alternatives. The Aleut Corporation is required by law to allocate half of its directed fishery allocation of pollock to catcher vessels under 60 feet LOA. Many of the vessels that may be affected by this requirement have homeports in Sand Point and King Cove. Thus, these ports may be impacted by Alternatives 2, 3, 4, and 5. Alternative 6 would prevent retention of pollock from the Aleutian Islands management areas; this has not been an active fishery in recent years, thus, the adverse impacts may be small.

Puget Sound provides bases for a disproportionate number of the trawl catcher/processors, non-trawl catcher/processors, and trawl catcher vessels that may be impacted by the alternatives. Impacts in the region will be large compared to those in the much smaller Alaskan communities, but will be relatively small, given the large size of the regional economy.

Residents of CDQ communities may be affected by changes in the royalties received by their CDQ groups for the lease of their Atka mackerel, Pacific cod, or pollock quota, or by profits from its direct use. They may also be affected by changes in community development initiatives associated with CDQ group revenue changes caused by the action. Persons living at Atka may be particularly affected by increased job opportunities and income associated with increased deliveries of Pacific cod.

The impacts on both the Puget Sound region and on the residents of the CDQ communities have been proxied by the estimates of the relative gross revenues to the different sectors associated with the alternatives. Alternative 4 provides the largest Atka mackerel benefits to the region, while Alternative 6 imposes the greatest costs. It is difficult, on the basis of differences in residual revenues during the baseline years, to discriminate among the other alternatives. Trawl catcher/processors and trawl catcher vessels have the largest Pacific cod gross revenues under Alternatives 4 and 5, and the least under Alternative 6, and the protective option to Alternative 2. Relative gross revenues under Alternatives 1, 2, and 3 are similar. Non-trawl catcher vessel gross revenues are lowest under Alternative 6, and similar to the baseline under the remaining alternatives. The lack of activity in the pollock fishery in recent years precluded estimates of pollock gross revenues for the alternatives. However, these are likely to be greatest for the alternatives that lift the most restrictions. Thus, these are ranked: Alternatives 3 and 4 (most benefits), then Alternative 5, Alternative 2, Alternative 1, and Alternative 6.

Aleut Corporation shareholders will benefit from increased dividends or increased corporate charitable donations to shareholders, and are presumed to benefit from the development of an Aleut community at Adak. The potential of the alternatives to contribute to the development of Adak were discussed earlier in this section. This discussion is relevant here as the impact of the alternatives on Adak provides a

reasonable proxy for the potential impact on Aleut Corporation revenues from businesses based in Adak, and for the psychological benefit its shareholders may receive from community development at Adak.

Impacts on consumers

Impacts on consumers are discussed in Sub-section 8.2.13 (on product markets) and in Section 8.17 (impacts on consumers). Most Atka mackerel products are exported, so alternatives affecting Atka mackerel production should have little impact on U.S. consumers. Since Pacific cod products are consumed in the United States, as well as exported, the alternatives may have some consumer surplus impacts. However, the alternatives may not affect overall BSAI production of Pacific cod. They may, however, affect the size composition of Pacific cod production, possibly reducing the flow of larger, more highly valued Pacific cod to one market segment, while reducing the flow of smaller, and lower valued Pacific cod to others. A more detailed discussion is not possible. Changes in Aleutian Islands pollock production will likely have a relatively small impact on United States consumers. The volumes are small in comparison with overall BSAI pollock production, and much of the Aleutian Islands pollock allocation is currently rolled over to the Bering Sea fisheries.

Safety

The impacts of the alternatives on the safety of fishing operations were discussed in Section 8.18.1. The analysis of safety reached no conclusions about the relative net impact on safety of the alternatives and options. The models that would project how sectors would respond to the alternatives and how these might be related to safety outcomes were not available. Moreover, alternatives may have some elements that increase safety, while other elements decrease it. The analysis was carried out with respect to the following factors that may affect safety (these are not listed in any order that implies a ranking of the magnitude of either the probability of a vessel casualty or the consequences of a vessel casualty.

- Increasing distance westward increases risk to fishing operations. This is due to greater distance to U.S. Coast Guard search and rescue (SAR) resources.
- Increased risk is related to reduced proximity to other fishing vessels that could act as “Good Samaritans” until the arrival of U.S. Coast Guard SAR resources.
- Increasing the number of fishing vessels less than 60-foot length overall increases risk.
- A “race to fish” or other increase in fishing pressure increases risk. In this discussion, fishing pressure is considered in temporal terms.
- Increasing the amount of fishing in “winter” increases risk.

Alternatives 2 through 5 relax fishing restrictions in Area 543 and/or Area 542, thus, increasing fishing activity in the far west, and increasing fishing activity in areas where other fishing vessels may not be close by. However, increased numbers of vessels operating in these areas may conversely increase the likelihood of good Samaritan assistance. Since regulations require that the Aleut Corporation allocate half of its pollock allocation to catcher vessels under 60 feet LOA, the alternatives which increase opportunities for fishing pollock may increase the number of small vessels active in the region. The Aleutian Islands-Bering Sea Pacific cod split, in combination with area-sector limits imposed on Pacific cod fishing under some alternatives, may contribute to a race for fish among fleet sectors. Alternatives 2 through 5 extend the Atka mackerel season from November 1 to December 31, and may contribute to increased fishing activity in the winter months. Alternatives 2 through 5 may have a similar effect for non-trawl Pacific cod fishing. Finally, the development of an A-season pollock roe fishery in the Aleutians could further contribute to winter fishing in the region. Alternative 6 prohibits retention of Atka mackerel, Pacific cod, and pollock in the three Aleutian Islands management areas, and would be expected to have impacts opposite to those described above for Alternatives 2 through 5.

Enforcement

Enforcement issues were discussed in Section 8.18.2. Alternative 1, the status quo, effectively precludes directed fisheries for Atka mackerel, Pacific cod, and pollock, in Area 543. Thus, the status quo has decreased enforcement input needs, decreased costs, presented a more straightforward closure regime, and present fewer enforcement difficulties compared to the measures that existed prior to implementation of the 2010 interim final rule. Alternatives 2 through 5, and their protective options, would provide additional access to Atka mackerel and Pacific cod fishing as well as new opportunities for pollock fishing in the Aleutian Islands sub-area. Enforcement of protection measures is most cost-effective if an area is completely closed or completely open. Establishing the complex series of open and closed areas associated with Alternatives 2 through 5 would create additional enforcement responsibilities. Alternative 6 prohibits retention of Atka mackerel, Pacific cod, and pollock throughout the Aleutian Islands management areas and would thus reduce enforcement burdens.

Under Alternatives 2 through 5, NMFS will propose an amendment to the BSAI FMP requiring an increase in VMS polling rates from two per hour to 10 per hour for all trawl vessels holding a Federal Fishing Permit and fishing for groundfish that is deducted or required to be deducted from a Federal groundfish TAC, in the Aleutian Islands subarea. The owner of the trawl vessel must ensure NMFS receives the transmission from the VMS unit at least 10 times per hour. This proposal is discussed starting at page 8-276. Increasing polling rates will provide NOAA OLE and the Coast Guard with the additional information needed to monitor potential accidental or intentional trawl vessel incursions into the often small, and irregularly shaped Steller sea lion critical habitat areas. This is estimated to cost an additional $400 a year for catcher vessels and catcher/processors, other than those fishing for Atka mackerel, and an additional $1,200 a year for catcher/processors targeting Atka mackerel. In some cases, vessels may have to replace VMS units in order to ensure NMFS receives transmissions. From 2004 through 2010, from 11 to 16 trawl catcher/processors a year (of which from 8 to 12 targeted Atka mackerel), and from 16 to 38 trawl catcher vessels a year, that were fishing for groundfish in the Aleutian Islands, would have been subject to the requirement for increased polling rates. (AKRO In-season management) Increased polling rates would not be necessary under Alternative 6, and a change in required rates would not be considered under the status quo alternative, Alternative 1.

In-season management

In-season management is discussed in Sub-section 8.18.3. The Alternatives 2, 3, and 5 generally involve standard NMFS management measures, and generally do not impose new requirements on the Alaska Regional Office of NMFS. Elements of the alternatives will increase management work load as the number of TAC limits to manage are increased under Alternatives 2 and 3. Also the TAC limits are further divided into smaller amounts. When compared to potential fishing effort, some of the projected TAC limits may be too small to permit a directed fishery. This may result in more closures, as NMFS management will not be able to mitigate the risk of exceeding the TAC limit. The potential increase in pollock directed fishing as a result of relaxed closures in Alternatives 2, 3, and 5 may result in increased monitoring of the Aleutian Islands pollock TAC. The alternatives will likely require no change in staffing requirements, though increased workload from these alternatives may mean delays in other tasks. Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock in the three Aleutian Islands management areas, would reduce in-season management responsibilities.

Science

The impacts on the value of scientific information are discussed in Sub-section 8.18.4.[167] Groundfish stock assessments rely on fisheries independent data from biennial trawl surveys, and other sources, but they also rely on fishery dependent data, such as catch size and composition, and the results of biological sampling. Alternatives which reduce fishing activity in the Aleutian Islands tend to reduce opportunities to collect fisheries dependent data, while activities that increase fishing activity tend to increase these opportunities. Since research to facilitate fishing activity derives its value from the value of the fishing output, circumstances that require reduced fishing activity and fishery production, may tend to reduce the value of the associated research, while circumstances that permit increased fishing activity and production may tend to increase it. The cost of a loss of fishery dependent scientific information would be (a) the reduction in net benefits associated with potentially more conservative ABC and TAC determinations, and smaller harvests, and (b) a reduction in the amount of information on interactions between fisheries and Steller sea lions, and other ecosystem resources.

Alternative 6 has the greatest adverse impact on the collection of fishery dependent scientific information, and Alternative 1 has the next greatest. In general, the protective option, and Alternatives 2 through 5, increase fishing activity for Atka mackerel and Pacific cod compared to Alternative 1. The relative increases follow the order in which the options and alternatives have just been listed, with Alternative 4 representing a return to the approximate regulatory conditions prevailing in 2010, before the interim final rule was implemented.

Net efficiency benefits

The sum of consumer and producer surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Atka mackerel, Pacific cod, and pollock products, and consumers' surpluses accruing to persons who value Steller sea lion population health. Producers' surpluses are likely to increase, compared to the status quo, under Alternatives 2, 3, 4, and 5, as restrictions on fishing are relaxed, but by amounts that cannot be measured at present. Conversely, they will decrease under Alternative 6, as retention of the three species is prohibited in the three Aleutian Island management areas. Surpluses accruing to U.S. consumers are unlikely to change much, since the Atka mackerel market is an export market and overall BSAI pollock and Pacific cod production are unlikely to change much. Limited information on the impact of the actions on Steller sea lion populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to quantify at present. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives, themselves, cannot be ranked using this criterion.

8.21 Comments by the SSC

The Council's SSC was sent a draft of Chapter 8 on September 13, 2012, and an AKR analyst briefed the SSC on the draft at the October 2012 Council meeting. At that time, Chapter 8 included drafts of the background section, and a partial analysis of the status quo alternative (Alternative 1). The SSC discussed the draft of Chapter 8 and made comments in its minutes.

The SSC's comments are reproduced below, with responses to the comments inserted and underlined. The comments and responses are broken into numbered sections for this review; this numbering is not

[167] Chapter 11 of this EIS provides a detailed description of data gathering in the Aleutian Islands to support groundfish fishery management, and to improve understanding of groundfish fishery interaction with Steller sea lions.

present in the originals. Page, figure, table, and section references in the SSC notes refer to the draft it had before it in October 2012.

(1) Dr. Ben Muse (NMFS-AKR) presented the analytical framework that will be used in the RIR[168] for the Steller Sea Lion Protection Measures EIS. Public testimony was provided by David Fraser (Adak Community Development Corp.).

The SSC was asked to focus on methodological considerations, emphasizing their relevance, appropriateness, and adequacy to carry-out the mandatory economic and socioeconomic impacts, including distribution considerations associated with the SSL EIS.

The presentation was excellent and very informative. **In general, the SSC believes that the methodology is sound, well established, and reasonable.**[169] When these economic analytical protocols are applied to the biological, ecological, and administrative attributes associated with the action, the SSC believes one can anticipate a meaningful, informative, and technically sufficient RIR/IRFA.

(2) There are a few elements of the RIR that should be modified or clarified. The document would benefit from more information on how cost items were allocated into fixed vs. variable costs in Table 8.20. In particular, maintenance is assumed to be split evenly between the two, but the basis for the assumption is not stated.

As the document evolves, it is important for the authors to clearly and accurately portray how the cost information should be used. The RIR estimates that variable costs are roughly 51-57 percent of gross revenue. It appears that this ratio is assumed to be constant across all the alternatives. If so, then the use of variable costs will shed absolutely no additional information in comparing alternatives than is already provided by gross revenue estimates. This is because all revenue estimates will be adjusted by the same, constant amount, and therefore, the relative impacts of the alternatives in terms of both ranking and ratios will be identical for gross revenue and net revenue estimates. Although the use of net revenue estimates will not be useful for evaluating alternatives, they will give a rough estimate of the financial impacts on the impacted fisheries. In the future, the SSC hopes that a framework will be developed that will allow for a more robust use of cost information, including relaxing the assumption that alternatives may impact revenue, but will have no impact on the variable cost ratio.

The draft of the analysis reviewed by the SSC in October 2012 included text drawing on EDR data from Amendment 80 trawl catcher/processors operating in the Aleutian Islands, and sought to use these data to make rough estimates of changes in quasi-rents in this fishery associated with Alternative 1 (the only alternative available at that time). Cost data were assigned to fixed and variable cost categories and the historical ratios of the cost categories to gross revenues were estimated. These ratios were then applied to estimates of the change in gross revenues associated with the alternatives to determine the associated change in variable costs and of quasi-rents (the change in gross revenues minus the change in variable costs). The SSC was concerned about the rules for assigning the costs to fixed and variable cost categories, and with the difficultly in

[168] Editorial note: While the current document was prepared following the requirements for an RIR, and was described as an RIR in the draft before the SSC, and while it may form the basis for an RIR in rulemaking, this chapter does not constitute NMFS's RIR for this action. A similar comment holds with respect to references to an IRFA in these minutes.

[169] Text in bold font was emphasized in this way in the SSC minutes

distinguishing between alternatives using this approach (since the change in quasi-rents would produce the same ordering as the change in gross revenues, it was not clear what the estimate of quasi-rents added).

In response to the request from the SSC, NMFS used a set of Amendment 80 EDR data for the seven key Atka mackerel catcher/processors disaggregated by vessel and year for the years 2008 to 2011, and regressed the values for each cost and for the sum of all costs, and the natural logs of these variables, on dummy variables representing each vessel in the data set, each year in the data set, and the number of days fishing, and the square of the number of days fishing, for each vessel-year. With seven vessels and four years, there were a total of 28 observations for most regressions (in some cases there were fewer observations because of questions about individual observations).

The hypothesis was that cost categories with a large variable component would be identifiable if the days fishing variables were statistically significant. This was tested with F tests on models run with and without the days variables. In addition, in models in which the sum of all costs, or the natural log of such a sum, was the dependent variable, it was hypothesized that the intercept term would provide a reasonable estimate of the fixed costs. While the regression results were interesting, the results were ambiguous enough to discourage attempts to allocate costs to fixed and variable categories in this analysis, and without additional evaluation of the data. Thus, this draft of the analysis does not attempt to use the EDR cost information to make estimates of quasi-rents.

(3) The document includes a discussion of the contingent valuation estimates of the willingness-to-pay (WTP) for changes in sea lion populations. In the background section (8.2.11), the document provides estimates for the WTP for 1 percent and 2 percent increases in sea lion populations. Given that the RPA does not predict an increase in populations, the RIR needs to justify the basis upon which it is deriving benefit estimates based on a 1-2 percent increase. If the purpose is to provide a rough sense of the order of magnitude of the benefits, then this should be made clear.

The background section to this analysis includes a discussion of 2007 survey research on the willingness to pay for the protection of Steller sea lions. The discussion includes information about two applications of this analysis. One, prepared for an appendix in the 2010 EA assumed 1 percent and 2 percent potential increases in the growth rate of the Steller sea lion populations. A second, based on a recent publication in the journal *Marine Policy*, made other assumptions. The information from these studies has been included here to provide a review of the relevant literature, to illustrate the nature of the existing analysis of this topic as it applies to Steller sea lions, and to provide a summary of the known information about the possible value of protecting Steller sea lions, along with information about its limitations. The section also refers to and cites concerns raised by the Bernard Commission about the use of this analysis. The discussion has been carefully segregated from the marginal analysis of benefits in Section 8.14 of this Chapter.

(4) The discussion of fishery taxes (section 8.2.12) seems to include all taxes in the communities, not just those taxes received from the potentially impacted fisheries. To facilitate a more accurate assessment of the potential impacts to the communities, it would be helpful if the discussion is clear about the share of tax revenues that could be affected. To the extent possible, the accompanying tables should separate out tax revenues from the potentially impacted fisheries.

The discussion of fishery taxes is now located in Sub-section 8.2.11. The section has been retitled “Public Finance” in an effort to point to a potentially broader range of issues; however the

discussion still primarily relates to municipal fisheries revenues and state revenue sharing. The section has been largely rewritten to take advantage of additional information from state and community sources, to place fisheries revenues in a context of estimated community operating budgets, and to update the information. This text is placed in the background section. Changes in municipal revenues and state revenue sharing are discussed in the analysis, but the discussion is qualitative; it has not been possible to provide estimates of tax revenue changes caused by the alternatives.

(5) One pertinent consideration offered in public comment warrants additional evaluation. Because of the unique status of the community of Adak, provided under several Congressional mandates and Council actions, the suggestion was made that the period following the 2000 SSL BiOp is not reliable or reflective of the community-based fishing effort, targeting patterns, and catch deliveries characteristic of Adak-adjacent areas. The SSC suggests that the analysts consider inclusion of pre-2000 fishing data in their baseline description.

The evaluation of the impact of this action on the Atka mackerel and Pacific cod fisheries is based on fishing activity in the years from 2004 through 2010; the evaluation of this action on the pollock fishery is based on fishing activity in the years from 2005 through 2012. These years, described as the baseline, provided a consistent set of fisheries data that could be subjected to a spatial analysis, a consistent set of Steller sea lion protection regulations, a consistent set of Aleut Corporation pollock rules, and a reasonably consistent background of other fisheries regulations (of course, these did change during the period). The baseline is relevant for describing the changes in activity, revenues, and costs caused by the alternatives. While the baseline is useful for measuring the changes caused by the alternatives, other information from non-baseline years is used in the analysis when appropriate. For example, ABCs from 1991 through 2014 are used to create estimates of the potential range of Aleut Corporation pollock allocations under the alternatives, and pollock observer data from the 1990s is used to help determine the potential impact of the measures proposed for relaxing access to critical habitat.

(6) The SSC endorses the proposed methodological approach for performance of the SSL EIS Chapter 8 RIR/IRFA.

The Council was sent the Preliminary Draft EIS on March 7, 2013. The SSC reviewed Chapter 8 at its meeting on April 1, 2013, and was briefed by one of the co-authors at that time. This draft was supplemented by an errata sheet, delivered to the SSC on April 1. The SSC heard public testimony, discussed the draft of Chapter 8, and made comments in its minutes.

The SSC's comments are reproduced below, with responses to the comments inserted and underlined. The comments and responses are broken into numbered sections for this review; this numbering is not present in the originals. Page, figure, table, and section references in the SSC notes refer to the draft EIS.

(1) Overall, the SSC was impressed with the scope of the analysis within the RIR and the manner in which SSC comments from October 2012 were addressed. The methods used in the analysis were appropriate given data and modeling limits, and were consistent with those presented to the SSC in October.

Based upon earlier SSC comments, the analysts dropped the use of variable cost data from the economic impact estimates. Although the SSC has long advocated for the use of cost data in analyses, in this particular case, the omission of cost data was appropriate because there was no meaningful way to estimate how the different alternatives would impact costs.

(2) The SSC has concerns about how the revenue-at-risk and harvest-at-risk tables are presented. Given the lack of cost data, economic models of price impacts, and models of fishing behavior, this "at-risk" approach provides potentially useful information about the share of the historical catch that was harvested in areas that would be variously open under the different alternatives. However, these values should not be labeled as impacts in the table headings or in the discussion. To be appropriately labeled as estimated impacts, this analysis would need to include other factors such as changes in costs, prices, and fishing behavior. These additional factors are acknowledged in the analysis (e.g., page 8-88). The SSC recommends that the tables be labeled "Estimated Harvest at Risk" and "Estimated Gross Revenue at Risk" (e.g., Table 8-48 to 8-50, among many others). The discussion should be modified similarly. For example, page 8-89 contains the assertion "(Table 8-54) provides estimates of the reduction in retained catch associated with Alternative 1," which could be modified to "(Table 8-54) provides estimates of the retained catch that were historically harvested in areas that would be closed under Alternative 1." On page 8-89 is the statement, "Actual reductions in retained catch range between…" The values are not actual reductions, rather, they are estimates of the historical catch that was harvested in areas that are closed under the status quo and may be opened variously under the proposed alternatives to Alternative 1.

The analysis includes many tables, with a standard format, summarizing information on harvests and associated revenues from areas that would be closed under different alternatives, and from areas remaining open under the alternatives. The first example is Table 8-49. Table headings have been revised to refer to the "location" of baseline harvest, or to revenues "from open or closed areas." These tables have been edited to use the following column headings, as appropriate: (1) for tables reporting catch the labels read, "Total catch (mt)," "Catch from areas closed (mt) (catch at risk),", and "Catch from areas left open (mt) (residual catch)"; (2) for tables reporting revenues, these headings are "Baseline gross revenues," "Gross revenues in closed areas (revenue at risk)", "Gross revenues in areas remaining open (residual revenues)." To the extent that time permitted, the text was edited to focus attention on the harvests, and associated revenues, coming from areas that would have remained open under the different alternatives during the baseline years, and the harvests, and associated revenues, coming from areas that would have been closed by the alternative and to remove references to "reductions", as requested. Note that a table has been added to the text since the SSC comment was received, so that all tables listed in the SSC comment must be incremented by "1" to find the current version of the table; thus, Table 8-48 in the comment is now Table 8-49.

(3) One way to deal with these concerns would be to include a separate section dedicated to a discussion of the concepts of revenue-at-risk and harvest-at-risk, including a rationale for the approach, its strengths and weaknesses, its role in estimating impacts to industry and net benefits to the Nation. Throughout the document, whenever this approach is used, there should be a cross-reference to this discussion. For the most part, this information is contained in various parts of the document, but it is not compiled in a single spot that is easily cross-referenced.

A detailed discussion of the methodology has been added to the analysis as Section 8.2.14.

(4) On a related note, gross revenue at risk should not be described as a cost to industry. For example, page 8-138 and Table 8-73 describe gross revenue at risk as the "Monetary Cost of Production Shortfalls." As already noted, these should be described as "Gross revenue at risk."

The references to "Monetary Cost of Production Shortfalls" is not to "revenues at risk" as the term is used elsewhere in the RIR. The reference is to a monetization of the difference between residual revenue and a binding area-sector limit that constrains catch below the level that would

have been associated with an alternative's area closures. These references have been changed to "Revenues associated with production shortfalls," or similar language, when they occur. Note that the Table 8-73 cited in the comment is now Table 8-74.

(5) In multiple places, the document contains a discussion of the potential price impacts on Atka mackerel and Pacific cod. Although industry reports price impacts, on page 8-15, the analysis indicates that a statistical analysis of prices suggests otherwise. At subsequent points in the document, there appears to be more weight given to the anecdotal industry reports than the statistical analysis. During the presentation, the analyst indicated that there were concerns about the statistical model, and that the reports from industry were deemed more credible. Given this discrepancy and the potential for confusion about which sources to use, the document would benefit from a clearer discussion of this issue.

Industry has reported regional differences in prices paid for Atka mackerel and Pacific cod. While NMFS has been unable to document these increases in weak statistical tests, industry sources are consistent in their reports, and provide corroborating detail. Because of the weakness of the tests, and the credibility of industry reports, this analysis has adopted the working hypothesis that these regional price variations exist. A new section, Section 8.2.15, has been added to pull together several discussions of this issue, and clarify the reasons the working hypothesis has been adopted.

(6) The summary on page 8-107 incorrectly states that the sector will not incur the costs of the harvest. In making adjustments to gross revenue at risk, however, the relevant adjustment is in changes to harvest cost. Similar summaries earlier in the document (e.g., page 8-98) correctly note that changes in variable costs should be deducted. These summary sections should use consistent language, where appropriate.

The specific text identified has been revised as requested. Similar text in this and related sections has been edited to increase consistency.

(7) To the extent that new entrants are constrained by quota (e.g., pages 8-88 and 8-98), it is conceivable that existing fishery participants could benefit from an increase in the value of quota shares.

Increased demand for certain types of quota by vessels redeploying out of the Aleutian Islands fisheries could tend to increase quota values. Text has been added to reflect this.

(8) On page 8-89, the impacts are described as "significant." This sentence should be deleted. The term is not meant to imply statistical significance, nor "significance" under E.O. 12866 or RFA. Rather, it is a subjective assessment about the size of the impacts. This raises the question of what the threshold is for determining whether a value is significant. Subjective assessments of the values in a table are not necessary and should be removed.

NMFS has reviewed the document and restricted the use of the word "significant" to (a) references to statistical significance, or (b) use of the word deriving from statutory language (including some NEPA based references to the physical environment in Section 8.15).

(9) With respect to the community impacts in Chapters 8 and 10, the analysts effectively addressed every concern and suggestion previously made by the SSC in connection with this proposed action. They have produced an impressive product, given the data gaps for these communities and a tight timeline; including moving analytical treatment of the community of

Atka to a more central location in the analysis, broadening the definition of community, thoroughly evaluating Adak's economic and social vulnerabilities, and carefully separating fishery engagement from dependency and vulnerability. In the subsistence hunting descriptions, the reasons for the decline in harvest are generally believed to be linked to the population of SSLs or to confusion among hunters about regulations. This section should also acknowledge that uncertainty about hunting regulations may affect reporting of harvest. It should include information describing changes in the population of SSL subsistence hunters in Atka. There were 92 people in Atka in 2000 (46 males and 46 females), and only 61 in 2010 (36 males and 25 females); this could indicate a loss of resident hunters.

This comment relates primarily to the analysis of community impacts in Chapter 10.

(10) Overall, the highest priority improvements to be made to the document before release for public review are: 1) improvements to navigating the document, 2) provide a definition of competition, and 3) appropriately characterizing the revenues and harvests at risk, as noted above.[170]

This SSC comment applies to the entire EIS, and provides priority guidance to authors in addressing SSC comments on a short time frame. NMFS has taken the following steps to address issue (1): reorganization of methodology text, and of text on tests of regional price variation, as requested by the SSC in its minutes; increased use of bookmarks and cross references in the text; addition of a chapter index. The use of the word "competition" is meant to refer to the ecological rather than the economic sense of the word; this issue is not related to this chapter. NMFS has prioritized point (3) in revisions to Chapter 8 with the addition of a methodological discussion, revision of many table headings, and those revisions of the text that could be made in the time available.

[170] This text was in bold in the SSC's minutes.

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8.24 Index

Adak, 8-257
  and alternatives, 8-258
Aleut Corporation, 8-268
  and alternatives, 8-269
  background, 8-46
Atka, 8-262
  and alternatives, 8-262
Atka mackerel fishing in the Bering Sea
  background, 8-41
Benefits from Steller sea lion stock health
  and alternatives, 8-254
  background, 8-51
CDQ, 8-267
  and alternatives, 8-268
CDQ groups
  background, 8-43
Community Development Quota
  background, 8-43
Community economic impacts
  background, 8-60
Consumers, 8-270
Cumulative Effects, 8-283
Enforcement, 8-274
Federal mandates and grants, 8-282
Gross revenue estimation methods, 8-70
In-season management, 8-279
Non-trawl catcher vessels
  background, 8-33
Non-trawl catcher/processors
  background, 8-23
Other Alaskan communities, 8-264
  and alternatives, 8-265
Other ecosystem resources, 8-254
Pacific Northwest, 8-265
  and alternatives, 8-266
Product markets
  background, 8-64
Public Finance
  background, 8-54
Regional price variation, 8-72
Safety, 8-271
Science, 8-280
State of Alaska GHL fishery
  background, 8-36
Subsistence, 8-48
Trawl catcher vessels
  background, 8-28
Trawl catcher/processors
  background, 8-9
  Pacific cod impacts, Alts 1 and 4, 8-77
U.S. balance of trade, 8-282
Unalaska, 8-263
  and alterantives, 8-264
VMS, 8-274
VMS polling rates, 8-276

9.0 SMALL ENTITY ANALYSIS

9.1 Introduction

This analysis estimates the numbers of small entities (as defined by the Small Business Administration) directly regulated by proposed changes to groundfish management that are required to insure that the groundfish fisheries in the Bering Sea and Aleutian Islands Management Area (BSAI) are not likely to result in jeopardy of continued existence or adverse modification or destruction of the critical habitat of Steller sea lions.[171] The specific measures under consideration would modify Federal fishery regulations for Atka mackerel, Pacific cod, and pollock in the Aleutian Island management areas 541, 542, and 543.[172]

This small entity analysis has been prepared following the statutory requirements of the Regulatory Flexibility Act (RFA) of 1980 [as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 (5 U.S.C. 601-612)], governing the preparation of an Initial Regulatory Flexibility Analysis (IRFA).[173]

The small entity analysis will provide the basis for an IRFA when NMFS prepares a proposed rule for this action. For this reason, the following three sections discuss the purpose of an IRFA, the required contents of an IRFA, and the definition of small entities appropriate to an IRFA.

[171] This EIS contains an economic analysis (Chapter 8) and a small entity analysis (Chapter 9). These analyses, along with the community impacts analysis containing the Environmental Justice analysis required under EO 12898 (Chapter 10), are presented as separate chapters in this EIS, rather than as a single combined "socioeconomics" chapter as is often found in other EISs. This presentation format is designed for ease of access and review, given the nature of these economic and social resources potentially affected by the proposed action alternatives, and reflecting the emphasis placed on a detailed community impacts analysis appropriate to the scope and issues identified in both the litigation and scoping processes. The organization will also facilitate use of these chapters to prepare a Regulatory Impact Review (RIR) and Initial Regulatory Flexibility Analysis (IRFA) for rulemaking.

[172] Some measures affect Atka mackerel in the Bering Sea, as well.

[173] National Marine Fisheries Servies (2007) provides current NMFS guidance for preparation of an IRFA; (Queirolo, 2013) provides a more accessible overview.

9.2 The purpose of an IRFA

The RFA, first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a Federal regulation. Major goals of the RFA are (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group, distinct from other entities, and on the consideration of alternatives that may minimize the adverse impacts, while still achieving the stated objective of the action.

On March 29, 1996, President Clinton signed the SBREFA. Among other things, the new law amended the RFA to allow judicial review of an agency's compliance with the RFA. The 1996 amendments also updated the requirements for a final regulatory flexibility analysis, including a description of the steps an agency must take to minimize the significant (adverse) economic impacts on small entities. Finally, the 1996 amendments expanded the authority of the Chief Counsel for Advocacy of the Small Business Administration (SBA) to file *amicus* briefs in court proceedings involving an agency's alleged violation of the RFA.

In determining the scope or "universe" of the entities to be considered in an IRFA, NOAA's National Marine Fisheries Service (NMFS) generally includes only those entities that can reasonably be expected to be directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address negative economic impacts, not beneficial impacts, and, thus, such a focus exists in analyses that are designed to address RFA compliance.

Data on cost structure, affiliation, and operational procedures and strategies in the fishing sectors subject to the proposed regulatory action are insufficient, at present, to permit preparation of a "factual basis" upon which to certify that the preferred alternative does not have the potential to result in "significant economic impacts on a substantial number of small entities" (as those terms are defined under RFA).

9.3 What is required in an IRFA?

Under 5 U.S.C., section 603(a) and (b) of the RFA, each IRFA is required to contain:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;
- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply including a description of the adverse economic impacts of the proposed rule on directly regulated small entities;
- A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize

any significant adverse economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:

1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
3. The use of performance rather than design standards;
4. An exemption from coverage of the rule, or any part thereof, for such small entities.

9.4 What is a small entity?

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) and small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a "small business" as having the same meaning as "small business concern" which is defined under section 3 of the Small Business Act. "Small business" or "small business concern" includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor...A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. From July 22, 2013, a business involved in *finfish* harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual gross receipts not in excess of $19.0 million, for all its affiliated operations worldwide. A business involved in *shellfish* harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual gross receipts not in excess of $5.0 million, for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business that both harvests and processes fish (i.e., a catcher/processor) is a small business if it meets the criteria for the applicable fish harvesting operation (i.e., finfish or shellfish). A wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring

the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) if two or more persons each owns, controls or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors, or general partners control the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor or subcontractor is treated as a participant in a joint venture if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small non-profit organizations. The RFA defines "small organizations" as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

9.5 Why the action is being considered

As explained in Section 1.3 in Chapter 1 of this EIS, this action is needed to comply with the Endangered Species Act of 1972 (ESA) requirement that a Federal agency insure that the agency's actions are not likely to jeopardize the continued existence of endangered species or to adversely modify or destroy critical habitat. In this case, NMFS's action is the management of the Alaska groundfish fisheries (including the authorization of research necessary to support such management) and the endangered species is the western distinct population segment (WDPS) of Steller sea lions. In the biological opinion on the Alaska groundfish fisheries (NMFS, 2010), NMFS determined that it could not insure that the Alaska groundfish fisheries were not likely to jeopardize the continued existence of the WDPS of Steller sea lions and not adversely modify their designated critical habitat. In response to this determination, NMFS recommended a reasonable and prudent alternative (RPA) to mitigate the fishery impacts that had been identified as having the potential to cause jeopardy. The RPA restricted the Aleutian Islands Atka mackerel and Pacific cod fisheries, to provide additional protection to the WDPS of Steller sea lions and their critical habitat. The RPA and other existing fishery management measures designed to protect Steller sea lions in the Aleutian Islands are known, collectively, as the Steller sea lion protection measures. The Steller sea lion protection measures restrict the Atka mackerel, Pacific cod, and pollock fisheries in a manner that may cause adverse economic impacts.

9.6 The objectives of, and the legal basis for, the proposed rule

Objectives

The objectives of this action are given in the last paragraph of the statement of purpose and need in Section 1.3:

- implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries, and their supporting research, in a manner that mitigates the Aleutian Islands groundfish fisheries' potential impacts on Steller sea lions;
- implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries, and their supporting research, in a manner that … minimizes, to the extent practicable, economic impacts to the groundfish fisheries.

Legal basis

NMFS manages the U.S. groundfish fisheries of the BSAI in the exclusive economic zone off Alaska under the Fishery Management Plan (FMP) for Groundfish of the BSAI (NPFMC, 2012). The North Pacific Fishery Management Council (Council) prepared, and the Secretary of Commerce (Secretary) approved, this FMP under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, *et seq*.).

The ESA provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. NMFS and the U.S. Fish and Wildlife Service (USFWS) share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous species. NMFS has jurisdiction over 87 listed species, including the Steller sea lion.[174]

Federal agencies are directed, under section 7(a)(1) of the ESA, to use their authorities to carry out programs for the conservation and recovery of threatened and endangered species. Federal agencies must also consult with NMFS, under section 7(a)(2) of the ESA, on **activities that may affect a species for which NMFS has responsibility**. These interagency consultations, also known as "Section 7" consultations, are designed to assist Federal agencies in fulfilling their duty to insure Federal actions are **not likely to jeopardize** the continued existence of a species, nor destroy or adversely modify critical habitat. Should NMFS determine that it cannot insure that the subject Federal action is not likely to jeopardize or adversely modify, NMFS will suggest RPAs that would not violate section 7(a)(2).[175] In the current instance, the agency taking the action is the Sustainable Fisheries Division of NMFS Alaska Region, and the "consulting" agency is the Protected Resources Division of NMFS Alaska Region. A history of recent, relevant consultations and actions, leading up to this action, is presented in the 2010 FMP Biological Opinion (biop) (NMFS, 2010).

[174] See the NMFS web page http://www.nmfs.noaa.gov/pr/laws/esa/.
[175] See the NMFS web page http://www.nmfs.noaa.gov/pr/consultation/.

9.7 Number and description of small entities directly regulated by the proposed action

The entities directly regulated by this action include (1) business firms operating trawl catcher/processors and catcher vessels, and non-trawl catcher/processors and catcher vessels, fishing for Atka mackerel and Pacific cod, in the three central and western Aleutian Island management areas (Areas 541, 542, and 543); (2) Community Development Quota (CDQ) groups that receive allocations of Atka mackerel, Pacific cod, and pollock in these three Aleutian Island management areas; (3) the Aleut Corporation, which receives an allocation of pollock in the Aleutian Islands; and (4) vessels taking Atka mackerel or Pacific cod as incidental catches in Area 543.[176]

NMFS has taken account of known business or cooperative affiliations among vessels in estimating the numbers of directly regulated small business entities. However, the public sources of information on the potentially complex co- or joint-ownership or contractual relationships that may exist among multiple vessels operated by individual firms is not complete. To the extent that NMFS has failed to identify all RFA relevant relationships, the number of small entities may be overestimated, since more of the entities categorized as small might have been treated as large entities, had multiple ownership and/or affiliation structures been amenable to identification. No large entities would have been moved to the small entity category as a result of the adoption of this approach. NMFS chose 2010 as the baseline year for identifying the numbers of entities. This was the last year before the date the interim final rule implementing the Steller sea lion rules that comprise the status quo (75 *FR* 77535; December 13, 2010) went into effect, and, thus, would not reflect any impact that action might have had on the number of active vessels.

NMFS evaluated catcher/processor and catcher vessel business firm revenues and affiliations in the year 2012, against the SBA's size thresholds, since that year provided the most recent complete annual revenue information at the time this evaluation was prepared (December 2013). If the interim final rule reduced vessel revenues, this might be reflected in a relatively larger number of small entities in 2012 than in 2010. Three vessels, active in 2010, were not active in Alaska fisheries in 2012. Based on firm and cooperative affiliations in 2010, these vessels would have been large entities had they been active in 2012, and they were classified as large for the analysis.

Of the 51 vessels identified as having been active in 2010, 12 vessels—one catcher/processor and 11 catcher vessels—were believed to constitute small entities. One of these vessels was a pot catcher/processor, and the remaining operations were trawl catcher vessels. The estimated average gross revenue for these firms, in 2012, was about $1.4 million. Note that firm revenues may have been larger, if these firms had revenues from sources other than the identified vessels. If this was the case, average gross revenues for small entities may be underestimated or the number of small entities might be overestimated, and the direction of the impact on average revenue for the remaining vessels would be unknown.

Through the CDQ program, the Council and NMFS allocate a portion of the BSAI groundfish total allowable catches (TACs), and apportion prohibited species catch (PSC) limits for Pacific halibut, Pacific salmon, and several crab species, to 65 eligible Western Alaska communities. These communities work through six non-profit CDQ groups, and are required to use the net proceeds from the CDQ allocations to start or support activities that will result in ongoing, regionally based, commercial fishery or related businesses. The CDQ groups receive allocations through the specifications process, and are directly

[176] More detailed descriptions of all of these sectors may be found in Section 8.2 of Chapter 8 of this EIS. To economize on space, these descriptions are not repeated here.

regulated by this action, but the 65 communities are not directly regulated. Because they are explicitly defined as small nonprofit entities within the RFA, the CDQ groups are small entities for purposes of this analysis.

As previously noted, the Aleut Corporation receives all of the pollock directed fishing allocation in Areas 541, 542, and 543.[177] The Aleut Corporation is an Alaska Native Corporation, and is a holding company evaluated according to the SBA criteria at 13 CFR 121.201, using a $7 million gross annual receipts threshold for "Offices of Other Holding Companies" (NAICS code 551112). As noted, in Table 8-39 of Chapter 8, Aleut Corporation revenues exceed this threshold (gross revenues were about $159 million in 2010), and the Aleut Corporation is considered to be a large entity for purposes of this analysis. This follows the analysis in the RFA certification for BSAI FMP Amendment 82, which created the Aleut Corporation allocation in the Aleutian Islands. (NMFS, 2005: 413).

Alternative 1, the status quo alternative, prohibits retention of Atka mackerel or Pacific cod in Aleutian Islands management area 543. This comprehensive prohibition on retention, which was not implemented under this alternative in Areas 541 and 542, is relaxed under the preferred alternative. This prohibition directly regulates vessels which would otherwise have retained these species in this management area. Thus, the preferred alternative directly regulates these vessels in this area. Only small numbers of vessels took incidental catches of these species in Area 543 during the baseline years. Six separate fixed gear catcher/processors or trawl catcher vessels were identified with incidental catches of Atka mackerel and/or Pacific cod during this period. None of these is believed to be a small entity based on a knowledge of vessel affiliations. Twenty fixed gear catcher vessels had incidental catches during the period. All of these are considered to be small entities based on a review of their gross revenues from all sources, and their affiliations. The aggregate fixed gear catcher vessel revenues from these sources are estimated to average about $11,300 a year in real 2012 dollars, during the baseline years (2004 through 2010). Average revenues per vessel-year from this source are estimated to be about $2,200.[178]

9.8 Recordkeeping and reporting requirements

An IRFA should include "a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record..."

NMFS will propose to the Secretary the following FMP amendment requiring an increase in vessel monitoring system (VMS) polling rates for all alternatives:

> Polling rates would be increased from two per hour to ten per hour for all trawl vessels holding a Federal Fishing Permit and fishing for groundfish that is deducted or required to be deducted from a Federal groundfish TAC, in the Aleutian Islands subarea. The owner of the trawl vessel must ensure NMFS receives the transmission from the VMS unit at least 10 times per hour.

[177] The Aleut Corporation may contract with fishing operations to harvest the pollock DFA. Because the Aleut Corporation receives the allocation and has discretion over its disposition, the Aleut Corporation, and not the fishing operations with which it may contract, is the entity directly regulated by the pollock measures in this action.

[178] Trawl catcher/processor incidental catches were included with the directed revenue analysis for these vessels, given the difficulty of discriminating between targeted and incidental revenues for many of these vessels following the introduction of the Amendment 80 quota system.

A detailed discussion of the need for this FMP amendment, and its implications, is included in Section 8.18.2 ("Enforcement") of the accompanying environmental impact statement (EIS). The reader is referred there for the details. NMFS estimates that this new requirement will increase VMS costs by about $400/year for trawl catcher vessels and catcher/processors operating in the Aleutian Islands, except for trawl catcher/processors targeting Atka mackerel. These vessels are expected to incur costs of about $1,200/year (these are all large entities, however). Some of these vessels may have to replace existing VMS units to meet the transmission reliability requirement. NMFS is unable to estimate the number of vessels for which this may be necessary, but the estimated cost per vessel is about $3,500.

Amendment 80 vessels have 100 percent observer coverage. Those observer data are linked to VMS data, and catch is assigned to critical habitat if, at any time during a trawl, a VMS point appears inside critical habitat. This allows the critical habitat limits to be managed. It will likely be difficult to monitor and enforce Atka mackerel critical habitat limits for BSAI trawl limited access catcher vessels. Catcher vessels that may fish the BSAI trawl limited access Atka mackerel quota do not have 100 percent observer coverage, so linking VMS data to fishing activity is not possible at this time. Alaska Department of Fish and Game statistical areas reported on eLandings are not specific to critical habitat areas, so they cannot be used to identify potential critical habitat catch. An electronic logbook would provide the information necessary to link VMS data to fishing activity by these vessels; however, there is no current regulation to require electronic logbooks on trawl catcher vessels. Managing these critical habitat limits on that sector will be difficult, and a solution to this problem will require changes in the catch accounting system and recordkeeping and reporting requirements. Such changes are, however, not part of the current action, so impose no attributable impacts.

9.9 Federal rules that may duplicate, overlap, or conflict with proposed action

An IRFA should include "An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule..."

This analysis did not reveal any Federal rules that duplicate, overlap, or conflict with the proposed action.

9.10 Description of significant alternatives and their effects on small entities

An IRFA should include, "A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize any significant adverse economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives…"

At its October 2013 meeting, the Council adopted a preferred alternative, referred to as Alternative 5. This alternative is discussed in more detail in Chapter 2. Section 8.13 of Chapter 8 provides an analysis of Alternative 5, while Section 8.20 compares Alternative 5 to the other alternatives.

Pollock management alternatives: minimizing impacts to small entities

The elements of Alternative 5 that regulate the pollock fishery are similar to those in Alternatives 3 and 4, which are identical, and which are less restrictive than other alternatives (see Section 8.7 of Chapter 8).

Alternative 5 only differs from Alternatives 3 and 4 in that it includes management area specific A-season catch limits, and increases critical habitat closures in Area 542. The A-season catch limits are 5 percent of the ABC in Area 543, 15 percent of the ABC in Area 542, and 30 percent of the ABC in Area 543.

As discussed in Section 8.18 of Chapter 8, NMFS is unable to estimate the potential production, or the location of production, under the different alternatives, and so is unable to determine whether or not the area constraints would be binding. However, these area constraints are not present in Alternatives 3 and 4. Thus those alternatives may be somewhat less burdensome for small entities that Alternative 5. Management area limits were introduced to provide control over potential harvests in a new pollock fishery of unknown potential and, thus, to provide more protection for Steller sea lions; the restrictions are more stringent in the western areas, where Steller sea lions are not doing as well as in the east (thus, they follow the Biop performance standards). The extension of the 542 closure areas, west of 178º W longitude, to 20 nm (see Table 2-22) under Alternative 5, may also contribute to making this alternative more restrictive than Alternatives 3 and 4. The extension was also included in Alternative 5 to provide more protection to the SSL rookeries and haul-outs that have experienced relatively greater declines in local SSL populations.

Atka mackerel management alternatives: minimizing impacts to small entities

For Atka mackerel, Alternative 5 is most comparable to Alternative 3 and the effects on small entities in the limited access trawl fishery and CDQ groups receiving Atka mackerel allocations may be similar to those under Alternative 3. Alternatives 3 and 5 are the same in Areas 541 and 542. They differ in Area 543 in that Alternative 3 closes certain waters around Buldir Island explicitly, while Alternative 5 does not do this. However, Alternative 5 sets an Area 543 TAC limit, equal to 65 percent of ABC, that is not included in Alternative 3. On balance, from information during the baseline years, Alternative 5 may be somewhat more restrictive in Area 543 than Alternative 3. However, the Alternative 5 TAC limit is included to prevent excessive harvest of Atka mackerel and potential jeopardy for the Steller sea lion population and/or adverse modification to their critical habitat.

As discussed in Section 8.8 in Chapter 8, Alternative 4 (which incorporates most of the elements of the management regime in place during the baseline years) is a less restrictive alternative to small entities participating in AI Atka mackerel fisheries than Alternative 5. However, the SSLMC did not select Alternative 4 as its preferred alternative. Alternative 4 measures were found to result in jeopardy or adverse modification of critical habitat for the Western DPS of Steller sea lion in the 2010 Biological Opinion. Alternative 5 may provide somewhat more protection for Steller sea lions in Area 543, where population declines have been larger than elsewhere.

Pacific cod management alternatives: minimizing impacts to small entities

For Pacific cod, Alternative 5 is most closely comparable with Alternative 4. However, Alternative 4 may be less restrictive to small entities, since Alternative 5 (Table 2-18) adds a catch limit for Pacific cod in Area 543 that limits area catch in proportion to the annual sock assessment. The SSLMC did not select Alternative 4 as its preferred alternative since it may provide less Steller sea lion protection than Alternative 5, increasing the possibility of adverse modification or jeopardy in this management area.

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9.14 Index

ESA, 9-6, 9-7
Federal rules that may duplicate, overlap, or conflict with proposed action, 9-10
Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act, 9-5
Number and description of small entities directly regulated by the proposed action, 9-7
principles of affiliation, 9-5
Recordkeeping and reporting requirements, 9-9
RFA, 9-3
The objectives of, and the legal basis for, the proposed rul, 9-6
What is a small entity?, 9-4
What is required in an IRFA?, 9-4
Why the action is being considered, 9-6

10.0 COMMUNITY IMPACTS

10.1 Introduction and Methodology

This chapter provides a community impact assessment of proposed Bering Sea/Aleutian Islands (BSAI) groundfish management changes for the Aleutian Islands (AI[179]) subarea Atka mackerel fishery and the portion of the Pacific cod fishery that takes place in the AI subarea as the result of implementation of Steller sea lion protection measures. This chapter also provides a community impact assessment of proposed management changes for the AI pollock fishery as the result of implementation of Steller sea lion protection measures.

10.1.1 Introduction

The community impacts analysis in this chapter is guided largely by the National Environmental Policy Act (NEPA); Executive Order (EO) 12898, Federal Action to Address Environmental Justice in Minority Population and Low-Income Populations; and National Standard 8 – Communities under the provisions of the Magnuson-Stevens Fishery Management and Conservation Act (Magnuson-Stevens Act).

- Under NEPA, "economic" and "social" effects are specific environmental consequences to be examined (40 CFR 1502.16 and 1508.8). In this Environmental Impact Statement (EIS), economic effects are examined primarily in Chapter 8, while social effects (and community-level economic effects) are examined primarily in this chapter (Chapter 10).[180]

[179] It is important to note that the Aleutian Islands subarea of the BSAI management area encompasses only a portion of the Aleutian Islands archipelago. To minimize the potential for ambiguity in this community impacts section, the abbreviation AI is used only when referring to the Aleutian Islands subarea of the BSAI management area. When the text is referring to the Aleutian Islands themselves, the terms "the Aleutians" or "the Aleutian Chain" are used.

[180] This EIS contains a Regulatory Impact Review (Chapter 8), required under EO 12866, and an Initial Regulatory Flexibility Analysis (Chapter 9), required under Regulatory Flexibility Act as amended (see Chapters 8 and 9 for additional detail). These analyses, along with the community impacts analysis containing environmental justice analysis required under EO 12898 (Chapter 10), are presented as separate chapters in this EIS rather than as a single combined "socioeconomics" chapter as is often found in other EISs. This presentation format is designed for ease of access and review, given the nature of the economic and social resources potentially affected by the proposed action alternatives, and in reflection of the emphasis placed on a detailed community impacts analysis appropriate to the scope and issues identified in both the litigation and scoping processes.

- EO 12898 (59 FR 7629; February 16, 1994) directs Federal agencies "to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The EO directs the development of agency strategies to include identification of differential patterns of consumption of natural resources among minority populations and low-income populations; Council on Environmental Quality (CEQ) environmental justice guidance under NEPA (CEQ 1997) also specifically calls for consideration of potential disproportionately high and adverse impacts to Indian tribes[181] beyond a more general consideration of potential disproportionately high and adverse impacts to minority populations. This chapter of the EIS identifies minority populations and low-income populations potentially subject to high and adverse environmental effects of the proposed action alternatives and identifies potential changes to patterns of subsistence resource use among minority populations and low-income populations that may result from implementation of the proposed action alternatives.
- National Standard 8 (50 CFR 600.345) specifies that conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act, take into account the importance of fishery resources to fishing communities by utilizing economic and social data that are based on the best scientific information available in order to (1) provide for the sustained participation of such communities, and (2) to the extent practicable, minimize adverse economic impacts to such communities. This chapter of the EIS describes the engagement and dependency[182] of fishing communities on the fisheries most likely to be affected by the proposed action alternatives and analyzes the risks to the sustained participation of those fishing communities.

10.1.2 Methodology and Document Organization

For the purposes of this community assessment, a two-pronged approach to analyzing the community or regional components of changes associated with the implementation of the proposed management revisions was utilized. First, tables based on existing quantitative fishery information were developed to identify patterns in the various components of the relevant fisheries, specifically the AI Atka mackerel and Pacific cod fisheries occurring in the three reporting districts within the AI subarea of the BSAI management area: Areas 541 (also known as the Eastern AI District), 542 (Central AI District), and 543 (Western AI District).[183] Similar tables were not developed for engagement in the AI pollock fishery due

[181] The term Indian tribe is retained due to its use in both the EO and CEQ guidance; the provisions of the EO and CEQ guidance are understood to apply to Alaska Native tribes in the region potentially affected by the proposed action alternatives.

[182] In this analysis, the term "engagement" is typically used to quantitatively describe, in absolute terms, type or level of participation in a fishery. The term "dependence," on the other hand, is typically used to describe, in relative terms, importance of that engagement when compared to engagement in other fisheries or other non-fishery socioeconomic activities, for indicators such as employment and private or public sector revenues. Dependence may be described for a community's locally owned fleet (i.e., how important is a given fishery relative to other fisheries pursued by the same vessels [vessel diversity] or the overall community fleet, including those vessels that do not participate in the given fishery); local shore-based processing operations (how important is local processing for a given fishery relative to local processing based on other fisheries by those same plants [processor diversity] or all local processors, including those plants that do not participate in a given fishery); local support services (i.e., how important are support service sector activities generated by a given fishery relative to support service activities generated by other fishery and non-fishery undertakings); and municipal finances (i.e., how important are public revenues derived from a given fishery relative to those generated by other fisheries and overall local municipal revenue generation), among others.

[183] Atka mackerel is managed separately at the AI subarea level, as is pollock; "AI Atka mackerel" and "AI pollock" are terms used in this section as shorthand for those separately managed AI subarea Atka mackerel and pollock fisheries. Pacific

to the relatively limited engagement in that fishery in recent years; community engagement in that fishery is described in quantitative terms in a separate subsection (Section 10.2.7). The second approach to producing this community analysis involved selecting a subset of communities most heavily engaged in the AI Atka mackerel fishery and/or the Pacific cod fishery in the AI subarea for characterization through a series of community profiles to describe the range, direction, and order of magnitude of social- and community-level engagement and dependency on those fisheries; also profiled were those communities engaged in subsistence resource pursuits in the AI subarea that may be affected by the proposed action alternatives. Engagement in and dependency on the AI pollock fishery are also described in the community profiles. These two approaches are described in the following subsections.

10.1.2.1 Identifying Patterns of Engagement

Summary tables, presenting data on community based participation from 2004 through 2011 are presented in Section 10.2, along with accompanying narrative. This analysis focuses on fishery sectors (catcher vessel trawl, catcher vessel non-trawl, catcher/processor trawl, catcher/processor non-trawl, and shore-based processors) and follows annual average participation indicators for the years 2004–2010 (the span of baseline years utilized for this analysis) and single-year participation indicators for 2011 (the only year to date that has featured management under the reasonable and prudent alternatives [RPA] interim final rule and for which complete year data are available).[184] More detailed fishery participant count tables by sector by year are presented in a series of tables (Table 10-34 through Table 10-39) included in a separate attachment (Section 10.9.1 Attachment A) at the end of this community impacts section.

Within this quantitative characterization of fishery participation, a number of simplifying assumptions were made. For the purposes of this analysis, assignment of catcher vessels (and catcher/processors) to a region or community has been made based upon ownership address information as listed in the Alaska Commercial Fisheries Entry Commission (CFEC) vessel registration files or the National Marine Fisheries Service (NMFS) Federal permit data. As a result, some caution in the interpretation of this information is warranted. It is not unusual for vessels to have complex ownership structures involving more than one entity in more than one region. Further, ownership location does not directly indicate where a vessel spends most of its time, purchases services, or hires its crew, as, for example, some of the vessels owned by residents of the Pacific Northwest spend a great deal of time in Alaska ports and hire at least a few crew members from these ports. The region or community of ownership, however, does provide a rough indicator of the direction or nature of ownership ties (and a proxy for associated economic activity, as no existing datasets provide information on where AI groundfish vessel earnings are spent), especially when patterns are viewed at the sector or vessel class level. Ownership location has further been chosen for this analysis as the link of vessels to communities rather than other indicators, such as vessel homeport information, based on previous North Pacific Fishery Management Council (Council or NPFMC) fishery management plan (FMP) social impact assessment experience that indicated the problematic nature of existing homeport data.[185]

cod, on the other hand, is not managed at the AI subarea level, but fishery statistics are tracked to the subarea level; "Pacific cod from the AI subarea" is used in this section as shorthand for Pacific cod that have been harvested in the AI subarea.

[184] Some types of quantitative fishery data are available for most of 2012, as shown in Chapter 8. Community-specific quantitative fisheries data for 2012 consistent with those for earlier years, however, are not yet available as of the date of this analysis. Where qualitative data on community engagement in the relevant fisheries for 2012 are available, those data are incorporated into the community profiles and impact analyses presented in this chapter.

[185] For example, one instance cited in the BSAI Crab Rationalization 3-year program review social impact assessment (EDAW 2008b) was Juneau, where (a) no BSAI crab vessel ownership was apparent for any of the years 1998–2007 in the BSAI crab dataset, (b) BSAI crab landings by Juneau homeported vessels were substantial at least in some years, and (c) BSAI crab landings and related activities had not occurred in Juneau itself, such that it was not clear how these activities linked back to Juneau in the absence of ownership or direct activity ties. A second example, also cited in the crab rationalization 3-year

For shore-based processors, regional or community designation was based on the physical location of the plant itself[186] (rather than ownership address) to provide a relative indicator of the local volume of fishery-related economic activity, which can also serve as a rough proxy for the relative level of associated employment and local government revenues. This is also consistent with other recent Council FMP social impact assessment practice.

There are, however, substantial limitations on the data that can be utilized for these purposes, based on confidentiality restrictions. A prime example of this is where a community is the site of a single processor, or even two processors. No information can be disclosed about the volume and/or value of landings in those communities.[187] This, obviously, severely limits quantitative discussions of the potential impacts of the management alternatives. In short, the frame of reference or unit of analysis for the discussion in this section (Section 10.2) is the individual sector,[188] and the analysis looks at how participation in fisheries most likely to be affected by the proposed management actions has been differentially distributed across communities and regions within this framework. The practicalities of data limitations, however, serve to restrict this discussion.

10.1.2.2 Community Profiles, the Context of Engagement and Dependency, and Relevant Subsistence Considerations

The approach of constructing community profiles for a subset of communities rather than attempting characterization of all of the communities in the region(s) involved, as presented in Section 10.3, was chosen due to the differences in relative levels of engagement of the communities in the relevant fisheries and the practicalities of time and resource constraints. This characterization was undertaken with existing information only and did not involve fieldwork in any of the communities, due to resource constraints; existing information was supplemented to a limited degree by phone and e-mail contact with individuals and entities in the relevant communities as well as industry representatives.

program review social impact assessment, was King Cove, where, in a very different pattern, no BSAI crab vessels showed up in the BSAI crab data set as being homeported in the community during 1998–2007, but it was known that both locally owned BSAI crab vessels and at least a few BSAI crab vessels with Pacific Northwest ownership spent considerable time in the port, hired local crew, and effectively operated out of the community for extended periods of time.

[186] Shore-based processors are identified by a specific code ("SBPR") in the fish ticket data; this excludes other fish buyers that may be present in the community but are not engaged in local shore-based processing.

[187] The number of data points that need to be aggregated to comply with data confidentiality restrictions varies by data source. The CFEC, as a state data source, requires aggregation of four data points to permit reporting of what would otherwise be confidential data, while use of Federal data sources requires the aggregation of three data points to permit disclosure. In this section, because several vessel data sources used draw at least in part on CFEC data, volume and value data are presented only when four or more data points are aggregated. Shore-based processor data presented in this section are limited to data from Federal data sources, so values are provided when three or more data points are aggregated (except for total first wholesale gross revenue figures for all species combined, which draws on state data, thereby requiring four data points for disclosure). Some data presented in this community impacts section will not, in some cases, match analogous data presented in the Regulatory Impact Review (RIR) portion of this document (Chapter 8) due to the utilization of different data sources. The RIR relies almost exclusively on Federal data sources (with the three data point confidentiality standard), while this chapter (Chapter 10) includes other state data (with the four data point confidentiality standard); additionally, gross revenue data presented in this section combine values for targeted and incidental catch to enable disclosure of additional information relevant to the community impacts analysis, while analogous data presented in Chapter 8 typically exclude values for incidental catch. These data sources differences are not of a great enough magnitude to result in differences in analytic conclusions.

[188] In this community analysis, the term "trawl vessels" is often used as shorthand for "vessels utilizing trawl gear" and "non-trawl vessels" is often used as shorthand for "vessels utilizing non-trawl gear." It is possible that at least some individual vessels may fish groundfish with both types of gear over the course of a year and may fish other species using a variety of gear types in a given year.

The total set of communities engaged in the fisheries is numerous and far-flung. Communities (and types of potential impacts) vary based upon the type of engagement of the individual community in the fishery, whether it is through being a center of activity for a portion of the catcher vessel fleet, being the location of shore-based processing, being the base of catcher/processor or floating processor ownership or activity, or being the location of fishery support sector businesses. In short, this second approach uses the community or region as the frame of reference or unit of analysis (as opposed to the fishery sector as in the first approach). This approach examines, within the community or region, the local nature of engagement or dependence on the fishery in terms of the various sectors present in the community and the relationship of those sectors (in terms of size and composition, among other factors) to the rest of the local social and economic context. This approach then qualitatively provides a context for potential community impacts that may occur as a result of fishery management-associated changes to the locally present sectors in combination with other community-specific attributes and socioeconomic characteristics.

Simplifying assumptions also needed to be made as to which communities to include in the profiles, given the large number of communities participating in the fisheries and the desire to focus on the communities most engaged in/dependent upon the relevant fisheries (and therefore most likely to be directly affected by proposed management actions).

Communities located within the AI subarea were included that were engaged in the AI Atka mackerel and/or Pacific cod fisheries in the AI subarea during the baseline period (2004–2010) or more recently (2011) through (1) local ownership of any catcher vessels participating in those fisheries during any year 2004–2011; (2) local operation of shore-based processing plants processing more than negligible amounts of landings from those fisheries in any year 2004–2011; and/or (3) provision of greater than negligible support services to catcher vessels, catcher/processors, and/or shore-based processing operations participating in those fisheries during 2004–2011.

To include communities located outside the AI subarea that were substantially engaged in the AI Atka mackerel and Pacific cod fisheries in the AI subarea, a more formal community engagement ranking exercise was undertaken that considered (1) level of catcher/processor support activity based on the number of port stops that occurred immediately before or after trips targeting AI Atka mackerel and/or Pacific cod in the AI subarea, (2) volumes of local landings from these fisheries made by catcher vessels, (3) share of total catcher vessel local landings that were from these fisheries, (4) local share of all catcher vessel landings that were from these fisheries, and (5) the number of catcher vessels with local ownership addresses. Details of this community engagement ranking are provided in a separate attachment to this community impacts chapter (Section 10.9.2 Attachment B).

It is also understood that the Atka mackerel and Pacific cod commercial fisheries that would be subject to potential reductions under the proposed alternatives are not the only natural resource-based activities of importance to local communities that could be affected by potential fishery management action changes. As described in Section 8.2.9, Steller sea lions are hunted for subsistence in the AI subarea by Alaska Native residents[189] of Adak and Atka. To the extent that Alaska Native Steller sea lion subsistence activities in the AI subarea are currently negatively affected by depressed Steller sea lion population numbers (which they may be for a number of reasons, as detailed in Section 8.2.9) and if Steller sea lion

[189] Taking of Steller sea lions (and other marine mammals) for subsistence purposes in the region is restricted to "any Indian, Aleut, or Eskimo who resides in Alaska and who dwells on the coast of the North Pacific Ocean or the Arctic Ocean" as specified by the Marine Mammal Protection Act (MMPA) of 1972 as amended. The MMPA also provides for marine mammal take (including Steller sea lion take) by these same persons "for the purposes of creating and selling authentic native articles of handicrafts and clothing." The MMPA further specifies that take for either purpose must not be accomplished in a wasteful manner.

population numbers increase over time as a result of implementation of proposed fishery management actions, positive impacts to Alaska Native Steller sea lion subsistence use could accrue. As a result, communities engaged in Steller sea lion subsistence use in the AI subarea were also selected for inclusion in the community profiles.

While no current information is readily available on subsistence fishing in the AI subarea for Atka mackerel, Pacific cod, or pollock, data from the most recent state study (1994) indicate that residents of Atka are engaged in subsistence fishing for Pacific cod and using and receiving if not harvesting Atka mackerel; no subsistence harvest or use of pollock was reported for Atka in that study (Alaska Department of Fish and Game 2013a). Atka mackerel and pollock are known to be harvested for subsistence in other areas (e.g., in the community of Unalaska). No information is available to indicate whether subsistence fishing for Atka mackerel, Pacific cod, or pollock occurs in Adak. There are no indications that commercial harvest activities in the AI subarea have adversely affected or are adversely affecting the level of Atka mackerel, Pacific cod, or pollock-specific subsistence activities that has occurred or may be occurring. Further, none of the alternatives restrict subsistence fishing. If localized abundance of these species increases as a result of implementation of proposed alternative commercial fishery management measures, it is possible that beneficial impacts could accrue to subsistence fishing for those species (assuming at least some subsistence fishing is taking place).

Using the AI subarea Atka mackerel and Pacific cod commercial fisheries engagement criteria described above in combination with the Steller sea lion subsistence use criteria also described above, four communities were initially selected for profiling as the communities most engaged in, and potentially the most dependent on, the AI groundfish fisheries and/or subsistence resource utilization potentially affected by the various proposed management alternatives. These communities were the following:

- Adak, Alaska
- Atka, Alaska
- Unalaska/Dutch Harbor, Alaska[190]
- Metropolitan Seattle, Washington, as defined by the Seattle-Tacoma Consolidated Metropolitan Statistical Area (CMSA)[191]

Following this exercise, potential changes specific to the AI pollock fishery were included as a part of the proposed action alternatives. During the baseline period (2004–2010) or more recently (2011), direct engagement in the AI pollock fishery was limited to three unique catcher vessels with Seattle ownership, three unique catcher/processors with Seattle ownership, and one shore-based processor operating in Adak (as described in more detail in Section 10.2.7); in other words, both communities with direct engagement in the AI pollock fishery during 2004–2011 (Adak and Seattle) were already selected for profiling due to their engagement in the AI Atka mackerel and/or the Pacific cod fishery in the AI subarea. A description

[190] In this chapter, the term "Unalaska" is used hereafter to refer to the community of Unalaska including its port of Dutch Harbor, which is fully encompassed within the boundaries of the City of Unalaska. Within some data sources, Unalaska and Dutch Harbor fishery statistics are reported separately, as there are separate Unalaska and Dutch Harbor mailing addresses and zip codes; in this chapter those statistics are combined for reporting as they represent two components of the same community.

[191] The Seattle-Tacoma CMSA is a U.S. Census Bureau definition used to tabulate the metropolitan area in and around Seattle, Washington. It includes the Primary Metropolitan Statistical Areas of Bremerton, Olympia, Seattle/Bellevue/Everett, and Tacoma. The Seattle-Tacoma CMSA includes the counties of Island, King, Kitsap, Pierce, and Snohomish. Specific to this report, of the 14 Washington communities identified in the data, 11 are included in the Seattle-Tacoma CMSA: Bellevue, Edmonds, Everett, Gig Harbor, Kirkland, Lakewood, Lynnwood, Mercer Island, Renton, Seattle, and Shoreline. The three other communities, Anacortes, Bellingham, and Lynden, located roughly 65, 80, and 95 miles north of Seattle, respectively, are outside of the CMSA. Anacortes and Bellingham are coastal communities; Lynden is not.

of engagement in, and dependency on, the AI pollock fishery is included in the community profiles for Adak and Seattle.

The location of the Alaska communities profiled and their proximity to the AI management districts may be seen in Figure 10-1. Summary profiles of each of these communities are presented in Section 10.3. These summaries are derived largely from other detailed community-profiling efforts (the results of which are in part included in this analysis and in part included in other documents incorporated by reference) as supplemented by targeted information gathering specific to the current community impact analysis effort.

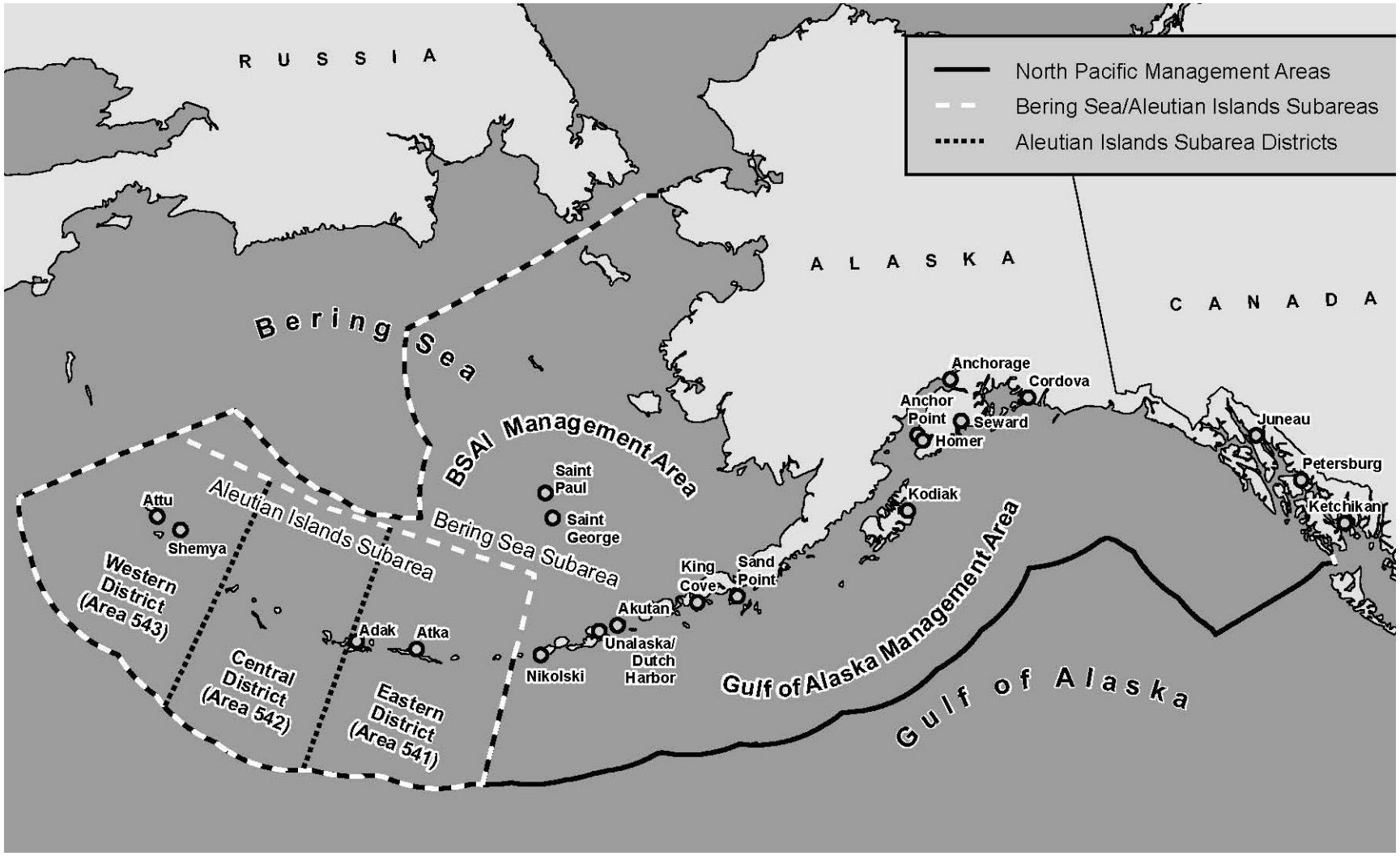


Figure 10-1 **North Pacific fishery management areas, Aleutian Islands subarea and districts, and selected Alaska communities**

10.1.2.3 Differential Distribution of Impacts and the Analysis of Dependence, Vulnerability, and Risks to Sustained Participation of Fishing Communities

It is important to note that those Alaska communities that have the potential to experience the greatest adverse impacts that could result from the proposed management actions based on their engagement in the relevant commercial fisheries (Adak and Unalaska) are not identical to the communities that have at least the potential to experience beneficial impacts that could result from the proposed management actions based on their engagement in relevant subsistence activities (Adak and Atka) or engagement in a fishery that could expand under the proposed management actions (Adak). Further, a change in patterns of fishery engagement could occur as a result of implementation of the proposed management actions, such that engagement could be reduced in one community (Adak) and increased in another (Unalaska). This potential differential distribution of adverse and beneficial impacts among and within communities is addressed in each of the Alaska community profiles, as well as in a focused discussion in Section 10.4.

Section 10.4 provides an analysis of potential community-level impacts of the proposed action alternatives. Discussions in this section include:

- An overview of community engagement, dependence, and vulnerability (Section 10.4.1)
- A summary of AI Atka mackerel fishery, Pacific cod fishery in the AI subarea, and AI pollock fishery engagement in the Alaska communities profiled (Section 10.4.2)
- AI Atka mackerel, Pacific cod in the AI subarea, and/or AI pollock fishery dependency and vulnerability to community-level impacts of the proposed action alternatives among Alaska communities, including vulnerability of low-income populations and minority populations of environmental justice concern (Section 10.4.3). The environmental justice analysis in this section follows CEQ environmental justice guidance under NEPA, which specifies that:
    - Low-income populations in an affected area should be identified with annual statistical poverty thresholds (from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty).
    - Minority populations (composed of individuals in any non-white racial category along with individuals of Hispanic origin in any racial category[192]) should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. A minority population also exists if more than one minority group is present, and the minority percentage, as calculated by aggregating all minority persons, meets one of these thresholds.
    - In identifying low-income and/ or minority communities, agencies may consider as a community either a group of individuals living in proximity to one another, or a set of individuals (such as migrant workers or Native Americans[193]), where either type of group experiences common conditions of environmental effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood,

[192] In other words, the only individuals not considered minority for the purposes of environmental justice analysis are non-Hispanic whites.

[193] The term Native American is retained in the discussion of this EO and related CEQ guidance due to its use in both the EO and CEQ guidance (rather than substituting the more specifically accurate and regionally preferred term Alaska Native).

a census tract, or other similar unit that is to be chosen so as not to dilute or inflate the affected minority population.

- When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
  - (a) whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and
  - (b) whether environmental effects are significant (as employed by NEPA) and are, or may be, having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds adverse impacts on the general population or other appropriate comparison group; and
  - (c) whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.[194]

- Risks to fishing community sustained participation in the AI Atka mackerel fishery, Pacific cod fishery in the AI subarea, and/or AI pollock fishery (Section 10.4.4). The analysis in this section utilizes the following definitions from National Standard 8:
  - National Standard 8 specifically defines "fishing community" as a community that is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities. Further, a fishing community is defined as a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries-dependent services and industries.
  - National Standard 8 specifies the term "sustained participation" as meaning continued access to the fishery within the constraints of the condition of the resource.

- Potential community beneficial impacts resulting from positive impacts to Steller sea lion subsistence hunting and/or Atka mackerel and/or Pacific cod and/or pollock subsistence fishing or potential redistribution of fishing engagement between communities (Section 10.4.5)

Section 10.5 provides a discussion of cumulative impacts. This section provides specific discussions for the communities of Adak, Atka, and Unalaska, along with a more general discussion of potential cumulative small/rural community and cultural context issues. Section 10.6 provides a chapter summary.

[194] EO 12898 speaks to both high and adverse environmental effects and high and adverse human health effects. Based on the nature of the proposed action alternatives, the analysis in this chapter focuses on environmental justice issues related to environmental effects rather than human health effects.

10.2 Quantitative Indicators of Community Engagement

The following series of tables (in Sections 10.2.1 through 10.2.6) provide quantitative information, within the bounds of confidentiality restrictions, for communities engaged in the Atka mackerel and Pacific cod fisheries in the AI subarea. Quantitative measures of community engagement in the AI pollock fishery are discussed, within the bounds of confidentiality restrictions, separately in Section 10.2.7. This information is summarized, on a community-by-community basis, in the community profiles in Section 10.3.[195]

The universe of Atka mackerel and Pacific cod vessels shown in the tables in this section is defined by vessels having any reported catch of Atka mackerel and/or Pacific cod in the AI subarea of the BSAI management area over the years 2004–2011. Participation is shown by AI district and "Other Alaska," with "Other Alaska" representing participation in Atka mackerel and/or Pacific cod fisheries, as relevant, in other Federal waters off of Alaska (that is, in the Bering Sea subarea of the BSAI management area and/or the Gulf of Alaska management area) and/or state waters fisheries for those species.

10.2.1 Trawl Catcher Vessels

Table 10-1 provides annual average vessel counts and a unique vessel count for 2004–2010 and vessel counts for 2011, by community of ownership, of trawl catcher vessels for all Alaska communities; the Seattle-Tacoma CMSA and other Washington communities; and state totals for Alaska, Washington, Oregon, and all other states combined. As shown, the largest component of fleet ownership, by far, is in Washington (and in the Seattle-Tacoma CMSA within Washington), followed by Alaska, Oregon, and all other states combined. Also clearly shown in this table is the absence of Alaska ownership of trawl catcher vessels that fished AI Atka mackerel in 2004–2011, and the paucity of Alaska-owned trawl catcher vessels that fished Pacific cod in the AI subarea during this same time (averaging less than one vessel per year 2004–2010 and none in 2011).

Because of confidentiality restrictions resulting from low vessel numbers for most communities and sector total numbers already reported in the analysis in the RIR (presented as Chapter 8 of this document), few gross revenue numbers can be reported for trawl catcher vessels by community of ownership for vessels fishing Pacific cod in the AI subarea and none can be reported for vessels fishing AI Atka mackerel. Table 10-2 provides all of the ex-vessel gross revenue data that can be disclosed, which within the AI subarea is limited to Area 542 only, to the years 2007 and 2009 only, to Pacific cod only, and to contrasting the Seattle-Tacoma CMSA with all other communities combined only.[196] Table 10-3 provides this same information, but expressed in terms of percentage of ex-vessel gross revenues for all species for those same vessels, which allows for a rough gauge of the relative importance, at least in terms of ex-vessel gross revenues, of Pacific cod in Area 542 for those years for those vessels.

[195] More detailed participation counts for catcher vessels, catcher/processors, and shore-based processors, for all communities, both within and outside of Alaska, are provided in a series of tables contained in an attachment (Section 10.9.1 Attachment A) to this community impacts chapter (Table 10-34 through Table 10-39).

[196] Even though there are enough total vessels to otherwise disclose ex-vessel gross revenues for trawl catcher vessels with Seattle-Tacoma CMSA ownership for Area 541 for some years as well, there are not enough vessels outside of the Seattle-Tacoma CMSA to permit disclosure of ex-vessel gross revenues for those vessels for Area 541 for those same years. As a result, either ex-vessel gross revenues for trawl catcher vessels with Seattle-Tacoma CMSA ownership can be disclosed in those instances or a grand total of ex-vessel gross revenues for vessels owned in all geographies combined can be disclosed, but not both. As grand total ex-vessel gross revenues for trawl catcher vessels are presented in Chapter 8, ex-vessel gross revenues for trawl catcher vessels with Seattle-Tacoma CMSA ownership in Area 541 have been suppressed.

Table 10-1 Trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011 (number of vessels)

			Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
State	Community	Year	541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
AK	Anchorage	Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.0	0.1	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kodiak	Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Petersburg	Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.4	0.3	0.1	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sand Point	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.4	0.3	0.3	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unalaska	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	Annual Average 2004–2010	0.0	0.0	0.0	0.4	0.9	0.6	0.0	1.4	0.9	0.6	0.0	1.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	3.0	5.0	4.0	0.0	6.0	5.0	4.0	0.0	6.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WA	Seattle-Tacoma CMSA	Annual Average 2004–2010	5.1	1.3	1.0	11.6	12.7	5.6	2.0	15.6	12.7	5.6	2.0	15.6
		Unique Vessels 2004–2010	18.0	6.0	3.0	27.0	30.0	21.0	5.0	35.0	30.0	21.0	5.0	35.0
		2011 (only)	8.0	3.0	1.0	8.0	13.0	6.0	1.0	13.0	13.0	6.0	1.0	13.0
	Bellingham	Annual Average 2004–2010	0.0	0.0	0.0	1.1	0.0	0.9	0.0	1.4	0.0	0.9	0.0	1.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	Annual Average 2004–2010	5.1	1.3	1.0	12.7	12.7	6.4	2.0	17.0	12.7	6.4	2.0	17.0
		Unique Vessels 2004–2010	18.0	6.0	3.0	30.0	30.0	24.0	5.0	38.0	30.0	24.0	5.0	38.0
		2011 (only)	8.0	3.0	1.0	8.0	13.0	6.0	1.0	13.0	13.0	6.0	1.0	13.0
OR	Total	Annual Average 2004–2010	0.1	0.0	0.0	1.0	0.1	0.1	0.0	1.1	0.1	0.1	0.0	1.1
		Unique Vessels 2004–2010	1.0	0.0	0.0	3.0	1.0	1.0	0.0	4.0	1.0	1.0	0.0	4.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Other States	Total	Annual Average 2004–2010	0.1	0.0	0.0	0.4	0.3	0.3	0.0	0.6	0.3	0.3	0.0	0.6
		Unique Vessels 2004–2010	1.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total		Annual Average 2004–2010	5.4	1.3	1.0	14.6	14.0	7.4	2.0	20.1	14.0	7.4	2.0	20.1
		Unique Vessels 2004–2010	20.0	6.0	3.0	37.0	37.0	30.0	5.0	49.0	37.0	30.0	5.0	49.0
		2011 (only)	8.0	3.0	1.0	8.0	13.0	6.0	1.0	13.0	13.0	6.0	1.0	13.0

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-2 Trawl catcher vessels with Pacific cod catches in Aleutian Islands Area 542, by community of ownership, 2007 and 2009 (ex-vessel gross revenues)

Community	Year	Pacific Cod Gross Revenue		Total Groundfish Gross Revenue	Total Gross Revenue, All Species
		542	Other Alaska		
Seattle-Tacoma CMSA	2007	$787,315	$5,335,800	$58,568,423	$64,159,713
All Other Communities		$215,245	$2,350,300	$7,636,013	$11,086,320
Total		$1,002,559	$7,686,100	$66,204,436	$75,246,033
Seattle-Tacoma CMSA	2009	$789,996	$1,350,717	$27,644,583	$29,912,046
All Other Communities		$117,270	$1,153,550	$3,255,484	$5,212,555
Total		$907,266	$2,504,267	$30,900,067	$35,124,601

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012.

Table 10-3 Trawl catcher vessels with Pacific cod catches in Aleutian Islands Area 542, by community of ownership, 2007 and 2009 (percentage of ex-vessel gross revenues for all species)

Community	Year	Pacific Cod Gross Revenue		Total Groundfish Gross Revenue	Total Gross Revenue, All Species
		542	Other Alaska		
Seattle-Tacoma CMSA	2007	1.2%	8.3%	91.3%	100.0%
All Other Communities		1.9%	21.2%	68.9%	100.0%
Total		1.3%	10.2%	88.0%	100.0%
Seattle-Tacoma CMSA	2009	2.6%	4.5%	92.4%	100.0%
All Other Communities		2.2%	22.1%	62.5%	100.0%
Total		2.6%	7.1%	88.0%	100.0%

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012.

10.2.2 Non-trawl Catcher Vessels

No non-trawl catcher vessels participated in the AI Atka mackerel fisheries during 2004–2010 or in 2011. For catcher vessels participating in the Pacific cod fishery in the AI subarea, Table 10-4 provides annual average vessel counts and a unique vessel count for 2004–2010 and vessel counts for 2011, by community of ownership, of non-trawl catcher vessels for all Alaska communities; the Seattle-Tacoma CMSA and other Washington communities; and state totals for Alaska, Washington, Oregon, and all other states combined. As shown, the largest component of fleet ownership has been in Alaska, followed by Washington (and in the Seattle CMSA within Washington) and then Oregon and all other states combined, but it is also clear that the vessels involved in this fishery have been few over the period 2004–2010. Also clearly shown in this table is the absence of participation of Alaska, Oregon, or all other states-owned vessels in this fishery in 2011; only one vessel with Washington ownership participated in 2011 and then in Area 542 only.

Table 10-4 Non-trawl catcher vessels with Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011 (number of vessels)

State	Community	Year	Pacific Cod			
			541	542	543	Other Alaska
AK	Adak	Annual Average 2004–2010	0.6	0.4	0.0	0.1
		Unique Vessels 2004–2010	2.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
	Anchor Point	Annual Average 2004–2010	0.1	0.0	0.0	0.3
		Unique Vessels 2004–2010	1.0	0.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0
	Anchorage	Annual Average 2004–2010	0.7	0.7	0.0	0.3
		Unique Vessels 2004–2010	3.0	3.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0
	Cordova	Annual Average 2004–2010	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
	Juneau	Annual Average 2004–2010	0.1	0.1	0.0	0.1
		Unique Vessels 2004–2010	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
	Ketchikan	Annual Average 2004–2010	0.1	0.1	0.0	0.0
		Unique Vessels 2004–2010	1.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0
	Kodiak	Annual Average 2004–2010	0.6	0.3	0.0	0.4
		Unique Vessels 2004–2010	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
	Unalaska	Annual Average 2004–2010	0.0	0.1	0.0	0.3
		Unique Vessels 2004–2010	0.0	1.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0
	Total	Annual Average 2004–2010	2.4	1.9	0.0	2.1
		Unique Vessels 2004–2010	10.0	8.0	0.0	11.0
		2011 (only)	0.0	0.0	0.0	0.0
WA	Seattle-Tacoma CMSA	Annual Average 2004–2010	0.6	0.3	0.1	0.9
		Unique Vessels 2004–2010	3.0	2.0	1.0	5.0
		2011 (only)	0.0	1.0	0.0	0.0
	Anacortes	Annual Average 2004–2010	0.1	0.1	0.0	0.0
		Unique Vessels 2004–2010	1.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0
	Bellingham	Annual Average 2004–2010	0.0	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
	Total	Annual Average 2004–2010	0.7	0.4	0.1	1.0
		Unique Vessels 2004–2010	4.0	3.0	1.0	6.0
		2011 (only)	0.0	1.0	0.0	0.0
OR	Total	Annual Average 2004–2010	0.1	0.1	0.0	0.3
		Unique Vessels 2004–2010	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
All Other States	Total	Annual Average 2004–2010	0.1	0.1	0.0	0.6
		Unique Vessels 2004–2010	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0
Grand Total		Annual Average 2004–2010	3.4	2.6	0.1	4.0
		Unique Vessels 2004–2010	16.0	13.0	1.0	19.0
		2011 (only)	0.0	1.0	0.0	0.0

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Because of confidentiality restrictions resulting from low vessel numbers for most communities and sector total numbers already reported in the analysis in the RIR (Chapter 8 of this document), few gross revenue numbers can be reported for non-trawl catcher vessels by community of ownership for vessels fishing Pacific cod in the AI subarea. Table 10-5 provides all of the ex-vessel gross revenue data that can be disclosed, which within the AI subarea is limited to Areas 541 and 542 only, to 2008 only, and to contrasting Alaska communities combined with all other communities combined only. Table 10-6 provides this same information, but expressed in terms of percentage of ex-vessel gross revenues for all species for those same vessels, which allows for a rough gauge of the relative importance, at least in terms of ex-vessel gross revenues, of Pacific cod in Areas 541 and 542 for those years for those vessels.

Table 10-5 Non-trawl catcher vessels with Pacific cod catches in Aleutian Islands Areas 541 and 542, by community of ownership, 2008 (ex-vessel gross revenues)

Community	Year	Pacific Cod Gross Revenue			Total Groundfish Gross Revenue	Total Gross Revenue, All Species
		541	542	Other Alaska		
Alaska Communities	2008	$279,656	$41,462	$719,089	$5,965,670	$9,104,803
All Other Communities		$160,636	$50,736	$772,361	$62,562,413	$66,858,710
Total		$440,293	$92,199	$1,491,450	$68,528,083	$75,963,513

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012.

Table 10-6 Non-trawl catcher vessels with Pacific cod catches in Aleutian Islands Areas 541 and 542, by community of ownership, 2008 (percentage of ex-vessel gross revenues, all species)

Community	Year	Pacific Cod Gross Revenue			Total Groundfish Gross Revenue	Total Gross Revenue, All Species
		541	542	Other Alaska		
Alaska Communities	2008	3.1%	0.5%	7.9%	65.5%	100.0%
All Other Communities		0.2%	0.1%	1.2%	93.6%	100.0%
Total		0.6%	0.1%	2.0%	90.2%	100.0%

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012.

10.2.3 Trawl Catcher/Processors

Table 10-7 provides annual average vessel counts and a unique vessel count for 2004–2010 and vessel counts for 2011, by community of ownership, of trawl catcher/processors. As shown, all trawl catcher/processors participating in either the AI Atka mackerel and/or the Pacific cod fisheries in the AI subarea during these years were owned in either of two communities, both of which were outside of Alaska: Seattle, Washington, and Rockland, Maine. Clearly shown in this table is the virtually exclusive concentration of ownership of trawl catcher/processors in Seattle, as no more than one vessel with Rockland ownership ever participated in the relevant fisheries in any given year 2004–2010, and none participated in 2011. No first wholesale gross revenue data can be reported for trawl catcher/processors based on community of ownership due to confidentiality restrictions, given that a total for first wholesale gross revenues for this sector is reported in the RIR (Chapter 8 of this document) and there are too few vessels outside of Seattle to permit reporting of both a community total and a grand total.

10.2.4 Non-trawl Catcher/Processors

Table 10-8 provides annual average vessel counts and a unique vessel count for 2004–2010 and vessel counts for 2011, by community of ownership, of non-trawl catcher/processors. As shown, all non-trawl catcher/processors participating in either the Atka mackerel and/or the Pacific cod fisheries in the AI subarea during these years were owned in one of three Washington communities: Everett, Lynden, and Seattle. Of these, Everett and Seattle are communities within the Seattle-Tacoma CMSA; Lynden, located near the Canadian border roughly 95 miles north of Seattle, is not. Clearly shown in this table is the exclusive concentration of ownership in Seattle of non-trawl catcher/processors participating in the AI Atka mackerel fishery and the predominance of Seattle ownership with respect to non-trawl catcher/processors participating in the Pacific cod fishery in the AI subarea. No first wholesale gross revenue data can be reported for non-trawl catcher/processors based on community of ownership due to confidentiality restrictions, given that a total for first wholesale gross revenues for this sector is reported in the RIR (Chapter 8 of this document) and there are too few vessels outside of Seattle to permit reporting of both a community total and a grand total for the sector.

10.2.5 Shore-Based Processors

Table 10-9 provides annual average plant counts and unique plant counts for 2004–2010 and plant counts for 2011, by community of operation, of shore-based processors. As shown, all shore-based processors receiving landings from either the AI Atka mackerel fishery and/or the Pacific cod fishery in the AI subarea during these years operated in 11 different Alaska communities. Clearly shown in this table is the virtual absence of shore-based processor participation in the AI Atka mackerel fishery.[197]

Caution must be taken in the interpretation of the distribution of shore-based processing efforts of Pacific cod from the AI subarea. Pacific cod from the AI subarea was processed in at least one year during 2004–2011 by shore-based processors operating in Anchorage, Atka, Homer, King Cove, Kodiak, Sand Point, Seward, and St. Paul. While specific processing volume and value figures are confidential for these communities, the rough order of magnitude of Pacific cod from the AI subarea processed in these communities during these years suggest that this was processing of incidental catch. On the other hand, shore-based processing of Pacific cod from the AI subarea in shore-based plants in Adak, Akutan, and Unalaska show a different pattern, but no specific processing volume or value data can be released for the single shore-based processing plant in Akutan due to confidentiality considerations.

Table 10-10 provides the minimal amount of first wholesale gross revenue information that can be released for shore-based processing of Pacific cod from the AI subarea by community, which during the period 2004–2011 is limited to 2008 only, to Area 541 within the AI subarea only, and to Unalaska and all other communities combined only. Further, first wholesale revenue totals for groundfish processing at these plants can be released as shown in the table, but total first wholesale revenues for processing of all species at these same plants cannot be released as that figure relies on state data and less than four entities were involved, triggering state confidentiality restrictions. Table 10-11 provides similar information but in percentage terms.

[197] AI Atka mackerel shows up in the data for one shore-based processor for one year only. While the volume and value of this specific processing are confidential, it is assumed that this reported AI Atka mackerel processing was the result of either the processing of incidental catch or "noise" in the data.

Table 10-7 Trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011 (number of vessels)

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
WA	Seattle	Annual Average 2004–2010	9.4	9.0	8.1	8.7	12.6	10.1	8.9	12.4	12.6	10.1	8.9	12.4
		Unique Vessels 2004–2010	14.0	10.0	10.0	15.0	16.0	13.0	11.0	16.0	16.0	13.0	11.0	16.0
		2011 (only)	7.0	7.0	0.0	5.0	7.0	7.0	1.0	7.0	7.0	7.0	1.0	7.0
ME	Rockland	Annual Average 2004–2010	0.4	0.3	0.1	0.3	0.6	0.3	0.1	0.6	0.6	0.3	0.1	0.6
		Unique Vessels 2004–2010	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grand Total		Annual Average 2004–2010	9.9	9.3	8.3	9.0	13.1	10.4	9.0	13.0	13.1	10.4	9.0	13.0
		Unique Vessels 2004–2010	15.0	11.0	11.0	16.0	17.0	14.0	12.0	17.0	17.0	14.0	12.0	17.0
		2011 (only)	7.0	7.0	0.0	5.0	7.0	7.0	1.0	7.0	7.0	7.0	1.0	7.0

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-8 Non-trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, annual averages 2004–2010 and 2011 (number of vessels)

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
WA	Everett	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.6	0.6	0.1	0.1	0.6
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lynden	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.3	0.3	0.3	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Seattle	Annual Average 2004–2010	0.4	0.1	0.4	0.1	6.9	4.9	2.7	7.9	6.9	4.9	2.7	7.9
		Unique Vessels 2004–2010	1.0	1.0	2.0	1.0	21.0	14.0	8.0	20.0	21.0	14.0	8.0	20.0
		2011 (only)	0.0	0.0	0.0	0.0	5.0	5.0	0.0	6.0	5.0	5.0	0.0	6.0
Grand Total		Annual Average 2004–2010	0.4	0.1	0.4	0.1	7.7	5.3	2.9	8.7	7.7	5.3	2.9	8.7
		Unique Vessels 2004–2010	1.0	1.0	2.0	1.0	25.0	17.0	9.0	24.0	25.0	17.0	9.0	24.0
		2011 (only)	0.0	0.0	0.0	0.0	5.0	5.0	0.0	6.0	5.0	5.0	0.0	6.0

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-9 Shore-based processors receiving landings of Atka mackerel and/or Pacific cod catches from the Aleutian Islands, by community of operation, annual averages 2004–2010 and 2011 (number of plants)

		Atka mackerel				Pacific Cod				Combined (Unique Processors)			
Community	Year	541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
Adak	Annual Average 2004–2010	0.0	0.0	0.0	0.0	1.0	0.9	0.7	0.9	1.0	0.9	0.7	0.9
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
	2011 (only)	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
Akutan	Annual Average 2004–2010	0.1	0.0	0.0	0.3	0.9	0.3	0.0	0.9	0.9	0.3	0.0	0.9
	Unique Processors 2004–2010	1.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
Anchorage	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2011 (only)	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
Atka	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Homer	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.3	0.0	0.0	0.3
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
King Cove	Annual Average 2004–2010	0.0	0.0	0.0	0.3	0.9	0.1	0.4	0.9	0.9	0.1	0.4	0.9
	Unique Processors 2004–2010	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2011 (only)	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
Kodiak	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.3	0.3	0.1	0.0	0.3
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sand Point	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.4	0.0	0.0	0.4
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seward	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Paul	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unalaska	Annual Average 2004–2010	0.0	0.0	0.0	0.4	2.1	1.1	1.0	2.1	2.1	1.1	1.0	2.1
	Unique Processors 2004–2010	0.0	0.0	0.0	2.0	3.0	2.0	2.0	3.0	3.0	2.0	2.0	3.0
	2011 (only)	0.0	0.0	0.0	2.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
Total	Annual Average 2004–2010	0.1	0.0	0.0	1.0	6.1	2.7	2.1	6.0	6.1	2.7	2.1	6.0
	Unique Processors 2004–2010	1.0	0.0	0.0	4.0	12.0	7.0	4.0	12.0	12.0	7.0	4.0	12.0
	2011 (only)	0.0	0.0	0.0	4.0	6.0	2.0	1.0	6.0	6.0	2.0	1.0	6.0

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 29, 2012; January 22, 2013.

Table 10-10 Shore-based processors receiving landings of Pacific cod catches from Aleutian Islands Area 541, by community of operation, 2008 (first wholesale gross revenues)

Community	Year	Pacific Cod Gross Revenue		Total Groundfish Gross Revenue
		541	Other Alaska	
Unalaska	2008	$146,917	$24,574,125	$258,766,763
All Other Communities		$7,781,201	$55,340,563	$283,551,685
Total		$7,928,118	$79,914,688	$542,318,448

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 29, 2012.

Table 10-11 Shore-based processors receiving landings of Pacific cod catches from Aleutian Islands Area 541, by community of operation, annual averages 2008 (percentage of first wholesale gross revenues, all groundfish)

Community	Year	Pacific Cod		Total Groundfish Gross Revenue
		541	Other Alaska	
Unalaska	2008	0.1%	9.5%	100.0%
All Other Communities		2.7%	19.5%	100.0%
Total		1.5%	14.7%	100.0%

Note: "Other Alaska" includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 29, 2012.

One of the things that these two tables show is the relative importance of Pacific cod from Area 541 to the three reporting Unalaska processors for 2008. In that year, Pacific cod from Area 541 accounted for approximately 0.1 percent of total groundfish first wholesale gross revenues at those same plants (and the percentage figure would be lower yet if total first wholesale gross revenue figures for all species run at the plants were available to be considered). While specific figures for other years are confidential for Unalaska, in general terms it is apparent that for at least some years during the 2004–2011 period, the entirety of processing of Pacific cod from the AI subarea in Unalaska resulted from the processing of incidental catch only.

For Adak, confidentiality restrictions preclude the release of shore-based processing data. However, as described in the Adak community profile, Pacific cod landings in Adak for the years 2002–2008 were reported in earlier Council and NMFS documents, including the NMFS 2010 Steller sea lion protection measures Environmental Assessment (EA)/RIR, due to a waiver of confidentiality procured from Adak Fisheries (NMFS 2010). Those data are presented in the Adak community profile (Section 10.3.1) and clearly show landings of Pacific cod from the AI subarea that were consistently the result of targeted efforts and that shore-based processing operations in Adak in 2002–2008 were clearly dependent upon Pacific cod from the AI subarea in a way that shore-based processing operations in Unalaska in 2004–2011 were not.

10.2.6 Support Services

No centralized sources of data are available for the characterization of fisheries-dependent services and industries in the communities most likely to be affected by the proposed action alternatives.[198] However, one indirect measure of the demand for such services may be found in quantitative information related to catcher vessel and/or catcher/processor port activity, as this would correspond to landings, product transfers, purchases of goods and services in the respective communities. One way of getting at these data would be through vessel homeport or other similar data, while another would be through port call data. These two approaches are discussed in the following subsections.

10.2.6.1 Alternate Owner City, Hailing Port, Homeport, and Federal Fisheries Permit Location

For any given vessel participating in the federally managed fisheries in the North Pacific, a variety of information is available that could potentially be used as a proxy for location of vessel port activity and therefore a potential location of support service sector activity. This includes information on ownership, hailing port, homeport, and Federal fisheries permit location. There are, however, at least two basic types of problems concerning these data: inconsistency across data sources, and lack of direct connection to vessel activity specific to the fishery being analyzed.

In terms of inconsistency across data sources, information is available from multiple sources on location of ownership, hailing port, and homeport, while Federal fisheries permit information, available from a single source, contains two different address types (permanent city and mailing city). Vessel ownership information is available from the CFEC, the Alaska Fisheries Information Network (AKFIN), and the United States Coast Guard; hailing port information is available from the same three sources plus NMFS Alaska Region; and homeport information is available from the CFEC and Federal fisheries permit data. Using the 10 unique catcher vessels that appear in the data as having been active in the AI Atka mackerel and/or Pacific cod fisheries in the AI subarea for any year 2004–2011 and that had the community of Adak appear in any one of these fields as an example, none of these vessels list Adak across all fields for any given year. Only one of the vessels shows Adak as the location of ownership across the three different ownership data sources for even one year; only two vessels show Adak as a hailing port consistently across all four different hailing port data sources for even one year; only one vessel shows Adak as a homeport for both homeport data sources for even one year; and only two vessels list associated Federal fisheries permits as having an Adak address (with both showing Adak as both the permanent city and mailing city address). In addition to inconsistencies between the data sources, some fields are missing data for some vessels for some years. The vessel closest to being consistently listed for Adak across all fields (and for which all fields have values) has a conflicting community address for one each of the hailing port and homeport data sources.

A similar situation exists for the seven unique catcher vessels and four unique catcher/processors that appear in the data as having been active in the AI Atka mackerel and/or Pacific cod fisheries in the AI subarea for any year 2004–2011 and that had the community of Unalaska appear in any one of these

[198] It should be noted, however, that the NMFS Alaska Fisheries Science Center conducted community surveys in 2011 in support of updating the Community Profiles for North Pacific Fisheries – Alaska compiled under the auspices of the Economic and Social Sciences Research Program. During that survey, communities were asked to list which fisheries-related services were available in the community. While not quantifying how many services there are, the scale of the services available, or the relationship of those services to any given fishery or set of fisheries, this information, which appears in the "infrastructure" section of the community profiles, does give an idea of the type of services available in a given community. These profiles may be accessed at http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php.

fields. While one catcher vessel for one year had Unalaska appear in all fields, except for one of the homeport fields (and no fields were empty), none of the other vessels listed Unalaska as the address of their Federal fisheries permits; of the two other vessels (one catcher vessel and one catcher/processor) that showed Unalaska ownership in any of the ownership fields, neither had Unalaska appear in any of the hailing port, homeport, or permit fields; and only one other vessel (a catcher/processor) showed Unalaska consistently across all hailing port and homeport fields for each of the years it appears in the data (2004–2007).

Beyond the inconsistencies in the various types of data that could be used as a proxy for location of vessel activity and therefore an assumed location of support services demand, none of these types of data are both fishery and harvest area specific. That is, none of these data show which ports the vessels are utilizing while engaged in the relevant fisheries potentially affected by the proposed management action over the baseline period and more recently (i.e., the AI Atka mackerel and Pacific cod fishery in the AI subarea). For these reasons, vessel port calls information as developed in the next section were used as a proxy for potential support services demand rather than vessel ownership, hailing port, homeport, and/or Federal fisheries permit address information.

10.2.6.2 Catcher Vessel and Catcher/Processor Port Calls

Catcher vessel and catcher/processor port calls immediately before and after trips targeting Atka mackerel and/or Pacific cod in the AI subarea (also called embarkations and disembarkations, respectively) may be the source of substantial economic activity in port communities, as vessels may use these calls for crew transfers, provisioning, fueling, product offloads, and purchases of other local goods and services, among other activities. For Adak and Unalaska in particular, support services related to port calls make up a substantial portion of the local fishing economy. Table 10-12 and Table 10-13 provide information on these types of port calls in these two communities, plus all other communities in Alaska combined, within data confidentiality constraints, for catcher vessels and catcher/processors, respectively, on an annual average basis 2004–2010 and for 2011.[199] No port call information specific to the community of Atka can be disclosed because of data confidentiality constraints. For catcher vessel port calls, data related to targeted Atka mackerel trips in the AI subarea are not available or cannot be disclosed due to confidentiality considerations. Targeted Pacific cod trips in the AI subarea make up virtually all of the catcher vessel groundfish target-related port calls in Adak in 2004–2011. There are many fewer catcher vessel port calls in Unalaska related to targeted Pacific cod trips in the AI subarea than was the case for Adak, but many more related to targeting Pacific cod in other areas of Alaska and to targeting other groundfish in the AI subarea and in the rest of Alaska. This underscores the relatively high degree of dependency of Adak on AI subarea specific targeted Pacific cod port calls and the relatively low degree of dependency of Unalaska on AI subarea specific targeted Pacific cod port calls. For catcher/processors, port calls related to targeted Atka mackerel and Pacific cod fishing in the AI subarea are of a similar magnitude in the two communities, Adak is far more dependent on those port calls than is Unalaska, when those calls are compared to port calls for trips targeting all groundfish species in other fishery management areas or subareas in Alaska.

[199] Other data provided by the NMFS Alaska Regional Office Analytical Team for the years 2008 through 2011 show that at least one port call was made by a catcher/processor targeting AI Atka mackerel or Pacific cod in the AI in only two other communities: Akutan (in 2009) and St. Paul (in 2008, 2009, and 2010) and neither community had an annual average of greater than one port call per year over this same time period. This underscores the importance of the communities of Adak and Unalaska with regard to port calls for those catcher/processors engaged in the AI Atka mackerel fishery and Pacific cod fishery in the AI. No information was provided for catcher vessels in this supplemental data set.

Table 10-12 Catcher vessel (all gear types) port calls in Adak and Unalaska immediately before and/or after targeted Pacific cod trips in the AI subarea and all of Alaska, annual averages 2004–2010 and 2011 (number of calls)

Fishery	Area	Annual Average 2004–2010			2011 (only)		
		Adak	Unalaska	All Other	Adak	Unalaska	All Other
Pacific Cod	Aleutian Islands Subarea (no.)	117.9	33.1	*	11.0	17.0	*
	All Alaska (no.)	119.3	675.3	1,888.1	12.0	595.0	2,275.0
	AI Subarea/All Alaska (%)	98.9%	5.2%	*	91.7%	2.9%	*
All Groundfish Trawl	Aleutian Islands Subarea (no.)	106.9	31.6	3.0	9.0	25.0	10.0
	All Alaska (no.)	109.6	1,518.9	2,305.4	10.0	1,693.0	2,495.0
	AI Subarea/All Alaska (%)	96.9%	2.3%	0.1%	90.0%	1.5%	0.4%
All Groundfish Non-trawl	Aleutian Islands Subarea (no.)	55.6	56.7	12.6	75.0	81.0	19.0
	All Alaska (no.)	57.7	699.3	2,008.9	76.0	683.0	2,441.0
	AI Subarea/All Alaska (%)	94.7%	8.2%	0.6%	98.7%	11.9%	0.8%

Notes: * = data suppressed to retain confidentiality
Source: NMFS Alaska Regional Office Analytical Team, September 4, 2012.

Table 10-13 Catcher/processor (all gear types) port calls in Adak and Unalaska immediately before and/or after targeted Atka mackerel or Pacific cod trips in the AI subarea and all of Alaska, annual averages 2004–2010 and 2011 (number of calls)

Fishery	Area	Annual Average 2004–2010			2011 (only)		
		Adak	Unalaska	All Other	Adak	Unalaska	All Other
Atka mackerel	Aleutian Islands Subarea (no.)	43.6	32.4	*	28.0	48.0	*
	All Alaska (no.)	43.6	58.0	*	28.0	50.0	4.0
	AI Subarea/All Alaska (%)	100.0%	61.7%	*	100.0%	96.0%	*
Pacific Cod	Aleutian Islands Subarea (no.)	28.9	36.7	*	13.0	15.0	0.0
	All Alaska (no.)	29.3	454.9	36.1	14.0	418.0	22.0
	AI Subarea/All Alaska (%)	98.5%	8.7%	*	92.9%	3.6%	0.0%
All Groundfish Trawl	Aleutian Islands Subarea (no.)	62.7	66.7	*	50.0	93.0	*
	All Alaska (no.)	67.7	964.9	61.9	50.0	1,197.0	60.0
	AI Subarea/All Alaska (%)	92.4%	6.9%	*	100.0%	7.8%	*
All Groundfish Non-trawl	Aleutian Islands Subarea (no.)	29.3	45.7	*	47.0	46.0	0.0
	All Alaska (no.)	30.0	425.7	40.3	49.0	440.0	22.0
	AI Subarea/All Alaska (%)	97.2%	11.0%	*	95.9%	10.5%	0.0%

Notes: * = data suppressed to retain confidentiality
Source: NMFS Alaska Regional Office Analytical Team, September 4, 2012.

10.2.7 Community Engagement in the AI Pollock Fishery

As described in Chapter 8 of this document, in 1999 the Council closed the AI subarea to directed pollock fishing due to concerns for Steller sea lion recovery; in 2003 the directed fishery re-opened outside of critical habitat; and in 2005 a directed fishing allocation (DFA) was granted to the Aleut Corporation by Congressional action (Public Law 108-199), with the allocation being made for the purposes of economic development in Adak.[200] As further described in Chapter 8, the law required the Aleut Corporation to select (authorize) participants in the Aleutian Islands directed pollock fishery and limited participation to American Fisheries Act (AFA) qualified entities and vessels 60 feet or less in length overall (LOA) with certain endorsements; while earlier years varied in the required split between AFA entities and the smaller vessels, vessels 60 feet or less LOA were to receive 50 percent of the annual directed pollock fishery allocation starting in 2013, with this same split continuing into subsequent years.

During the baseline period 2004–2010 or more recently (2011 or 2012), direct engagement (as defined by fish landed and/or processed) in the AI pollock fishery was limited to three unique AFA-qualified catcher vessels with Seattle ownership, three unique AFA-qualified catcher/processors with Seattle ownership, and one unique shore-based processor that operated in Adak. In general, steady, year-to-year participation in the fishery has been the exception rather than the rule, with any entity participating in two or more consecutive years being limited to one catcher vessel (five consecutive years) and one shore-based processor (four consecutive years). Specifically:

- Of the three unique catcher vessels engaged in the fishery, only one participated in more than one year. One unique vessel participated each year 2006–2010 but not in 2005, 2011, or 2012; the other two participated 2007 only. All AI pollock harvested by these catcher vessels in all years discussed was taken in Area 541, with the exception of AI pollock taken by one vessel from Area 542 during one trip in 2007.
- Of the three unique catcher/processors engaged in the fishery, only one participated in more than one year. One unique catcher/processor participated in 2007, when it both harvested and processed AI pollock, and again in 2010, when it only processed AI pollock harvested by others; the other two participated in 2005 only (when each both harvested and processed AI pollock). All AI pollock harvested and/or processed by these catcher/processors in all years discussed was harvested in Area 541.
- The one shore-based processor engaged in the fishery operated in Adak each year 2006–2009, but not in 2005, 2010, 2011, or 2012). All AI pollock processed at this plant in all years discussed was taken in Area 541, with the exception of AI pollock from Area 542 that was landed by one vessel in 2007.

Table 10-14 provides a summary of the number of entities authorized by the Aleut Corporation to participate in the AI pollock fishery as well as the subset of authorized entities actually participating in the fishery by sector by year. As shown in the table, no catcher vessels, catcher/processors, or shore-based processors participated in the AI pollock fishery in 2004 (when the fishery was open outside of critical habitat but before the DFA was granted to the Aleut Corporation) or in 2011 or 2012 (when the

[200] As described in Chapter 8, there is a Community Development Quota (CDQ) allocation of 10 percent of the total allowable catch (TAC); in addition, an incidental catch allowance is determined annually by the Regional Administrator. Both the CDQ allocation and the incidental catch allowance are deducted from the TAC, and the balance of the TAC is allocated to the Aleut Corporation as an annual pollock DFA. None of the CDQ allocation has been fished in recent years. In the years between the fishery re-opening outside of critical habitat (2003) and the provision of a DFA to the Aleut Corporation (2005), the fishery was essentially inactive, reportedly due to the inability of potential participants to find fishable amounts of pollock.

Aleut Corporation did not authorize any vessels to participate in the fishery). Also as shown in the table, all catcher vessels participating to date have been AFA vessels; although the Aleut Corporation authorized smaller vessels in 2007 (only), none have participated in the fishery over the years shown. (Of the smaller catcher vessels authorized in 2007, three had Alaska ownership [two had Sand Point and one had Anchorage ownership] while the other four vessels had Washington state ownership [two had Seattle-Tacoma CMSA ownership and two had Bellingham ownership]). No motherships have participated in this fishery over the years shown in the table, with authorization in this sector limited to a single vessel in 2005. Authorized shore-based processors have been limited to one operation in Adak, except for 2005, when two processors operating in Unalaska were also authorized (but did not participate in the fishery).

Table 10-14 Number of catcher vessels, catcher/processors, and shore-based processors authorized by the Aleut Corporation and participating in the AI pollock fishery, by year, 2004–2012

Sector	2004	2005	2006	2007	2008	2009	2010	2011	2012
Authorized AFA CVs	na	22	6	13	6	8	1	0	0
Participating AFA CVs	0	0	1	3	1	1	1	0	0
Authorized < 60' LOA CVs	na	0	0	7	0	0	0	0	0
Participating < 60' LOA CVs	0	0	0	0	0	0	0	0	0
Authorized AFA CPs	na	10	0	1	0	1	1	0	0
Participating AFA CPs	0	2	0	1	0	0	1	0	0
Authorized AFA MTH's	na	1	0	0	0	0	0	0	0
Participating AFA MTH's	0	0	0	0	0	0	0	0	0
Authorized SB Processors	na	3	1	1	1	1	0	0	0
Participating SB Processors	0	0	1	1	1	1	0	0	0

Abbreviations used in this table: CV = catcher vessel; CP = catcher/processor; MTH = mothership; SB = shore-based.
Source(s): Authorized vessels 2006–2010 retrieved from http://www.alaskafisheries.noaa.gov/ram/aipollock.htm on January 11, 2013. Authorized vessels 2005: NMFS, January 14, 2013. Participating vessels: NMFS, January 10, 2013.

10.3 Community Profiles and the Local Context of Potential Impacts of Proposed Management Changes

Detailed information on the range of Alaska and Pacific Northwest groundfish fishing communities relevant to the proposed management alternatives may be found in a number of other groundfish-related documents, including the *Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement* (NMFS 2004) and *Sector and Regional Profiles of the North Pacific Groundfish Fishery* (EDAW and Northern Economics 2001), and in a technical paper (Downs 2003) supporting the *Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska* (NMFS 2005) as well as that EIS itself. These sources also include specific characterizations of the degree of individual community and regional engagement in, and dependency upon, the North Pacific groundfish fishery.

For this analysis, these documents, as well as other Council-related documents concerning other fisheries but containing detailed community profile information for a number of the groundfish-related communities, are incorporated by reference, including the *Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement– Appendix 3: Social Impact Assessment* (EDAW 2004)*; Five-Year Review of the Crab Rationalization Management Program for Bering Sea and Aleutian Islands Crab Fisheries – Appendix A: Social Impact Assessment* (AECOM 2010); *Comprehensive Baseline Commercial Fishing Community Profiles: Unalaska, Akutan, King Cove, and Kodiak, Alaska – Final Report* (EDAW 2005); and *Comprehensive Baseline Commercial Fishing Community Profiles: Sand Point, Adak, St. Paul and St. George, Alaska – Final Report* (EDAW 2008a). Additionally, *Community Profiles for North Pacific Fisheries – Alaska* (Sepez et al. 2005), *Community Profiles for West Coast and*

North Pacific Fisheries – Washington, Oregon, California, and Other U.S. States (Sepez et al. 2007), and draft updates to *Community Profiles for North Pacific Fisheries – Alaska* currently being compiled by the Alaska Fisheries Science Center (Himes 2012a) (Himes 2012c) were used in framing the summary community profiles presented here.

In general, the fishing communities that are expected to be potentially directly and adversely affected by the proposed management alternatives are those communities where potentially affected vessel owners reside; where vessels make deliveries to shore-based processors and generate associated economic activities and public revenues, including those derived from landing or severance taxes; where catcher/processors offload product, make crew changes, or otherwise generate local business activity; where vessel support services are provided; where vessels are otherwise located during the year and generate some level of related economic activity; and where skippers and crew reside. Community-level information for some of these potential data categories, however, is not available or is too inconsistently collected to be useful for multi-community analyses. As noted earlier, information on vessel homeport (or the meaning of homeport designations for given vessels), for example, is known to be inconsistent enough for homeport designation to be of little utility as an indicator of location of vessel-associated economic activity in general; direct information on the location of vessel purchases of support services specifically is not readily available. Information on the community of long-term residence of vessel skippers and crew, and processing crew that work aboard the potentially affected vessels or in the shore-based processors active in the relevant AI groundfish fisheries is not readily available. Information developed for other recent analyses, however, suggests that, generally, companies operating vessels in the AI subarea groundfish trawl and non-trawl catcher vessel and catcher/processor sectors alike tend to recruit crew from many locations, depending on the specific location of vessel ownership, vessel activity, and/or the scale and scope of vessel operations. Different shore-based processors use a combination of local and regional or national (and, at times, even international) hiring that varies based on the location of the processing plant; the processing season and combination of species processed; and individual operational characteristics, including the size of plant operations, the mix of product forms produced, and the scale of the operating company. To the extent that these types of information are available for the individual communities profiled, a summary of these types of data is included in the community profiles below.

In general, it is not possible to quantitatively differentiate potential impacts of the different alternatives on an individual community basis, especially for Alaska communities. Taken from a community perspective, however, qualitative analysis of the alternatives inherent in the following profiles suggests that, while impacts may be noticeable at the individual operation level for at least a few vessels and/or a few shore-based processors (and potentially at the individual operation level for at least a few local support service providers for those vessels and/or processors), the impacts at the community level for any of the involved fishing communities would likely be less than significant as gauged through the use of existing data, with the notable exception of Adak. The sustained participation of these fishing communities, aside from Adak, would not clearly be put at risk by any of the alternatives being considered; the case of Adak is considered in more detail in Section 10.4. The case of Atka is less straightforward. For Atka, engagement in the Pacific cod commercial fishery in the AI subarea did not begin until 2012. In other words, the community was not engaged under baseline conditions (2004–2010); rather, participation was initiated only after fishery management under the interim final rule was in place (2011/status quo conditions). While clearly planning and investment for engagement in the fishery occurred before the implementation of management under the interim final rule, potential adverse impacts to the community from the implementation of the proposed action alternatives would be less about sustaining historic participation in the fishery and more about preclusion of the community from a fishery previously determined by the community (and Aleutian Pribilof Island Community Development Association [APICDA]) to be a viable component to add to its portfolio of commercial fisheries engagement to help meet the social and economic needs of the community.

The following sections provide a community-by-community characterization of the local community context of Atka mackerel and Pacific cod fishery participation in the AI subarea as well as participation in Steller sea lion subsistence hunting and Atka mackerel and Pacific cod subsistence fishing in the AI subarea for those communities.

10.3.1 Adak

10.3.1.1 Location

Adak is located on Adak Island, which is 350 miles west of Unalaska, and 1,300 miles from Anchorage in the Aleutian Islands archipelago. The southernmost city in Alaska, Adak encompasses 122.4 square miles of land and 4.9 square miles of water. Adak is located within the Aleutians West Census Area, and in 2001 was incorporated as a second class city but is not under the jurisdiction of any organized borough (Himes 2012a).

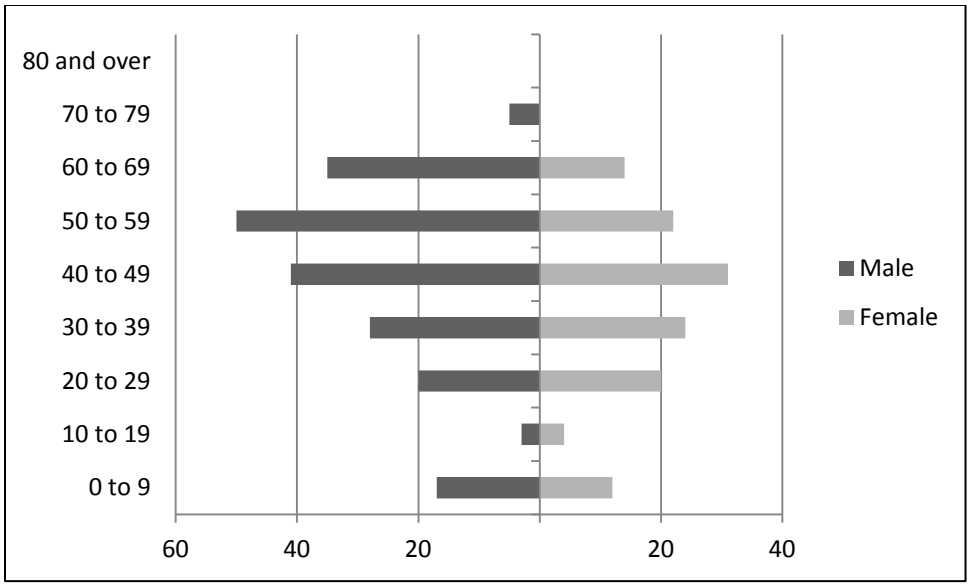
10.3.1.2 History

Archaeological evidence suggests that Adak Island was occupied up to 6,000 years ago, but its more recent recorded history began in the 17th century when Aleut residents from other nearby islands, who used the island for hunting and fishing, encountered the Russian fur trade. The Aleuts continued to utilize the island's resources until World War II, at which time the island became an important operations and supply location for the United States after the Japanese occupation of Kiska and Attu Islands. Adak hosted 32,000 military personnel during World War II and after the war that number was reduced to 6,000 personnel when the base was made into a Naval Air Station. The Naval Air Station acted as a key surveillance operations center during the Cold War. In 1994, however, Navy family housing and schools were closed, with the rest of the station officially closing in 1997. Soon after, the land was acquired by the Aleut Corporation in a land transfer agreement (Himes 2012a).

10.3.1.3 Community Demographics

According to U.S. Census figures from 2010, a total of 326 people reside in Adak. The gender composition of the community is 61 percent male and 39 percent female, as demonstrated by Figure 10-2, and the largest cohort of residents consists of individuals aged 40 to 49 and 50 to 59 (U.S. Census 2012a). Adak is similar to other small fishing communities that feature relatively greater male populations typically associated with large-scale transient worker-based seafood processing and/or other industrial enclave type of development. If residency in households is used as a proxy for permanent residency, the permanent population of Adak can be estimated at 109 for 2010,[201] with group quarter residents, assumed to be transient workers associated with fisheries sectors, composing the other 217 individuals enumerated in 2010. The population of Adak is at its greatest during the fishing seasons, January through April, and June through October, with peaks in population occurring in January and July (Himes 2012a).

[201] Alaska Fisheries Science Center in 2011 estimated 120 to 140 full-time residents (Himes 2012a).

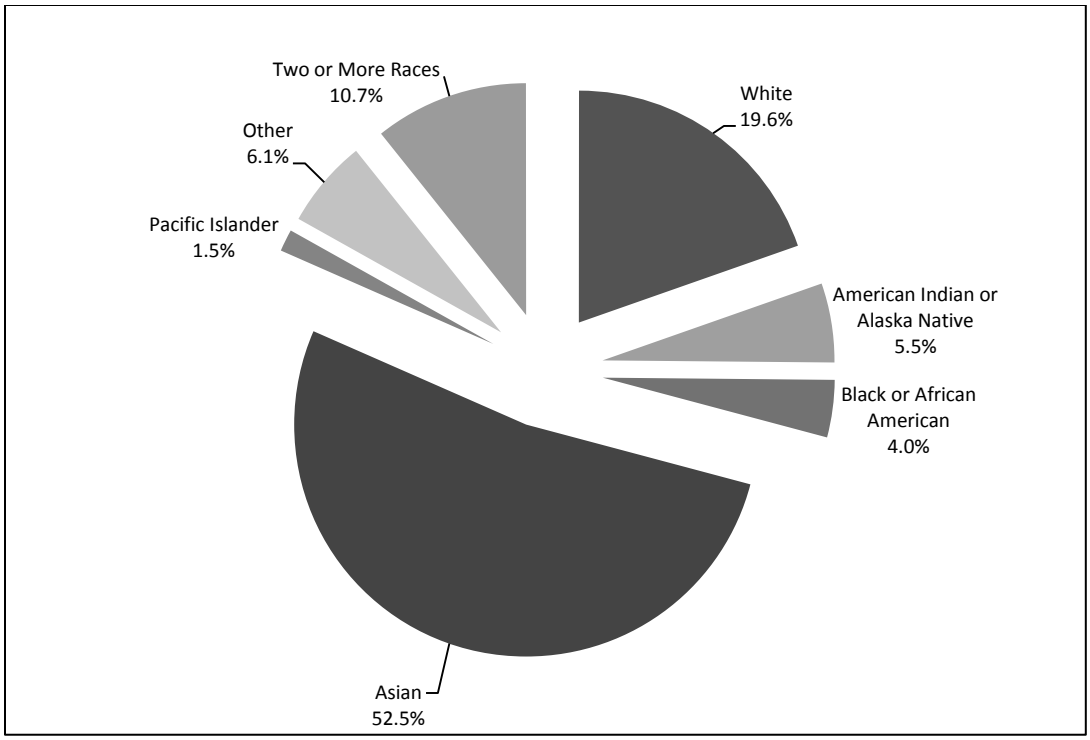


Source: (U.S. Census 2012a)

Figure 10-2 Adak 2010 population structure

Census figures from 2010 show that 19.6 percent of the residents of Adak identified themselves as White, 5.5 as American Indian or Alaska Native, 4.0 percent as Black/African American, 52.5 as Asian, 1.5 as Pacific Islander, and 16.8 percent as "some other race" or "two or more races." Finally, 8.9 percent of the residents of any race in Adak identified themselves as Hispanic. Based on race and ethnicity combined, 81.9 percent of Adak's total population was composed of minority residents (that is, all residents other than those identified as White/non-Hispanic [race/ethnicity]). Figure 10-3 provides a graphic representation of the racial structure of Adak in 2010 (ADCED 2012a). Adak's population has a relatively large minority population segment; this is congruous with other communities associated with one or more large seafood processing operations that draw a proportionately large number of workers from a non-local labor pool.

Housing data from the U.S. Census, as shown in Table 10-15 indicate that 33.4 percent of all Adak residents live in non-group quarters housing, with total housing units (former military housing) in Adak numbering 500. Of those housing units, approximately 8.8 percent were occupied. Family households number 26, with an average household size of 2.48 persons. There is one seafood processor in Adak that is reported to have group housing for workers.



Source: (ADCED 2012a)

Figure 10-3 Adak 2010 racial structure

Table 10-15 Adak 2010 housing information

Total Population	326	100%
Living in Non-Group Quarters	109	33.4%
Living in Group Quarters	217	66.6%
Total Housing Units	500	100%
Occupied Housing (Households)	44	8.8%
Vacant Housing	456	91.2%
Family Households	26	59.1%
Average Household Size	2.48	na

na = not applicable
Source: (ADCED 2012a)

10.3.1.4 Local Economy

Commercial fishing is vitally important to the community since seasonal fluctuations of employees associated with seafood processing affects employment rates; the latest estimates, based on the 2010 U.S. Census American Community Survey, suggest that 39 people were employed in Adak,[202] with an unemployment rate of 2.5 percent (U.S. Census 2012b). Per capita income for people in Adak was $36,947, median household income was $93,750, and median family income was $64,750 (U.S. Census 2012a). An estimated 1.7 percent of Adak's residents were considered low-income, defined as those individuals living below the poverty level threshold (ADCED 2012b). As shown in Table 10-16,

[202] American Community Survey data from 2010 indicate that 39 of 40 persons in Adak's labor force were employed. As Himes notes (Himes 2012a) Adak's small population size may have prevented the American Community Survey from accurately portraying economic conditions.

major employers included the seafood processing facility, city government, the island fuel company, a cement contractor, and the Eastern Aleutian Tribes.

Table 10-16 Adak top five occupations and employers

Occupations	
1	Construction Laborers
2	Teachers and Instructors, all other
3	First-Line Supervisors of Office and Administrative Support Workers
4	Not Available
5	Not Available
Employers	
1	Adak Seafoods LLC
2	City of Adak
3	Adak Petroleum LLC
4	Lakloey Inc.
5	Eastern Aleutian Tribes Inc.

Source: (ADOL 2012a) and (Himes 2012a)

10.3.1.5 Commercial Fishery Engagement

10.3.1.5.1 Overview

Three residents held commercial fishing permits as of 2010 for sablefish, salmon, groundfish, and halibut. Adak community representatives have participated in the Council and the Federal Subsistence Board/Federal Subsistence Regional Advisory Council processes. Adak is not currently eligible to participate in either the Community Quota Entity or Community Development Quota (CDQ) programs. The island is located in Federal Reporting Area 541, International Pacific Halibut Commission (IPHC) Regulatory Area 4B, and the Aleutian Islands Sablefish Regulatory District (Himes 2012a). While Adak is not a CDQ community, as a result of Congressional action it receives an allocation of Western AI golden king crab to help foster the development and maintenance of sustained fisheries participation. Congressional action has also provided an allocation of AI pollock to the Aleut Corporation for the benefit of Adak outside of the CDQ program. Within the AI subarea, Adak is located within the western portion of Area 541, approximately 14 miles to the east of the eastern boundary of Area 542.

10.3.1.5.2 Harvest Sector

General. As briefly mentioned above, in 2010 three residents of Adak held 10 commercial fishing permits issued by the CFEC, but only 50 percent of those permits were actively fished. In 2010, nine residents held commercial crew licenses and Adak residents held majority ownership of two vessels. During the 2011 fishing seasons, Adak was used as a base of operations for vessels ranging 35 to over 125 feet with gear types including trawl, pots, longline, jigs, and circle hooks (Himes 2012a).

As a new civilian community, the local resident-owned fleet in Adak is relatively small. Existing information suggests that recently only a handful of vessels were considered “local” by community residents and were actively engaged—or attempting to be engaged in—area fisheries. These vessels included two that were owned by Adak Seafoods; two that were owned by part-time residents, with one of these vessels spending part of every year outside of the community; and one that was owned by a full-time resident but not currently active in commercial fisheries. Active local vessels generally participate in multiple fisheries and have diversified their yearly activities, combining earnings from commercial fishing with other income earned from seasonal construction work or other employment (EDAW 2008a).

Adak has faced challenges in attracting and retaining a local commercial fishing fleet since the departure of the military; more recent information on turn-over in the local fleet is presented in Section 10.4.3.1.3.

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher Vessels. No Adak resident-owned trawl catcher vessels were present in the data for 2011, the most recent year for which data are available, and no Adak resident-owned trawl catcher vessels were in the data for 2004–2010 (Table 10-1).

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher Vessels. No Adak resident-owned non-trawl catcher vessels were present in the data as fishing AI Atka mackerel for the years 2004–2011. However, one unique vessel was present in the data as having fished Pacific cod in the AI subarea (Areas 541 and 542) in 2006 and 2007. In 2008, one unique vessel was present in the data for Area 542 and two unique vessels were present in the data for Area 541. Overall, the number of unique vessels present in the dataset for 2004–2011 is two, with an annual average of 0.6 Adak resident-owned vessels per year over the period 2004–2010 for Area 541, and an annual average of 0.4 over the same period for Area 542. Participation in the Pacific cod fishery outside the AI subarea did not occur for the one unique vessel in the data in 2006 or 2007. One unique vessel did participate in the Pacific cod fishery outside of the AI subarea in 2008, for an annual average of 0.1 resident-owned vessels per year over the period 2004–2010 (Table 10-4 and Table 10-35).

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher/Processors. No Adak resident-owned trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Adak resident-owned trawl catcher/processors were in the data in 2004–2010 (Table 10-7).

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher/Processors. No Adak resident-owned non-trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Adak resident-owned non-trawl catcher/processors were in the data for the years 2004–2010 (Table 10-8).

Aleutian Islands Pollock Trawl Catcher Vessels. No Adak resident-owned trawl catcher vessels were present in the data for 2011, the most recent year for which data are available, and no Adak resident-owned trawl catcher vessels were in the data for 2004–2010 (as discussed in Section 10.2.7).

Aleutian Islands Pollock Trawl Catcher/Processors. No Adak resident-owned trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Adak resident-owned trawl catcher/processors were in the data in 2004–2010 (as discussed in Section 10.2.7).

10.3.1.5.3 Processing Sector

General. Adak is home to a shore-based processing plant that was operated by Icicle Seafoods from July 2011 to the first months of 2013. Icicle withdrew from Adak in 2013, and a new firm, Adak Cod Cooperative LLC, plans to begin Pacific cod processing operations. (Shedlock 2013; Paulin et al. 2013)[203] Processing activity was known to take place in Adak during the 1960s and 1970s, when the military was in full control of the area. The single shore-based processing plant in the post-military era began processing in February 1999 under the name Adak Seafoods. Since that time, it has gone through a series of operator/leaseholder ownership and/or partnership changes that involved various companies

[203] The facility is owned by Aleut Enterprise and is currently leased through Aleut Fisheries LLC, a wholly owned subsidiary of Aleut Enterprise, to the Adak Cod Cooperative LLC.

active elsewhere in the region, including Norquest, Aleutian Spray, and Icicle (with the latter being involved in two different ways at two different times). Existing information suggests that while exact employment numbers fluctuate for each season, the processor typically employs about 130 people during the peak season for the cod fishery (at which time it also processes halibut). Its most busy season is from January through March, with another active season from July to September (EDAW 2008b). (Additional information gathered during interviews for this analysis is provided in Section 10.4.3.1.3.) Processor housing arrangements have varied in recent years, but at present workers reside in Aleut Real Estate, LLC, managed housing units[204] leased by the processor.

Aleutian Islands Atka mackerel and Pacific Cod Processing. Shore-based processors in Adak did not receive any AI Atka mackerel deliveries during the years 2004–2011. The number of Adak shore-based processors that received deliveries of Pacific cod from the AI subarea was steadily one (Adak Seafood, although it operated under the name Adak Fisheries 2004–2009, creating two "unique" processors in the dataset). This processor received deliveries of Pacific cod from Area 541 (2004–2010), Area 542 (2004–2009), and Area 543 (2004–2008). It also received deliveries of Pacific cod from outside the AI subarea (2004–2010) (Table 10-9 and Table 10-38). In 2011, the plant, operating as Icicle Seafoods, received deliveries of Pacific cod from Area 541, Area 542, and from outside of the AI subarea.

Due to confidentiality restrictions, quantitative first wholesale gross revenue data cannot be disclosed for any year or for any area; however, some data on deliveries to the local processor of Pacific cod from the AI subarea for 2002–2008 were made public in earlier documents after a waiver of confidentiality was provided by the processor, as noted in Table 10-17. The data in this table show the very strong engagement of the shore-based processing in Adak for catcher vessel cod deliveries from the AI subarea over the years 2002–2008. Information disclosed under this waiver also indicated that a substantial amount of the Pacific cod processed in Adak came from the State of Alaska's guideline harvest level (GHL) fishery for Pacific cod from the time that fishery began (2006) through the end of the period covered by the waiver (2008). Pacific cod from the GHL fishery accounted for about 14 percent of the Pacific cod deliveries to the plant in 2006 and about 23 percent in each of 2007 and 2008 (NMFS 2010).

Table 10-17 Amount of catcher vessel Pacific cod harvested in the Central and Western Aleutian Islands and delivered to Adak Fisheries, LLC, 2002–2008.

	Area 541		Area 542				
Year	Metric tons	Percentage	Metric tons	Percentage	AI total Adak landings	% of total AI CV cod landings to Adak	Total CV cod landings in AI
2002	7,091	83%	1,407	17%	8,498	56%	15,140
2003	7,776	89%	930	11%	8,706	51%	17,031
2004	8,453	90%	975	10%	9,428	69%	13,657
2005	5,280	82%	1,156	18%	6,435	81%	7,939
2006	4,986	89%	591	11%	5,576	82%	6,818
2007	8,733	91%	870	9%	9,603	84%	11,429
2008	4,043	94%	277	6%	4,319	38%	11,224
Average	6,623	88%	886	12%	7,509	63%	11,891

Source: Prepared by Council staff using Alaska Department of Fish and Game fish tickets, 2003–2008, retained catch only, NPFMC 2009:60, as cited in NMFS 2010.
Notes: Excludes CDQ harvest and State AI cod fishery harvest. A confidentiality waiver was procured from Adak Fisheries by the authors of the source document, in order to provide these data.

[204] These are former military family housing units, similar to the units operated as the local hotel by Aleut Real Estate LLC, a wholly owned subsidiary of the Aleut Corporation.

Aleutian Islands Pollock Processing. The shore-based processor in Adak was the only shore-based processor engaged in the AI pollock fishery during the baseline period 2004–2010, when it processed AI pollock each year 2006–2009. With the exception of landings from one vessel in 2007 that came from Area 542, all AI pollock processed at the plant during these years came from Area 541. No AI pollock was processed in any shore-based processing plant, including the plant in Adak in 2004, 2005, or 2010. No shore-based processing plants, including the plant in Adak, participated in the fishery in 2011 or 2012 (nor did the Aleut Corporation authorize the participation of any shore-based processing plants for either of those years). Confidentiality restrictions do not allow for a disclosure of first wholesale gross revenue data for AI pollock for the shore-based processing plant operating in Adak for any year.

10.3.1.6 Support Services

The support services in Adak are dominated by the Aleut Corporation and the Aleut Enterprise Corporation (a wholly owned subsidiary of the Aleut Corporation), which has taken over almost all of the support service infrastructure on the island and leases land and facilities to all other private business owners on the island.[205] The former military infrastructure has provided the Aleut Enterprise Corporation with a unique opportunity to provide services to the region, as the airport in Adak is the largest in the Aleutians and regularly receives service from Alaska Airlines. The harbor facilities consist of three deep water piers and a small boat harbor. Marine and other fuels sales are arguably the most vital of the services available in Adak, as the former-military fuel storage facility has a capacity of 22 million gallons, although the basic storage capacity is around 2 to 4 million gallons at any one time. Marine fuel comprises a large proportion of sales, but the fuel facility (owned by the Aleut Enterprise Corporation), also provides jet fuel sales, automobile fuel sales, and supports the city generator. Other services in Adak include hauling, boat watch services, expediting services, general and marine hardware supply, and grocery sales (EDAW 2008a).

Catcher vessel port calls related to the fisheries potentially affected by the proposed alternatives are a substantial source of support services demand in the community. Catcher vessels (trawl and non-trawl) regularly made embarkations and disembarkations in the community of Adak for the years 2004–2011 immediately before or after targeted AI Atka mackerel and Pacific cod trips in the AI subarea, based on information from observers (Table 10-12 and Table 10-39). While the data are silent on the nature of these visits to Adak, it can safely be assumed that at least a portion of these port calls included crew transfers, provisioning, fueling, product offloads, and purchases of other local goods and services. For example, the 2010 Steller Sea Lion Protection Measures EA/RIR notes that that owners of F/V *Seafisher* conduct offloads and/or crew changes in Adak about four times a year, and United States Seafoods reported that they flew more than 250 crewmembers through Adak in 2009 and spent over $1.2 million in fuel and supplies (NMFS 2010). The Adak port calls of catcher vessels making targeted AI Atka mackerel trips are few in number and are suppressed for confidentiality. For targeted Pacific cod trips in the AI subarea, the number of Adak port calls ranged from 52 (2010) to 202 (in 2007), with an annual average of 117.9 total Adak port calls 2004–2010. The proportion of port calls for AI Pacific cod trips is approximately 98.8 percent of all Pacific cod-related port calls occurring in Adak, averaged for the years 2004–2010. In 2011, 11 catcher vessels made AI Pacific cod-related port calls.[206] These port calls

[205] The only exception to this is the Veteran of Foreign Wars hall, which leases its facility directly from the Navy.

[206] The number of port calls represents a large drop from the 2004–2010 annual average and, while some of the drop is likely due to changes in fishery conditions from those of baseline years as a result of implementation of the interim final rule, the shore-based processing plant was undergoing a series of operational challenges between 2009 and 2011 not directly related to the interim final rule that undoubtedly decreased the number of port calls. These challenges included a bankruptcy filing, periods where no processing took place, and a change in operational ownership. In 2011, in particular, the plant was not active during the key March–April Pacific cod processing window.

comprised 91.7 percent of all Pacific cod-related port calls in Adak for 2011. The absolute number of port calls for catcher vessels making Pacific cod-related trips in the AI subarea was substantially lower in 2011 compared to past years. The proportion of port calls for catcher vessels making Pacific cod-related trips in the AI subarea compared to all Pacific cod-related trips was only slightly lower than in years past.

The numbers of port calls for catcher vessels making targeted groundfish trips in the AI subarea are not substantially greater than the port calls for vessels making targeted Pacific cod trips. For catcher vessels, for all targeted groundfish trips, total port calls ranged from 75 (in 2005) to 281 (in 2008), with an annual average of 162.4 total port calls from 2004–2010. The proportion of port calls for catcher vessel AI groundfish trips is approximately 97.1 of all groundfish-related port calls occurring in Adak, averaged for the years 2004–2010. In 2011, the number of port calls for catcher vessels making AI groundfish-related trips was 84. These port calls comprised 97.7 percent of all groundfish-related port calls in Adak for 2011.

Catcher/processor port calls related to the fisheries potentially affected by the proposed alternatives are also a substantial source of support services demand in the community. Catcher/processors (trawl and non-trawl) regularly made embarkations and disembarkations in the community of Adak for the years 2008–2011 immediately before or after trips that targeted AI Atka mackerel and/or Pacific cod in the AI subarea, based on information from observers (Table 10-13 and Table 10-39). The number of port calls in Adak for catcher/processors making targeted AI Atka mackerel trips ranged from 32 (in 2004) to 59 (in 2009), with an annual average of 43.6 total port calls 2004–2010. For targeted Pacific cod trips in the AI subarea, the number of port calls ranged from 11 (in 2005) to 55 (in 2010), with an annual average of 28.9 total port calls 2004–2010. The proportion of port calls for AI Atka mackerel trips is 100.0 percent of all Atka mackerel-related port calls occurring in Adak, averaged for the years 2004–2010. The proportion of port calls for AI Pacific cod trips is also high, with approximately 98.5 percent of all Pacific cod-related port calls in Adak, averaged for the years 2004–2010. In 2011, 28 catcher/processors made Atka mackerel-related port calls, while 13 catcher/processors made Pacific cod-related port calls. These port calls comprised 100.0 and 92.6 percent of all Atka mackerel and Pacific cod-related port calls, respectively, in Adak for 2011. The absolute number of port calls for catcher/processors making Atka mackerel-related trips in the AI subarea was substantially lower in 2011 compared to past years, while the number of port calls for catcher/processors making Pacific cod-related trips in the AI subarea was also lower compared to past years. The proportion of port calls for catcher/processors making Atka mackerel-related trips in the AI subarea compared to all Atka mackerel-related trips was the same as years past, while the proportion of port calls for catcher/processors making Pacific cod-related trips in the AI subarea compared to all Pacific cod-related trips was only slightly lower than in previous years.

The numbers of port calls for catcher/processors making targeted groundfish trips in the AI subarea are not substantially greater than the port calls for vessels making targeted Atka mackerel and/or Pacific cod trips. For catcher/processors, for all targeted groundfish trips in the AI subarea, total port calls ranged from 54 (in 2005) to 141 (in 2010), with an annual average of 92.0 total port calls from 2004–2010. The proportion of port calls for catcher/processors making AI groundfish trips is approximately 98.0 percent of all groundfish-related port calls occurring in Adak, averaged for the years 2004–2010. In 2011, the number of port calls for catcher/processors was 97. These port calls comprised 98.0 percent of all groundfish-related port calls in Adak for 2011.

10.3.1.7 Community Financial Indicators

State and municipal fishery taxes in Adak have been highly variable during the years 2008–2012 (see Section 8.2.11 for additional detail):

- Alaska Department of Revenue (DOR) shared fishery business tax revenues ranged annually between approximately $14,000 (2010) and $311,000 (2009), with an annual average of approximately $160,000 over this period.
- DOR shared landing tax revenues ranged annually between approximately $40,000 (2011) and $128,000 (2008), with an annual average of approximately $76,000 over this period.
- Alaska Department of Commerce and Economic Development Division of Community and Regional Affairs (DCED) shared fishery business tax revenues ranged annually between approximately $99,000 (2012) and $146,000 (2009), with an annual average of approximately $120,000 over this period.
- DCED shared landing tax revenues ranged annually between approximately $93,000 (2010) and $201,000 (2008), with an annual average of approximately $141,000 over this period.

As noted in Section 8.2.11, in 2008, Adak levied a 3 percent sales tax and a $0.02/gallon fuel transfer tax. The sales tax increased to 4 percent in 2011 and is reported in fiscal year (FY) 2013 as the major component of the local taxes. Of $1.64 million in FY 2013 estimated taxes, 30.9 percent is from Fisheries Business and Resource Landing taxes. Through 2012, Adak did not levy a dedicated local raw fish tax, although a portion of its sales tax was derived from the sale of processed fish and groundfish (and directly related industry). The amount of the sales tax attributed from the sale of processed fish is not reported in the DCED data, but approximately one-third of the tax base for Adak originated from activities associated with the fishing industry. In December 2012, Adak voted to adopt a 2 percent raw fish tax, and to modify its sales tax so that it no longer applied to raw fish sales by fishermen. The raw fish tax was implemented in January 2013.

10.3.1.8 Aleutian Island Steller Sea Lion, Pacific Cod, Atka mackerel, and Pollock Subsistence

Adak is considered rural by the State of Alaska, meaning that residents are eligible to subsistence harvest on state lands, subject to state regulations. According to Alaska Department of Fish and Game information from 2008 (the latest data available), an estimated harvest of four Steller sea lions occurred, accounting for an estimated 800 pounds in total harvest. The data also show that an estimated four Steller sea lions were harvested in 2005 and two were harvested in 2004 (Alaska Department of Fish and Game 2012a).

No information is available on the subsistence harvest of Pacific cod, Atka mackerel, or pollock at this time, as the latest subsistence figures for Adak were collected in 1994 and occurred before the military relinquished control of the island. Regardless, previous research in Adak suggests that subsistence salmon and halibut fisheries are active in Adak (EDAW 2008a). Pacific cod and Atka mackerel are used for subsistence on nearby Atka (Alaska Department of Fish and Game 2013a), while a pollock subsistence fishery occurs elsewhere in the Aleutians (with Unalaska being the nearest Aleutian community with documented harvest [Alaska Department of Fish and Game 2013b]); based on the dated nature of subsistence information for Adak and the occurrence of these fisheries elsewhere in the region, it is possible that Adak residents also participate in Pacific cod, Atka mackerel, and/or pollock subsistence fisheries.

10.3.2 Atka

10.3.2.1 Location

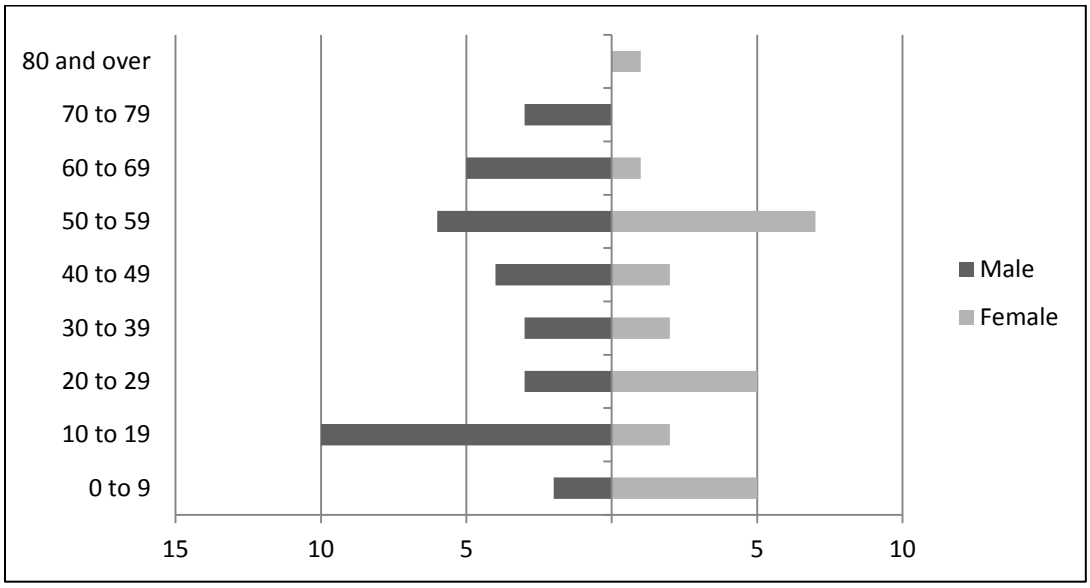
The community of Atka is located on Atka Island on the Aleutian Chain, about 100 miles east of Adak and 350 miles west of Unalaska. Atka encompasses 8.7 square miles of land and 27.4 square miles of water (Sepez et al. 2005). Aside from Adak, it is the only civilian community in the AI subarea.

10.3.2.2 History

The island has been occupied for over 2,000 years by Aleut residents and became a major trade site for Russian settlers in the 1700s. By the 1920s, Atka had become a center for fox farming. The island was evacuated during World War II after the Japanese military attacked Unalaska and landed on Attu and Kiska. After World War II, former residents of Attu, Kiska, and Atka relocated to the island (NMFS 2010).

10.3.2.3 Community Demographics

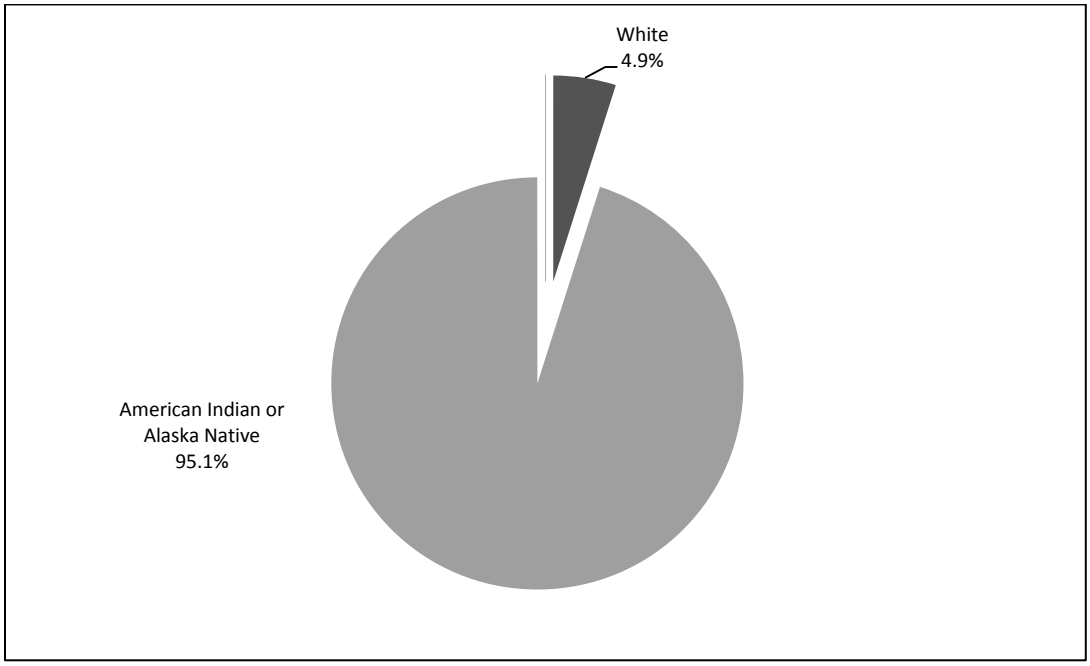
Today, the population of the community is relatively small, estimated at 61 total persons by the latest U.S. Census. The gender composition of the community is 59 percent male and 41 percent female, as demonstrated by Figure 10-4, and the largest cohort of residents consists of individuals aged 50 to 59 (U.S. Census 2012c). While home to a seafood processing entity, Atka is dissimilar to the other Alaska communities profiled in this chapter in that no large transient worker population is present in the data. The community of Atka has little tourism, although a relatively new lodge can accommodate visitors to the island (APICDA 2012).



Source: (U.S. Census 2012c)

Figure 10-4 Atka 2010 population structure

Census figures from 2010 show that 4.9 percent of the residents of Atka identified themselves as White and 95.1 percent as American Indian or Alaska Native. No residents of Atka identified themselves as Hispanic. Based on the racial characteristics of the Atka population, 95.1 percent of the community was composed of minority residents (that is, everyone who identified as American Indian or Alaska Native). Figure 10-5 provides a graphic representation of the racial structure of Atka in 2010 (U.S. Census 2012c). Atka's large minority population segment is similar to many Alaska Native communities throughout the Aleutian Chain and elsewhere in Alaska.



Source: (U.S. Census 2012c)

Figure 10-5 Atka 2010 racial structure

Housing data from the U.S. Census, as shown in Table 10-18, indicate that no residents live in group quarters housing, with total housing units in Atka numbering 43. Of those housing units, approximately 55.8 percent were occupied. Family households number 17, with an average household size of 2.54 persons.

Table 10-18 Atka 2010 housing information

Total Population	61	100.0%
Living in Non-Group Quarters	61	100.0%
Living in Group Quarters	0	0.0%
Total Housing Units	43	100.0%
Occupied Housing (Households)	24	55.8%
Vacant Housing	19	44.2%
Family Households	17	70.8%
Average Household Size	2.54	na

na = not applicable
Source: (ADCED 2012c)

10.3.2.4 Local Economy

The local economy of Atka is centered around commercial fishing and the government sector (city, state, and tribal). The latest estimates, based on the 2010 U.S. Census American Community Survey suggests that 13 people were employed in Atka, with an unemployment rate of 0.0 percent, although seasonal fluctuations of employees associated with seafood processing may have affected these numbers.[207] Per capita income for people in Atka was $27,542, median household income was $90,000, and median family income was $86,667 (U.S. Census 2013). It is unknown what percentage of Atka's residents was considered low income because the information has been suppressed by the U.S. Census due to confidentiality concerns. As shown in Table 10-19, major employers included city (City of Atka), state (Village Safe Water, Aleutian School District), and tribal (Aleutian Pribilof Island Association) government entities, as well as the local seafood processing facility.

Table 10-19 Atka top five occupations and employers

Occupations	
1	General Maintenance and Repair Workers
2	Not Available
3	Not Available
4	Not Available
5	Not Available
Employers	
1	City of Atka
2	Village Safe Water
3	Aleutian Pribilof Island Association
4	Atka Pride Seafoods
5	Aleutian School District

Source: (ADOL 2012b) and (Himes 2012c)

10.3.2.5 Commercial Fishery Engagement

10.3.2.5.1 Overview

Four residents held commercial fishing permits for halibut as of 2010. No other permits were held in Atka for other fisheries (CFEC 2012a). Community leaders have reported that a resident of Atka participates in the Council meetings. Atka is a CDQ community and a member of the APICDA CDQ group. The island is located in Federal Reporting Area 541, IPHC Regulatory Area 4B, and the Aleutian Islands Sablefish Regulatory District. As a member community of APICDA, the community benefits from the CDQ's share in a number of commercial fisheries, including groundfish, Pacific cod, Atka mackerel, yellowfin sole, rock sole, Greenland turbot, arrowtooth flounder, flathead sole, Pacific ocean perch, Pacific halibut, various crab fisheries, and Chinook salmon. In 2011, specific to Pacific cod and Atka mackerel, APICDA had an effective allocation within the CDQ reserve of 15.4 and 30.0 percent, respectively. In recent years, APICDA has used CDQ funds to construct small and large dock facilities, add infrastructure to Atka's harbor, improve the Aka Pride Seafoods plant, and construct a new inn for visitors (APICDA 2012).

[207] The American Community Survey also has a large margin of error for communities with small populations, like Atka.

10.3.2.5.2 Harvest Sector

General. As mentioned above, in 2010 four residents of Atka held four commercial fishing permits issued by the CFEC, with all of the permits in the halibut fishery and all of those permits actively fished. In 2010, eight residents held commercial crew licenses and Atka residents held majority ownership of three vessels. These vessels were an average of approximately 23 feet long and primarily employed longline gear.

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher Vessels. No Atka resident-owned trawl catcher vessels were present in the data for 2011, the most recent year for which data are available, and no Atka resident-owned trawl catcher vessels were in the data for 2004–2010 (Table 10-1).

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher Vessels. No Atka resident-owned non-trawl catcher vessels were present in the data for 2011, the most recent year for which data are available, and no Atka resident-owned non-trawl catcher vessels were in the data for 2004–2010 (Table 10-4).

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher/Processors. No Atka resident-owned trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Atka resident-owned trawl catcher/processors were in the data in 2004–2010 (Table 10-7).

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher/Processors. No Atka resident-owned non-trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Atka resident-owned non-trawl catcher/processors were in the data for the years 2004–2010 (Table 10-8).

Aleutian Islands Pollock Trawl Catcher Vessels. No Atka resident-owned trawl catcher vessels were present in the data for 2011, the most recent year for which data are available, and no Atka resident-owned trawl catcher vessels were in the data for 2004–2010 (as discussed in Section 10.2.7).

Aleutian Islands Pollock Trawl Catcher/Processors. No Atka resident-owned trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Atka resident-owned trawl catcher/processors were in the data in 2004–2010 (as discussed in Section 10.2.7).

10.3.2.5.3 Processing Sector

General. Atka is home to the Atka Pride Seafoods processing plant. Atka Pride Seafoods was formed by APICDA and the Atka Fishermen's Association in 1994, began processing in 1995, and reportedly has processed every year since. According to the APICDA website, the plant has operated seasonally, from June through September, and has focused on halibut products and sablefish (APICDA 2012).

Aleutian Islands Atka mackerel and Pacific Cod Processing. Shore-based processors in Atka did not receive any AI Atka mackerel deliveries during the years 2004–2011. The community is present in the 2004–2011 data as receiving a negligible amount of Pacific cod from Area 541 in 2006 (only); while details of this processing are confidential, the order of magnitude of the processing is such that it is likely to either be "noise" in the data or a small amount of incidental catch.

While no Atka resident-owned vessels are present in the 2004–2011 data reviewed for this report, and no landings of AI Atka mackerel and few (if any) landings of Pacific cod from the AI subarea were recorded

for the community of Atka, the seafood processing plant had been remodeled and upgraded by the time of the 2010 Steller sea lion protection measures EA/RIR (NMFS 2010) to provide space to process Pacific cod. However, the equipment necessary to process Pacific cod had not yet been installed, and information contained in that EA suggested that the Atka Pride management did not feel at that time that it was economically viable to offer Pacific cod processing at the plant (NMFS 2010).

More recently, however, the development of cod processing has begun at the plant, with plans to move into year-round production of cod; a prior key constraint to cod processing has been removed with the initiation of use of a near-completed dock extension. More information on these developments and future plans is presented in Section 10.4.3.2.2.

Aleutian Islands Pollock Processing. Shore-based processors in Atka did not receive any AI pollock deliveries during the years 2004–2010 or in 2011 or 2012.

10.3.2.6 Support Services

A floating processor, M/V *Independence* (Trident-owned), has reportedly operated near Atka in the past and made limited use of the local airstrip for crew rotations. At least some offloads (presumably to the floater) and crew transfers have been made in Atka by catcher vessels as well, but these activities appear to have had little impact on the community (NMFS 2010). To date, development of a local fishery support service sector has been constrained by a number of factors, including a lack of deep water vessel access to the community and limited processing of catch from vessels from outside of the community. This may change, however, with the recent (2012) completion of a deep water dock and plans to expand the local processing facility into a year-round operation in the near future (2013–2014). As discussed in Section 10.2.6.2, quantitative port call information for the community of Atka specific to catcher vessels or catcher/processors targeting AI Atka mackerel and/or Pacific cod in the AI subarea cannot be disclosed due to data confidentiality restrictions.

10.3.2.7 Community Financial Indicators

State and municipal fishery taxes in Atka have been highly variable during the years 2008–2012 (see Section 8.2.11 for additional detail):

- DOR shared fishery business tax revenues ranged annually between $0 (2009) and $81,000 (2009), with an annual average of approximately $42,000 over this period.
- DOR shared landing tax revenues ranged annually between approximately $10,000 (2010) and $19,000 (2012), with an annual average of approximately $14,000 over this period.
- DCED shared fishery business tax revenues ranged annually between approximately $93,000 (2010) and $127,000 (2012), with an annual average of approximately $109,000 over this period.
- DCED shared landing tax revenues ranged annually between approximately $87,000 (2010) and $188,000 (2009), with an annual average of approximately $129,000 over this period.

As noted in Section 8.2.11, Atka levies a 2 percent raw fish tax, and a 10 percent bed tax; these taxes rates have been in place for several years, and were not revised for 2013. In 2013, of approximately $922,000 in total municipal revenues in Atka, approximately $250,000 of that total is local raw fish tax, shared Fisheries Business Tax, and shared Resource Landing Tax. Aggregate fisheries taxes represent approximately 27 percent of the FY 2013 revenues for the municipality.

10.3.2.8 Aleutian Island Steller Sea Lion, Pacific Cod, Atka Mackerel, and Pollock Subsistence

According to Alaska Department of Fish and Game information during 2004–2008 (the latest data available), a relatively large number of Steller sea lions are harvested as part of subsistence activities in Atka. Total individual Steller sea lions harvested are estimated to range from 35 (in 2008) to 52 (in 2006), contributing between an estimated 7,000 and 10,400 pounds in total harvest (Alaska Department of Fish and Game 2012a).

The latest Pacific cod, Atka mackerel, and pollock subsistence figures are from 1994 and show that an estimated harvest of 280 Pacific cod (about 866 pounds) were harvested; while no Atka mackerel subsistence harvest was documented, residents reported using and receiving Atka mackerel for subsistence purposes (Alaska Department of Fish and Game 2012c) (Alaska Department of Fish and Game 2012b). No recent subsistence harvest or use of pollock has been reported for Atka (Alaska Department of Fish and Game 2013b).

10.3.3 Unalaska

10.3.3.1 Location

Unalaska is located in the Aleutian Islands archipelago in Southwest Alaska. Unalaska lies 800 air miles from Anchorage and 1,700 miles from Seattle. Unalaska is only accessible by air and sea, and is on the Alaska Marine Highway system. The City of Unalaska lies on two neighboring islands, Unalaska Island and Amaknak Island, which are linked by bridge. The portion of the city that lies on Amaknak Island is typically referred to as Dutch Harbor. Unalaska is a first-class city encompassing 111 square miles of land and 101.3 square miles of water; it is not located in any organized borough and is federally recognized as a Native village. The city, which incorporated in March 1942, lies within the Aleutian Islands Recording District and the Aleutians West Census Area (Himes 2012b).

10.3.3.2 History

Occupation of Unalaska is assumed to be as old as that on neighboring Umnak and Anangula Islands, where archaeological evidence suggests occupation of these islands goes back 8,000 years. More recent recorded history begins with the fur trade and the first Russian ships that reached the Aleutian Chain in 1741. In 1759, it was estimated that about 3,000 Aleuts lived in 24 settlements on Unalaska and Amaknak Islands. During 1759 through 1787, many Aleuts were enslaved by the Russians or died from illness and disease brought from Europe. In 1787, the Russian American Company enslaved and forcibly moved many Aleuts and their families to St. George and St. Paul to engage in the fur seal harvest industry. By 1825, the Aleutians had largely been abandoned by fur traders in lieu of more favorable trapping to the east. However, the Russian Orthodox Church of the Holy Ascension of Christ was constructed that year and its founding priest, Father Ivan Veniaminov, created the first Aleut written language and translated the Bible into Aleut. The Russian fur trade had taken its toll on the Aleut community and by 1830 only 200 to 400 Aleuts lived in Unalaska.

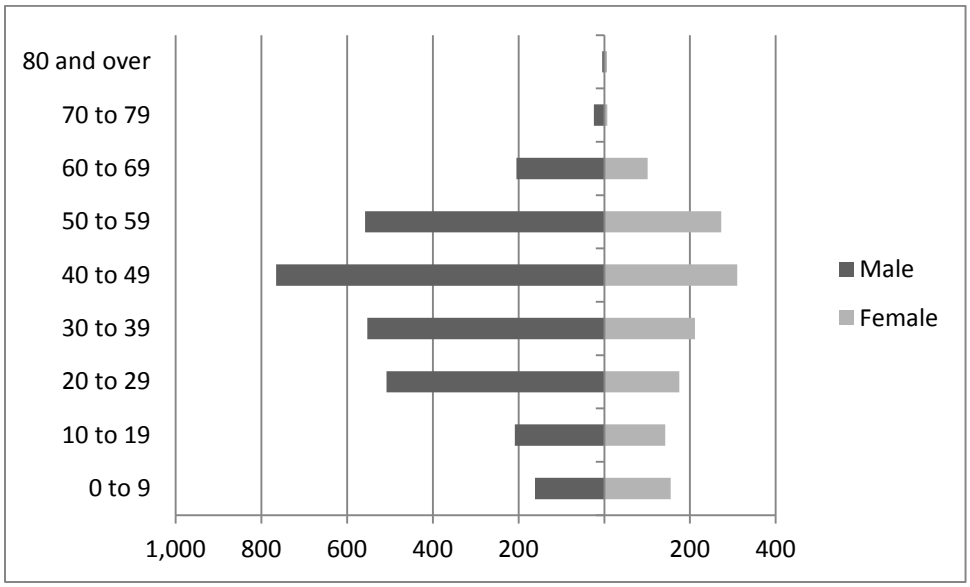
Unalaska slowly transitioned from a Russian trade and supply center into an American trade and supply center as people headed northward, drawn to Unalaska by furs, fishing, and whaling. By the 1880s, Unalaska served as a coal station and commercial trade center. By the early 1900s, several seafood processors had begun operation in Unalaska. Incorporated in 1942, the City of Unalaska hosted the Dutch Harbor Naval Station and Fort Mears, both of which were established at the beginning of hostilities with

Japan during World War II. Japanese forces damaged or destroyed several facilities in 1942, as the Aleutians became an important front in the Pacific theater. After the cessation of hostilities, many Aleut families, who had been moved to other communities to the east, returned to Unalaska only to find that some of their homes were damaged or destroyed.

In the 1950s commercial fishing increased, and the 1960s saw growth in the king crab fishery. Both of these increases benefitted Unalaska and greatly improved economic conditions. Unalaska today is arguably the busiest port in the Aleutian Islands and its economic foundation is focused on fishing and seafood processing activities (Himes 2012b).

10.3.3.3 Community Demographics

According to U.S. Census figures from 2010, a total of 4,376 people reside in Unalaska. The gender composition of the community is 68.4 percent male and 31.6 percent female and the largest cohort of residents consists of individuals aged 40 to 49 (Figure 10-6). Unalaska is similar to other small fishing communities that feature relatively greater male populations typically associated with large-scale transient worker-based seafood processing and/or other industrial enclave type of development (U.S. Census 2012i).

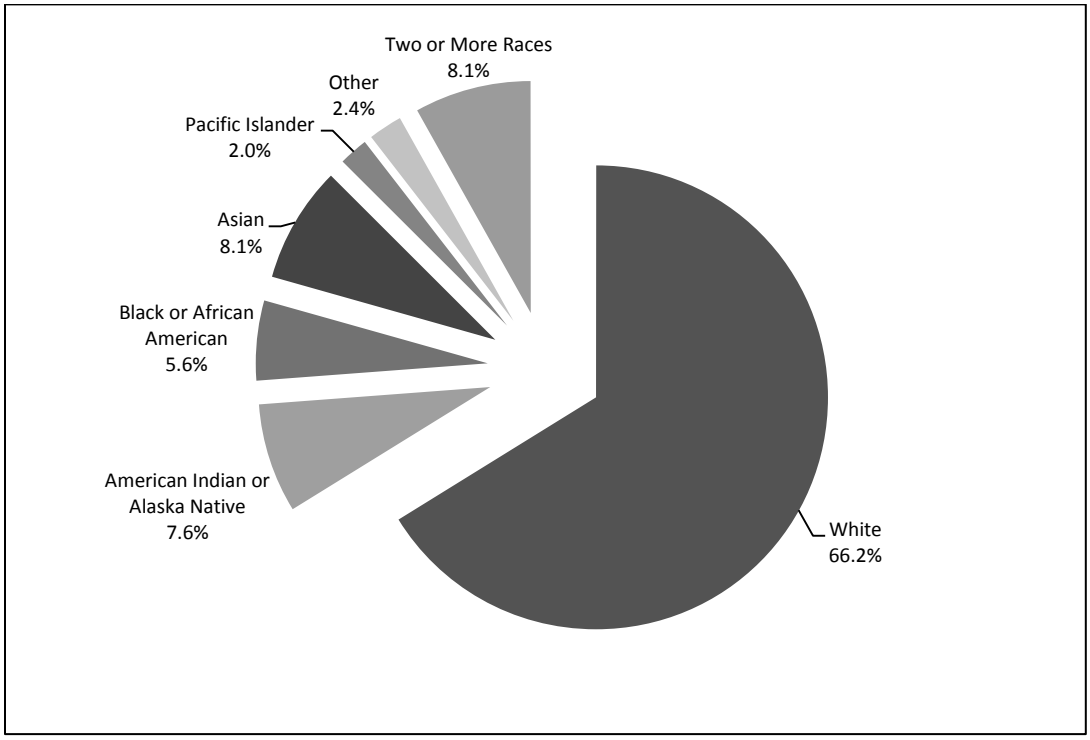


Source: (U.S. Census 2012d)

Figure 10-6 Unalaska 2010 population structure

Census figures from 2010 show that 39.2 percent of the residents of Unalaska identified themselves as White, 6.1 as American Indian or Alaska Native, 6.9 percent as Black/African American, 32.6 as Asian, 2.2 as Pacific Islander, and 13 percent as “some other race” or “two or more races.” Finally, 15.2 percent of the residents of any race in Unalaska identified themselves as Hispanic. Based on race and ethnicity combined, 67.2 percent of Unalaska’s total population was composed of minority residents (that is, all residents other than those identified as White/non-Hispanic [race/ethnicity]). Figure 10-7 provides a graphic representation of the racial structure of Unalaska in 2010 (ADCED 2012d). In general, compared

to a number of the small fishing communities in the Aleutians, Unalaska's population has a relatively large minority population segment; this is congruous with other communities in Southwestern Alaska associated with one or more large seafood processing operations that draw a proportionately large number of workers from a non-local labor pool.



Source: (U.S. Census 2012d)

Figure 10-7 Unalaska 2010 racial structure

Housing data from the U.S. Census, as shown in Table 10-20, indicate that 52.0 percent of all Unalaska residents live in non-group quarters housing, with total housing units in Unalaska numbering 1,106. Of those housing units, approximately 83.8 percent were occupied. Family households number 533, with an average household size of 2.46 persons. Several seafood processors in Unalaska have group housing for workers, with a relatively large proportion of individuals living in group housing compared to the overall population.

Table 10-20 Unalaska 2010 housing information

Total Population	4,376	100%
Living in Non-Group Quarters	2,277	52%
Living in Group Quarters	2,099	48%
Total Housing Units	1,106	100%
Occupied Housing (Households)	927	83.8%
Vacant Housing	179	16.2%
Family Households	533	57.5%
Average Household Size	2.46	na

na = not applicable
Source: (ADCED 2012d)

10.3.3.4 Local Economy

The economy of Unalaska is based primarily on commercial fishing, with top industry sectors including fishing, fish processing, and fleet services (fuel, repairs, maintenance, trade, and transportation). Seasonal fluctuations affect employment rates, but the latest estimates based on the 2010 U.S. Census American Community Survey suggest that 3,938 people were employed in Unalaska, with an unemployment rate of 2.2 percent (U.S. Census 2012e). Per capita income for people in Unalaska was $25,353, median household income was $64,821, and median family income was $95,000. An estimated 11.5 percent of Unalaska's residents were considered low-income, defined as those individuals living below the poverty level threshold (ADCED 2012e). As shown in Table 10-21, the top five occupations in Unalaska are related to commercial fishing and the seafood industry. The top employers include those related to seafood processing, the school district, and city government.

Table 10-21 Unalaska top five occupations and employers

Occupations	
1	Meat, Poultry, and Fish Cutters and Trimmers
2	Material Moving Workers, All Other
3	Laborers and Freight, Stock, and Material Movers, Hand
4	Installation, Maintenance, and Repair Workers, All Other
5	Stock Clerks and Order Fillers
Employers	
1	UniSea Inc.
2	Westward Seafood Inc.
3	City of Unalaska
4	Horizon Lines of Alaska LLC
5	Unalaska School District

Source: (ADOL 2012c) and (Himes 2012b)

10.3.3.5 Commercial Fishery Engagement

10.3.3.5.1 Overview

In the 1960s and 1970s, the halibut, king crab, and salmon fisheries began to develop rapidly, and the BSAI king crab fishery in particular brought economic growth to Unalaska. During that time, the number of commercial fishing vessels and processing plants also rapidly increased, until the 1980s when king crab stocks collapsed. Today, Unalaska's fishing interests are diversified and major varieties of fish processed include king, opilio, and bairdi crab; and halibut, salmon, herring, pollock, Pacific cod, turbot, sablefish, rockfish, and Atka mackerel. As of 2011, community leaders reported that a paid staff member participates in fisheries management processes in Alaska including the Council, Board of Fisheries, and working groups run by Alaska Department of Fish and Game. Unalaska is not currently eligible to participate in either the Community Quota Entity or Community Development Quota programs. The community is located in Federal Statistical and Reporting Area 610, Pacific Halibut Fishery Regulatory Area 4A, and the Western Gulf of Alaska Sablefish Regulatory Area (Himes 2012b). Unalaska is located adjacent to the Bering Sea subarea of the BSAI management area and nearby to the Western Gulf subarea of the Gulf of Alaska management area, approximately 145 miles east of the eastern boundary of Area 541, the closest reporting area within the AI subarea.

10.3.3.5.2 Harvest Sector

General. During the 2010 fishing seasons, 42 permit holders held a total of 95 commercial fishing permits issued by the CFEC for crab, salmon, groundfish, halibut, sablefish, and herring. During the 2011 fishing seasons, Unalaska was used as a base of operations for vessels ranging from 35 feet to over 125 feet LOA with gear types including trawl, pots, longline, gillnet, purse seine, and jig. Crab permits in 2010 were issued for several fisheries including the Cook Inlet Dungeness crab pot fishery; the westward Dungeness crab pot fishery; the Dutch Harbor, Aleutian CDQ, Bering Sea, and Bristol Bay king crab pot fisheries; the Peninsula-Aleutians, Dutch Harbor, and Bering Sea Tanner crab pot fisheries; and the Kodiak Tanner bairdi crab pot fishery. Salmon CFEC permits were for the Prince William Sound, Chignik, and Peninsula-Aleutians purse seine fisheries; the Peninsula-Aleutians set gillnet fishery; and the statewide hand troll fishery. Groundfish CFEC permits were for miscellaneous saltwater finfish fisheries using a variety of gear types. Herring CFEC permits were for the Bristol Bay roe herring fisheries and the Alaska Peninsula herring food/bait gillnet fishery. Also in 2010, there were 17 permit holders of groundfish License Limitation Program (LLP) permits, and five individuals holding seven crab LLP permits. There were 181 crew license holders, seven shore-side processing facilities, and 14 fish buyers. In 2010, Unalaska was the top port in Alaska in landings and ex-vessel revenue with 568,112,302 pounds of fish landed carrying an ex-vessel value of $102,550,584 (Himes 2012b).

Despite being the top port in Alaska in landings and ex-vessel revenue, the local resident-owned fishing fleet in Unalaska is relatively small. Most vessels range from 18 to 68 feet in length and these vessels typically do not participate in the rationalized BSAI or pollock fisheries, both of which are dominant in terms of local processing and revenues generated for the community. Resident-owned vessels do participate in cod, halibut, black cod, and other crab fisheries. Recent research suggests that only a handful of local residents make a relatively large proportion of their living from commercial fishing (AECOM 2010).

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher Vessels. No Unalaska resident-owned trawl catcher vessels were present in the data as fishing AI Atka mackerel for the years 2004–2011. However, one unique vessel was present in the data as having fished Pacific cod in the AI subarea (Area 541) in 2007, for an average of 0.1 Unalaska resident-owned vessels per year over the period 2004–2010 for this area (Table 10-1 and Table 10-34). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for this vessel.

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher Vessels. No Unalaska resident-owned non-trawl catcher vessels were present in the data as fishing AI Atka mackerel for the years 2004–2010. However, one unique vessel was present in the data as having fished Pacific cod in the AI subarea (Area 542) in 2006, for an average of 0.1 Unalaska resident-owned vessels per year over the period 2004–2010 for this area (Table 10-4 and Table 10-35). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for this vessel.

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher/Processors. No Unalaska resident-owned trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Unalaska resident-owned trawl catcher/processors were in the data for 2004–2010 (Table 10-7).

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher/Processors. No Unalaska resident-owned non-trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Unalaska resident-owned non-trawl catcher/processors were in the data for the period 2004–2010 (Table 10-8).

Aleutian Islands Pollock Trawl Catcher Vessels. No Unalaska resident-owned trawl catcher vessels were present in the data for 2011, the most recent year for which data are available, and no Unalaska resident-owned trawl catcher vessels were in the data for 2004–2010 (as discussed in Section 10.2.7).

Aleutian Islands Pollock Trawl Catcher/Processors. No Unalaska resident-owned trawl catcher/processors were present in the data for 2011, the most recent year for which data are available, and no Unalaska resident-owned trawl catcher/processors were in the data in 2004–2010 (as discussed in Section 10.2.7).

10.3.3.5.3 Processing Sector

General. Unalaska is home to a number of seafood processing facilities, generally grouped into two categories: four large, multispecies plants (UniSea, Alyeska, Westward, and Bering), and a mobile processor (Icicle). The large multispecies plants are AFA-qualified groundfish plants and typically have large workforces that cycle throughout the year as different fishing seasons become more active. For example, the UniSea plan can have between 1,220 and 440 workers, while the Alyeska plant has a staff of between 500 and 60 workers, depending on the season. The Westward plant employs about 125 people throughout the year, but employment can swell to about 550 workers during pollock, opilio, and cod activity. Bering Fisheries is a relatively new processor in Unalaska, having purchased the plant from Harbor Crown Seafoods in 2010 and currently processes king crab, opilio, halibut, and cod (Bering Fisheries 2012).[208] Local Icicle operations are limited to floating processors, one of which is typically moored at the northern end of Dutch Harbor. The Icicle processors generally process cod, opilio, and king crab, and employ around 60 to 150 workers depending on the individual processor and the season. (AECOM 2010)

Aleutian Islands Atka mackerel and Pacific Cod Processing. No Unalaska shore-based processors received AI Atka mackerel deliveries during the years 2004–2011. The number of Unalaska shore-based processors that received Pacific cod from the AI subarea in 2004–2011 ranged between one and three, depending on the year and the area. The years with the greatest number of shore-based processors receiving deliveries include 2007 and 2008 (Area 541), and included Westward Seafoods, UniSea, and Harbor Crown Seafoods. The annual average number of shore-based processors receiving Pacific cod deliveries 2004–2010 is 2.1, 1.1, 1.0, and 2.1 for Areas 541, 542, 543, and all other areas, respectively (Table 10-9 and Table 10-38).

Quantitative first wholesale value data cannot be disclosed for the majority of years due to confidentiality restrictions; however, data for 2008 for Area 541 can be disclosed and discussed. During this year, three unique shore-based processors received deliveries of Pacific cod from Area 541. The total first wholesale gross revenue for groundfish was nearly $260 million for these three processors, of which the Pacific cod deliveries from Area 541 accounted for about $146,000, or 0.1 percent of the total first wholesale groundfish gross revenue for these processors (and the percentage figure would be lower yet if total first wholesale gross revenue figures for all species run at the plants were available to be considered). Pacific cod from outside the AI subarea accounted for approximately 9.5 percent of the total first wholesale groundfish gross revenue for these three processors in 2008 (Table 10-10 and Table 10-11). While specific figures for other years are confidential for Unalaska, in general terms it is apparent that for at

[208] Bering Fisheries is notable as being part owned by Dutch Harbor Acquisitions LLC, which was formed by a partnership between Copper River Seafoods and the Siu Alaska Corporation. The Siu Alaska Corporation is a wholly-owned subsidiary for the Norton Sound Economic Development Corporation, a CDQ entity.

least some years during the 2004–2011 period, the entirety of processing of Pacific cod from the AI subarea in Unalaska resulted from the processing of incidental catch only.

Aleutian Islands Pollock Processing. Shore-based processors in Unalaska did not receive any AI pollock deliveries during the years 2004–2010 or in 2011 or 2012.

10.3.3.6 Support Services

Unalaska has been characterized in the past as a town that, despite having a sizable local fleet, is focused on service. This industry provides important support for major sectors of the commercial fishery, including harvesters, shore-based processors, and offshore processors (including processor/motherships and catcher/processors). There is no other community in the region with the level of development or the range of services provided to the various sectors in the BSAI, which include accounting and bookkeeping, banking, construction and engineering, diesel sales and service, electrical and electronics services, freight forwarding, hydraulic services, logistical support, marine pilots/tugs, maritime agencies, gear replacement and repair, vessel repair, stevedoring, vehicle rentals, warehousing, and welding, among others (AECOM 2010).

Catcher vessel port calls related to the fisheries potentially affected by the proposed alternatives represent a specific source of support services demand in the community. Catcher vessels (trawl and non-trawl) regularly made embarkations and disembarkations in the community of Unalaska for the years 2004–2011 immediately before or after targeted AI Atka mackerel and Pacific cod trips in the AI subarea, based on information from observers (Table 10-12 and Table 10-39). While the data are silent on the nature of these visits to Unalaska, it can be safely assumed that at least a portion of these port calls included crew transfers, provisioning, fueling, product offloads, and purchases of other local goods and services. The port calls of catcher vessels making targeted AI Atka mackerel trips are relatively few in number and are suppressed for confidentiality. For targeted Pacific cod trips in the AI subarea, the number of port calls ranged from 17 (2005) to 56 (in 2008), with an annual average of 33.1 total port calls 2004–2010. The proportion of port calls for AI Pacific cod trips is approximately 4.9 percent of all Pacific cod-related port calls occurring in Unalaska, averaged for the years 2004–2010. In 2011, 17 catcher vessels made AI Pacific cod-related port calls. These port calls comprised 2.9 percent of all Pacific cod-related port calls in Unalaska for 2011. The absolute number of port calls for catcher vessels making Pacific cod-related trips in the AI subarea was lower in 2011 compared to past years. The proportion of port calls for catcher vessels making Pacific cod-related trips in the AI subarea compared to all Pacific cod-related trips was only slightly lower than in years past.

The numbers of port calls for catcher vessels making targeted groundfish trips in the AI subarea are substantially greater than the port calls for vessels making targeted Atka mackerel and/or Pacific cod trips. For catcher vessels, for all targeted groundfish trips, total port calls ranged from 55 (in 2004) to 119 (in 2010), with an annual average of 88.3 total port calls from 2004–2010. The proportion of port calls for catcher vessel AI groundfish trips is approximately 4.0 percent of all groundfish-related port calls occurring in Unalaska, averaged for the years 2004–2010. In 2011, the number of port calls for catcher vessels making AI groundfish-related trips was 106. These port calls comprised 4.5 percent of all groundfish-related port calls in Unalaska for 2011.

Catcher/processor port calls related to the fisheries potentially affected by the proposed alternatives are also a source of support services demand in the community. Catcher/processors (trawl and non-trawl) regularly made embarkations and disembarkations in the community of Unalaska for the years 2004–2011 immediately before or after targeted AI Atka mackerel and Pacific cod trips in the AI subarea, based on information from observers (Table 10-13 and Table 10-39). The number of port calls for

catcher/processors making targeted AI Atka mackerel trips ranged from 29 (in 2004 and 2005) to 36 (2010), with an annual average of 32.4 total port calls 2004–2010. For targeted Pacific cod trips in the AI subarea, the number of port calls ranged from 29 (in 2004 and 2005) to 52 (in 2010), with an annual average of 36.7 total port calls 2004–2010. The proportion of port calls for AI Atka mackerel trips is approximately 55.9 percent of all Atka mackerel-related port calls occurring in Unalaska, averaged for the years 2004–2010. The proportion of port calls for AI Pacific cod trips is approximately 8.1 percent of all Pacific cod-related port calls occurring in Unalaska, averaged for the years 2004–2010. In 2011, 48 catcher/processors made Atka mackerel-related port calls, while 15 catcher/processors made Pacific cod-related port calls. These port calls comprised 96.0 and 3.6 percent of all Atka mackerel and Pacific cod-related port calls, respectively, in Unalaska for 2011. The absolute number of port calls for catcher/processors making Atka mackerel-related trips in the AI subarea was slightly up in 2011 compared to past years, while the number of port calls for catcher/processors making Pacific cod-related trips in the AI subarea was much lower compared to past years. The proportion of port calls for catcher/processors making Atka mackerel-related trips in the AI subarea compared to all Atka mackerel-related trips was higher than in years past, while the proportion of port calls for catcher/processors making Pacific cod-related trips in the AI subarea compared to all Pacific cod-related trips was only slightly lower than in previous years.

The numbers of port calls for catcher/processors making targeted groundfish trips in the AI subarea are substantially greater than the port calls for vessels making targeted Atka mackerel and/or Pacific cod trips. For catcher/processors, for all targeted groundfish trips in the AI subarea, total port calls ranged from 78 (in 2004) to 167 (in 2010), with an annual average of 112.4 total port calls in 2004–2010. The proportion of port calls for catcher/processor AI groundfish trips is approximately 8.1 percent of all groundfish-related port calls occurring in Unalaska, averaged for the years 2004–2010. In 2011, the number of port calls for catcher/processors making AI groundfish-related trips was 139. These port calls comprised 8.5 percent of all groundfish-related port calls in Unalaska for 2011.

10.3.3.7 Community Financial Indicators

State and municipal fishery taxes in Unalaska have been variable during the years 2008–2012 (see Section 8.2.11 for additional detail):

- DOR shared fishery business tax revenues ranged annually between approximately $2.9 million (2010) and $4.2 million (2009), with an annual average of approximately $3.7 million over this period.
- DOR shared landing tax revenues ranged annually between approximately $3.0 million (2011) and $4.8 million (2008), with an annual average of approximately $3.9 million over this period.
- DCED shared fishery business tax revenues ranged annually between approximately $317,000 (2010) and $430,000 (2012), with an annual average of approximately $372,000 over this period.
- DCED shared landing tax revenues ranged annually between approximately $298,000 (2010) and $636,000 (2009), with an annual average of approximately $439,000 over this period.

As noted in Section 8.2.11, Unalaska levies a 2 percent sales tax, a 2 percent raw fish tax, and a 5 percent bed tax. These taxes continue to apply in FY 2013. In 2010 total revenues for the municipality were reported to be $30.9 million. The fisheries revenues from local and shared sources for 2010 represented approximately 41 percent of the total annual revenues for the municipality.

10.3.3.8 Aleutian Island Steller Sea Lion, Pacific Cod, Atka Mackerel, and Pollock Subsistence

According to Alaska Department of Fish and Game information from 2008 (the latest data available), an estimated harvest of three Steller sea lions occurred, accounting for an estimated 514 pounds in total harvest (Alaska Department of Fish and Game 2012a). The latest Pacific cod and Atka mackerel subsistence figures are from 1994 and show that an estimated harvest of 4,379 Pacific cod (about 14,011 pounds) and 227 Atka mackerel (about 227 pounds) were harvested (Alaska Department of Fish and Game 2012d) (Alaska Department of Fish and Game 2012e). Figures from 1994 also show that an estimated harvest of 90 pollock (about 126 pounds) were harvested (Alaska Department of Fish and Game 2013b). However, as the community of Unalaska is considerably removed from the AI subarea, it is assumed that subsistence activities with regard to Steller sea lions, Pacific cod, Atka mackerel, and/or pollock would not be directly affected by the proposed management actions.

10.3.4 Seattle-Tacoma CMSA

10.3.4.1 Location

The Seattle-Tacoma CMSA consists of six counties that surround the Seattle metropolitan area: Island, Pierce, Kitsap, King, Snohomish, and Thurston. These six counties lie on the coast of Puget Sound in northwestern Washington State and comprise an area of 7,197.7 square miles.

10.3.4.2 History

The City of Seattle was founded by white settlers in 1851 and named after a Duwamish Indian leader who befriended the settlers. The arrival of the Transcontinental Railway in 1883 facilitated rapid expansion of the community and surrounding areas. The economic base of the new city was founded on a number of industries including fishing, shipbuilding, shipping, and wholesale trade. Seattle experienced rapid growth between the 1880s and the early years of the 20th century. The City of Seattle Municipal Archives noted that, in the first half of 1899, Seattle was gaining 1,000 new residents per month and construction of new buildings was rapid (City of Seattle Municipal Archives 2012). The fire of June 6, 1899, slowed but did not cease the expansion of Seattle.

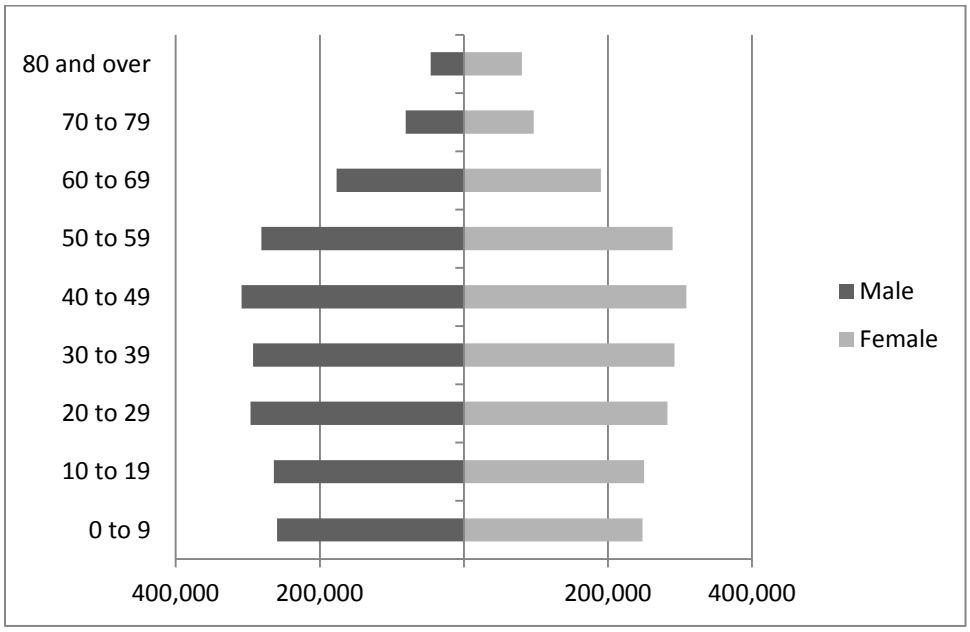
By World War I, Seattle was building 20 percent of the nation's wartime ship tonnage. Shipbuilding remained an important industry throughout World War II. After World War II, the city fell in an economic slump until the mid-1950s. Since that time, Seattle has grown into a booming metropolitan area with a highly diversified economy (City of Seattle Municipal Archives 2012). Seattle-based fishermen began exploring opportunities for Pacific cod and salmon in the North Pacific in the late 19th century. Today, Seattle is a major hub of activity for the North Pacific commercial fishing fleet and has continued its role from the 1890s as a destination for those fishermen traveling to and from the fishing grounds in Alaska (Sepez et al. 2007).

Seattle is at once the community most engaged in many of the important North Pacific fisheries (as measured by absolute participation numbers of vessels and crew, as well as volume and value of landings from those vessels) and among the least dependent of the engaged communities on those fisheries (based on the relative number of fishing jobs and economic value of those fisheries when compared to the size of the overall Seattle metropolitan labor pool and the scale, diversity, and resilience of its economy). For many of the fisheries off Alaska, especially the industrial-scale fisheries, it could be stated, paradoxically perhaps, that the major BSAI fisheries in their present configurations are more dependent upon Seattle

than Seattle is dependent upon the fisheries. Regardless, a central part of Seattle's identity has always been as a fishing community, and there are still distinct areas within the Seattle-Tacoma CMSA where concentrations of businesses and infrastructure are focused on the area's large and wide-ranging fleet and the support of that fleet and of the fishing industry in general. From an Alaska-based perspective, the Seattle fleet and support operations might be considered components of interest-based rather than place-based communities; from the Seattle perspective, however, Seattle has been and remains a place-based North Pacific fishing community.

10.3.4.3 Community Demographics

According to U.S. Census figures from 2010, a total of 4,021,712 people reside in the Seattle-Tacoma CMSA. The gender composition of the CMSA is 49.8 percent male and 50.2 percent female, as demonstrated by Figure 10-8, and the largest cohort of residents consist of individuals aged 40 to 49 (U.S. Census 2012h). As a major metropolitan center with a widely diverse economy, the Seattle-Tacoma CMSA differs greatly from small fishing communities in southwestern Alaska, which often feature relatively greater male populations typically associated with large-scale transient worker-based seafood processing and/or other industrial enclave type of development.

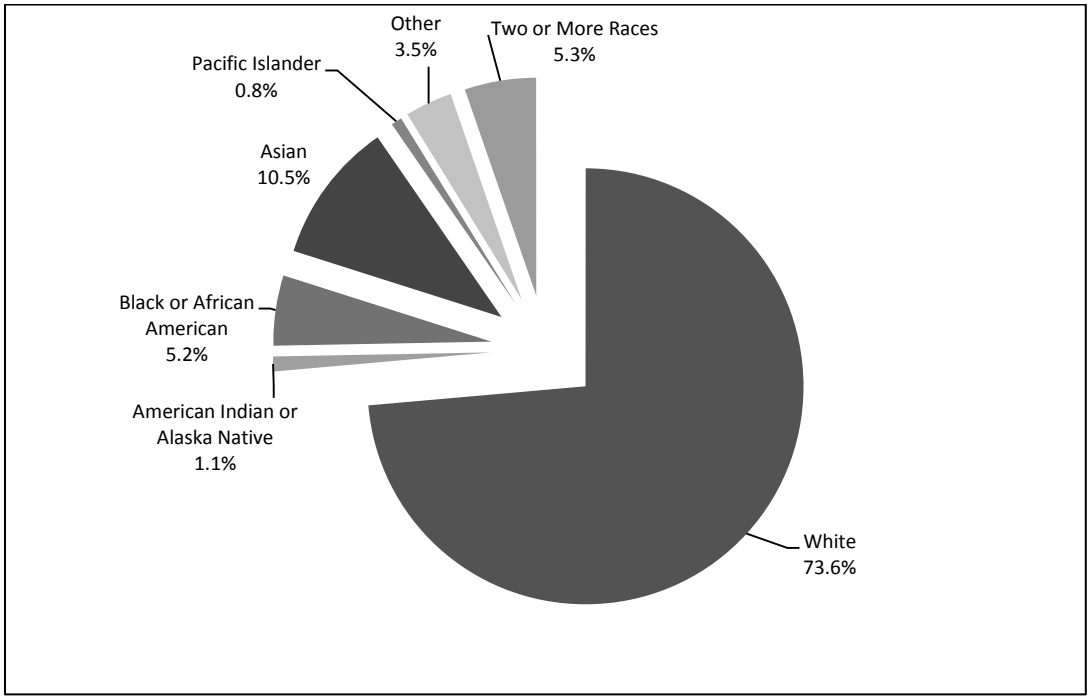


Source: (U.S. Census 2012f)

Figure 10-8 Seattle-Tacoma CMSA 2010 population structure

Census figures from 2010 show that 73.5 percent of the residents of the Seattle-Tacoma CMSA identified themselves as White, 1.1 as American Indian or Alaska Native, 5.2 percent as Black/African American, 10.5 as Asian, 0.8 as Pacific Islander, and 8.8 percent as "some other race" or "two or more races." Finally, 8.6 percent of the residents of any race in the Seattle-Tacoma CMSA identified themselves as Hispanic. Based on race and ethnicity combined, 35.1 percent of the Seattle-Tacoma CMSA total population was composed of minority residents (that is, all residents other than those identified as White/non-Hispanic [race/ethnicity]). Figure 10-9 provides a graphic representation of the racial structure

of the Seattle-Tacoma CMSA in 2010 (U.S. Census 2012f). The Seattle-Tacoma CMSA is congruous with the national level, which reports 36.6 percent minority population as of the U.S. Census 2010.



Source: (U.S. Census 2012f)

Figure 10-9 Seattle-Tacoma CMSA 2010 racial structure

Housing data from the U.S. Census, as shown in Table 10-22, indicate that 97.1 percent of all Seattle-Tacoma CMSA residents live in non-group quarters housing, with total housing units in the Seattle-Tacoma CMSA numbering 1,719,078. Of those housing units, approximately 92.4 percent were occupied. Family households number 1,000,103, with an average household size of 2.9 persons.

Table 10-22 Seattle-Tacoma CMSA 2010 housing information

Total Population	4,021,712	100%
Living in Non-Group Quarters	3,903,557	97.1%
Living in Group Quarters	79,883	1.9%
Total Housing Units	1,719,078	100%
Occupied Housing (Households)	1,588,091	92.4%
Vacant Housing	130,987	7.6%
Family Households	1,000,103	58.2%
Average Household Size	2.9	na

na = not applicable
Source: (U.S. Census 2012f)

10.3.4.4 Local Economy

As noted in Table 10-23, the top occupations for the Seattle-Tacoma CMSA for 2011 were service-oriented occupations. In contrast to small fishing communities in the Aleutian Chain, the CMSA has a widely diversified economy; commercial fishing is just one of the many occupations in the Seattle-Tacoma CMSA area. The latest estimates, based on the 2010 U.S. Census American Community Survey, suggest that 1,926,327 people were employed in the Seattle-Tacoma CMSA, with an unemployment rate of 11 percent. Per capita income for people in the Seattle-Tacoma CMSA was $29,286, median household income was $59,671, and median family income was $71,979 (U.S. Census 2012g). An estimated 11.4 percent of the Seattle-Tacoma CMSA residents were considered low-income, defined as those individuals living below the poverty level threshold (U.S. Census 2012g). Despite being a key center for the North Pacific fishing industry, the major employers in the state are not focused on commercial fishing and include Boeing, Microsoft, the University of Washington, online retailer Amazon.com, and logging company Weyerhaeuser.

Table 10-23 Washington state top five occupations and top Puget Sound employers

Occupations	
1	Retail Salespersons
2	Combination Food Preparation and Serving Workers, Including Fast Food
3	Cashiers
4	Registered Nurses
5	Waiters and Waitresses
Employers	
1	Boeing
2	Microsoft
3	University of Washington
4	Amazon.com
5	Weyerhaeuser

Source: (WAESD 2012) and (Williams 2012)

10.3.4.5 Commercial Fishery Engagement

10.3.4.5.1 Overview

The Seattle-Tacoma CMSA plays an important role in the North Pacific commercial fisheries because many vessels that fish the North Pacific are based in the City of Seattle or elsewhere in the CMSA. Additionally, as noted by Sepez, “Major fish processing companies often hire processing workers through their Seattle-based administrative offices” (Sepez et al. 2007). The CMSA also serves as a hub for regional fishing support services, such as harbors, nautical supply facilities, ship yards, cold storage plants, shipping facilities, and repair companies. There is a lack of current data specific to the Seattle-Tacoma CMSA and its involvement in the North Pacific fisheries; however, generalized data do exist for the year 2010 for those vessels based in Washington State.

10.3.4.5.2 Harvest Sector

In 2010, the Alaska Fisheries Commercial Entry Commission reported that it issued 2,843 permits to 2,096 Washington State residents for crab, halibut, herring, sablefish, salmon, other groundfish, and other shellfish (CFEC 2012b), and 1,793 vessels listed Washington as the state of their home port. During that year, the most common gear types included otter trawl, purse seine, pot gear, longline, and drift gill net. In 2010, the average boat was built in 1978 and measured 53.1 feet LOA (CFEC 2012c). Washington

State is recorded as having landed 1,896,710,880 pounds in 2010 from the North Pacific fishery. The largest landings in 2010 were groundfish, salmon, crab, and herring. Estimated gross earnings for North Pacific fishery landings in Washington State in 2010 were $589,293,983 (CFEC 2012d).

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher Vessels. The trawl catch-vessel fleet is concentrated in the Seattle-Tacoma CMSA for both AI Atka mackerel and Pacific cod in the AI subarea. With regard to AI Atka mackerel, a total of 18 unique vessels fished in Area 541 during the years 2004–2010, with six fishing in Area 542, and three fishing in Area 543. In 2011, eight vessels, three vessels, and one vessel fished in Areas 541, 542, and 543, respectively. Within the larger CMSA, the resident-owned trawl catcher vessels were most present in the City of Seattle (Table 10-1 and Table 10-34).

The participation in the Pacific cod fishery in the AI subarea was larger, with 35 unique resident-owned trawl catcher vessels present in the data between the years 2004–2010 fishing in areas inside and outside the AI subarea. Within the AI subarea, Area 541 had the most unique vessels participating with 30, followed by Area 542 (21 vessels) and Area 543 (five vessels). In 2011, 13 vessels, six vessels, and one vessel fished Pacific cod in Areas 541, 542, and 543, respectively. Again, the City of Seattle had the most resident-owned trawl catcher vessels in the Pacific cod fishery (Table 10-1 and Table 10-34).

Due to the number of vessels engaged in the AI Atka mackerel and Pacific cod trawl catcher vessel fishery, most quantitative data regarding pounds harvested and ex-vessel value are confidential. However, enough vessels were engaged in 2007 and 2009 in the Pacific cod fishery (Area 542) to provide a description for those resident-owned vessels from the Seattle-Tacoma CMSA. In 2007, those resident-owned catcher vessels from the CMSA had a total ex-vessel gross revenue from the North Pacific of approximately $64 million, of which 91.3 percent was attributable to groundfish. Specific to Pacific cod, the harvest from outside the AI subarea accounted for nearly $5.3 million (8.3 percent of the total ex-vessel gross revenue), while the harvest from Area 542 was approximately $0.8 million (1.2 percent of the total ex-vessel gross revenue). The overall values were substantially less in 2009, with a total ex-vessel gross revenue for CMSA resident-owned trawl catcher vessels near $30 million. Of that, $27.6 million (92.4 percent) was attributable to groundfish. Specific to Pacific cod, the harvest outside the AI subarea was just over $1.4 million (4.5 percent of the total ex-vessel gross revenue), while the harvest from Area 542 was approximately $0.8 million (2.6 percent of the total ex-vessel gross revenue) (Table 10-2 and Table 10-3).

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher Vessels. No Seattle-Tacoma CMSA resident-owned non-trawl catcher vessels were present in the data as fishing AI Atka mackerel for the years 2004–2011. However, five unique vessels were present in the data as having fished Pacific cod outside the AI subarea during the years 2004–2010, and three of those vessels caught Pacific cod in Area 541 over the same span, for an average of 0.6 CMSA resident-owned vessels per year over the period 2004–2010. Two unique vessels were present over this span for Area 542, and one vessel was present in the data for Area 541. In 2011, only one vessel participated in the Pacific cod fishery in Area 542 (Table 10-4). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for these non-trawl catcher vessels for any year.

Aleutian Islands Atka mackerel and Pacific Cod Trawl Catcher/Processors. The data suggest that the trawl catcher/processor fleet in the AI Atka mackerel and Pacific cod fisheries in the AI subarea is concentrated in the City of Seattle based on resident ownership of vessels. A total of 14 unique vessels fished in Area 541 of the AI during the years 2004–2010, with 10 fishing in Area 542, and 10 fishing in Area 543. In 2011, seven vessels fished in Areas 541 and 542, while no vessels fished in the closed Area 543.

Like the trawl catcher vessel fishery, the participation in the Pacific cod fishery was larger, with 16 resident-owned trawl catcher/processors present in the data for the years 2004–2010 fishing in Area 541. Area 542 had the next highest number of unique vessels with 13, followed by Area 543 with 11 unique vessels. Annual averages for these areas ranged from 12.6 vessels (Area 541) to 8.9 vessels (Area 543). In 2011, seven unique vessels fished in Areas 541 and 542, with one vessel in Area 543 (Table 10-7). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for these trawl catcher/processors for any year.

Aleutian Islands Atka mackerel and Pacific Cod Non-trawl Catcher/Processors. Very few non-trawl catcher/processors engaged in the AI Atka mackerel fishery during the years 2004–2010, and none participated in 2011. Of the vessels that did participate, Seattle resident-owned vessels accounted for all of the vessels. This included one unique vessel that fished in Areas 541 and 542 during the years 2004–2010, and two unique vessels that fished in Area 543 during that same span.

Like the trawl catcher/processor fishery, participation in the Pacific cod fishery in the AI subarea was larger, with 21 resident-owned non-trawl catcher/processors present in the data for the years 2004–2010 fishing in Area 541. Area 542 had the next highest number of unique vessels with 14, followed by Area 543 with eight unique vessels. Annual averages for these areas ranged from 6.9 vessels (Area 541) to 2.7 vessels (Area 543). In 2011, five unique vessels fished in Areas 541 and 542, with no vessels present in Area 543 (Table 10-8). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for these trawl catcher/processors for any year.

Aleutian Islands Pollock Trawl Catcher Vessels. During the baseline period 2004–2010, direct catcher vessel engagement in the AI pollock fishery was limited to three unique AFA-qualified catcher vessels, each of which had Seattle ownership. Of the three unique catcher vessels engaged in the fishery, only one participated in more than one year. One unique vessel participated each year 2006–2010 but not in 2005; the other two participated 2007 only. All AI pollock catch by these vessels for the years discussed came from Area 541, with the exception of AI pollock from Area 542 that was caught by one vessel in 2007. No catcher vessels participated in the fishery in 2011 or 2012 (nor did the Aleut Corporation authorize the participation of any catcher vessels for either of those years). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for these catcher vessels for any year.

Aleutian Islands Pollock Trawl Catcher/Processors. During the baseline period 2004–2010, direct catcher/processor engagement in the AI pollock fishery was limited to three unique AFA-qualified catcher/processors, each of which had Seattle ownership. Of the three unique catcher/processors engaged in the fishery, only one participated in more than one year. One unique catcher/processor participated in 2007, when it both harvested and processed AI pollock, and again in 2010, when it only processed AI pollock harvested by others; the other two participated in 2005 only (when each both harvested and processed AI pollock). All AI pollock harvested and/or processed by these catcher/processors came from Area 541. No catcher/processors participated in the fishery in 2011 or 2012 (nor did the Aleut Corporation authorize the participation of any catcher/processors for either of those years). Confidentiality restrictions do not allow for a disclosure of ex-vessel gross revenues for these trawl catcher/processors for any year.

10.3.4.5.3 Processing Sector

A number of seafood processing facilities are located in the Seattle-Tacoma CMSA region. Many have regional headquarters in the area. Just in the City of Seattle alone, these processing entities include: Westward Seafoods, UniSea, Trident Seafoods, North Pacific Seafoods, Northwest Seafood Processors, and Ocean Beauty Seafoods. “Processing businesses include shore-based and offshore facilities as well

as full ownership or partnerships in catcher-processor vessels" (Sepez et al. 2007). As noted by Sepez, the number of processing workers engaged in North Pacific fisheries on catcher/processors and/or motherships is not well documented and there is no reliable standardized data source (Sepez et al. 2007).

Aleutian Islands Atka mackerel and Pacific Cod Processing. No Seattle-Tacoma CMSA shore-based processors were present in the data for the period 2004–2010 or for 2011. However, many of the companies engaging in processing in other communities (e.g., Unalaska, Akutan) have regional headquarters in the area.

Aleutian Islands Pollock Processing. No Seattle-Tacoma CMSA shore-based processors were present in the data for the period 2004–2010 or for 2011 or 2012.

10.3.4.6 Support Services

The Seattle-Tacoma CMSA has extensive fishery support services available, including some types or scale of services unavailable anywhere in Alaska. As noted in Section 8.2.12, the region is an important supplier of logistical services to the fleet, including corporate headquarters support, shipyard services, other repairs and maintenance, and supplies, as well as other services support, including the provision of financial, legal, and other services, marketing, and product shipment and storage. The region also has seafood reprocessing plants that receive and reprocess catcher/processor deliveries from BSAI fisheries. No information specific to support services related to the fisheries most likely affected by the proposed action alternatives has been developed, and in-season port call information similar to that developed for the Alaska communities profiled is not relevant to the Seattle-Tacoma CMSA. In contrast to at least two of the other communities profiled in this chapter (Adak and Unalaska) for which in-season support service activities are a major underpinning of the local economy, it is anticipated that any support service related effects in the Seattle-Tacoma CMSA would be experienced on a much more individual and localized level.

10.3.4.7 Community Financial Indicators

The regional economy of the Seattle-Tacoma CMSA is large and diverse, and is not dependent on the commercial fishing industry in the North Pacific for its economic foundation. In contrast to other communities profiled in this chapter for which fishery-related taxes contribute a substantial proportion of revenue to the community, it is anticipated that any economic effects in the Seattle-Tacoma CMSA would be experienced on a much more individual and localized level. Thus, community financial indicators are not included in the description of baseline conditions.

10.3.5 Other Aleutian Island Subarea Communities

While no other civilian communities exist in the AI subarea, in recent years there have been pockets of United States Air Force and United States Coast Guard-related populations on the islands of Shemya and Attu.

Shemya Island is home to Eareckson Air Station, which began as Shemya Army Field during World War II when it was built to support military operations against the Japanese occupation of Attu and Kiska. Later in World War II, it supported more distant Pacific Theater operations; following the war, it was redesignated as Shemya Air Force Base and supported Cold War activities in the region. The island was once home to approximately 2,000 Air Force personnel but was transitioned to "caretaker" status in 1995,

eliminating most of the military staff. As of 2009, no permanently assigned military personnel were stationed at Shemya and the station is supported and maintained by 160 staff from Chugach McKinley, a military contractor and subsidiary of the Chugach Alaska Corporation, an Alaska Native regional corporation. The population of Shemya can grow to approximately 220 in the summer as construction projects require additional personnel. The station currently serves as a radar installation and weather reporting station for the region (Orland 2010; Harris 2009). There is no known engagement of any residents of Shemya in any commercial fisheries or subsistence activities relevant to the proposed fishery management changes in the AI subarea 2004–2011.

Attu Island was home to an Aleut village until World War II. In 1942, the Japanese military landed on Attu and took surviving residents of the community prisoner for the remainder of the war. Interned in Japan, over one-third of the prisoners did not survive captivity. As discussed elsewhere, many of the other islands in the Aleutian chain experienced various amounts of development during World War II as the United States and Japanese forces battled in the region. Japanese forces were ultimately defeated on Attu in May of 1943. After the war, the surviving members of the civilian population of pre-war Attu were not allowed to return to the community and many relocated to Atka, Unalaska, or other places in Alaska. Attu became the site for a key LORAN (LOng RAnge Navigation) station, which operated from 1944 through 2010. In 2010, 21 residents of Attu were counted by the U.S. Census (all LORAN station operations personnel), but no resident population is currently present since the LORAN station ceased operations (U.S. Census 2012h). There was no known engagement of any residents of Attu in any commercial fisheries or subsistence activities relevant to the proposed fishery management changes in the AI subarea from 2004 through the depopulation of the island that accompanied the closure of the LORAN facility in 2010.

10.3.6 CDQ Communities

The CDQ program and the engagement of CDQ communities in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and the AI pollock fishery are described in Section 8.2.7. CDQ groups can be and are directly and indirectly engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and/or the AI pollock fishery through ownership of quota; ownership interest in catcher/processors, catcher vessels, and/or shore-based processors engaged in these fisheries; and ownership interests in enterprises that provide goods or services to relevant fishery or fishery support service enterprises.

The only CDQ community within the AI subarea itself is Atka, a member of the APICDA CDQ group. APICDA, representing Akutan, False Pass, Nelson Lagoon, Nikolski, and St. George, in addition to Atka,[209] holds CDQ for both AI Atka mackerel and Pacific cod that has been fished in the AI subarea. AI Atka mackerel CDQ and Pacific cod CDQ that has been fished in the AI subarea are also held other by CDQ groups representing communities throughout the Bering Sea subarea.

The CDQ community nearest to, but outside of, the AI subarea is Nikolski on the Aleutian Chain, about 45 miles east of the eastern boundary of Area 541; the next nearest CDQ communities are St. George and St. Paul in the Pribilof Islands, approximately 110 and 145 miles, respectively, to the north of the northern boundary of Area 541. There is no indication that, outside of CDQ group participation, residents of Nikolski, St. George, or St. Paul are directly engaged in any of the commercial fisheries or subsistence activities that could be affected negatively or positively by the proposed action alternatives.

[209] Though not an officially designated CDQ community, residents of Unalaska may participate in APICDA's Training and Education Program. Unalaska is also represented by a non-voting member on the APICDA Board of Directors.

10.3.7 Other Communities

As noted in previous sections, and as shown in the community detailed fishery engagement tables in Attachment A (Section 10.9.1), a number of other communities outside of Alaska are engaged in the AI subarea fisheries potentially affected by the proposed Steller sea lion protection measure alternatives through ownership interest in vessels participating in various fishery sectors. The level of engagement and assumed level of dependency of these communities on these fisheries are low, however, and as a result, it is assumed that no significant community level impacts would result from implementation of any of the alternatives.

10.4 Community-Level Impacts of the Proposed Action Alternatives

10.4.1 Community Engagement, Dependence, and Vulnerability

Vulnerability of communities to adverse community-level impacts from the proposed Steller sea lion protection measures is in part a function of dependence of the community on the potentially affected AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, the AI pollock fishery, and/or and the economic resiliency of the community. Dependency is influenced by the relative importance of these three fisheries in the larger community fisheries sector(s), as well as the relative importance of the overall community fishery sector(s) within the larger community economic base (both in terms of private sector business activity and public revenues). Also important to adverse community-level impact outcomes is the specific nature of local engagement in the potentially affected AI Atka mackerel fishery and/or Pacific cod fishery in the AI subarea; and the resiliency of a community based on alternative employment, business, and public revenue opportunities available within the community as a result of the location, scale, and relative economic diversity of the community.[210]

The potential for beneficial subsistence related community-level impacts from the proposed Steller sea lion protection measures in any given community is in part a function of dependence of the community on the potentially affected subsistence activities, specifically Steller sea lion hunting in the AI subarea, in part a function of the efficacy of the Steller sea lion protection measures in increasing the numbers of Steller sea lions in the area that would be available over time to subsistence users, and in part a function

[210] Communities could have similar levels of engagement in a given fishery, but very different levels of dependence on that fishery. For example, a small, rural Alaskan community may have two locally owned vessels participating in a given fishery, while a large, urban Pacific Northwest community may also have two locally owned vessels participating in that same fishery. For those two communities, the nature and level of engagement could be seen as the same (both participate at the same *absolute* level in the same sector); however, the *relative* importance of, or dependency on, that fishery could be quite different. If, in the case of the small Alaska community, the two vessels represent a substantial portion of the local fleet, the local fleet represents a substantial portion of the local fishing economy, and the local fishing economy represents a substantial portion of the overall (relatively undiversified) community economy and, in the case of the urban Pacific Northwest community, the two vessels represent a small portion of the local fleet, the local fleet represents a small portion of the local fishing economy, and the local fishing economy represents a small portion of the overall (relatively diversified) community economy, the rural Alaska community would be seen as more dependent on that fishery than the urban Pacific Northwest community. This is not to say, however, that potential impacts to individual fishing vessels are more or less important at the individual operation level in one community or another; it is understood that loss of employment, for example, is extremely important to the individuals involved, regardless of community base, despite the fact that individuals who have lost fishing employment while residing in a larger community with a more diversified economy may have more opportunities for alternative sources of employment than individuals in a similar situation residing in communities with a smaller and less diversified economic base.

of whether subsistence utilization would, in fact, increase with increasing the number of Steller sea lions that would be available to local subsistence users over the long term.[211]

Adverse impacts to commercial fishing and beneficial impacts to subsistence, however, would not be symmetric. Whereas the potential for adverse impacts to commercial fisheries would be immediate and relatively quantifiable (at least in theory), the potential for beneficial impacts to subsistence would take place only over time and would be inherently challenging to quantify. Further, there would be differences in geographic scale. Adverse impacts to commercial fishing would potentially involve individuals and entities from a wide geographic area, including the Pacific Northwest, given the patterns of engagement in the fishery described in Sections 10.2 and 10.3, above; beneficial impacts to subsistence would have a much tighter geographic focus, potentially involving only the communities of Adak and Atka, given assumptions about the concentration of benefits of the proposed action alternatives on Steller sea lions in the AI subarea, further developed in Section 10.4.5, below.[212]

Potential beneficial commercial fishing-related community-level impacts from the proposed Steller sea lion protection measures could also occur if a shift occurred in fishery engagement patterns between communities as a result of implementation of those measures. An example of this would be a decrease in engagement in the regional Pacific cod fishery in Adak and a corresponding increase in engagement in the Pacific cod fishery in Unalaska if the center of gravity of that fishery were to shift eastward with widespread closures in the westernmost districts in the AI subarea. In terms of community dependency, this would not necessarily be a zero-sum situation, as what could be a relatively large shift (loss) from the perspective of the Adak local fishing economy could be a relatively small shift (gain) from the perspective of the much larger and more diversified Unalaska local fishing economy. Additionally, beneficial impacts to communities could result from potential increases in harvesting and processing opportunities in the AI pollock fishery that could occur under several of the proposed action alternatives, particularly for Adak.

10.4.2 Fishery Engagement Summary: Adak, Atka, Unalaska, and the Seattle-Tacoma CMSA

With regard to the specific communities profiled and assessed as part of this chapter, the levels and natures of engagement in the AI subarea Atka mackerel, Pacific cod, and/or pollock fisheries vary widely. Table 10-24 provides a simplified graphic representation of AI subarea Atka mackerel, Pacific cod, and/or AI pollock fisheries engagement as well as relevant subsistence engagement for the communities profiled. Also shown in this table is relative community size, which, in these cases, corresponds to relative diversity of the local economy. This engagement may also be summarized as follows:

[211] As noted in Section 10.1.2.2, no community impacts related to subsistence fishing for Atka mackerel, Pacific cod, and/or pollock are anticipated, due to there being no indications that commercial harvest activity in the AI subarea has adversely affected or is adversely affecting whatever level of Atka mackerel, Pacific cod, and/or pollock-specific subsistence activities have occurred or may be occurring. Further, none of the alternatives restrict subsistence fishing. If localized abundance of these species increases as a result of implementation of proposed alternative commercial fishery management measures, however, it is possible that beneficial impacts could accrue to subsistence fishing for those species (assuming at least some subsistence fishing is taking place).

[212] As noted in Section 10.4.5.1.1, it is assumed that impacts to Steller sea lion subsistence use would be concentrated in Atka and Adak, the two communities within the AI subarea, for the same reasons that the proposed fishery management action designed to benefit Steller sea lions is concentrated in the AI subarea (the provisions of the RPA and the interim final rule are premised on impacts in the action area and implicitly assume there would be little impact outside the action area).

Table 10-24 Graphic representation of annual average engagement in potentially affected AI Atka mackerel, Pacific cod, and pollock fisheries, and relevant subsistence engagement, by community, 2004–2010

Community	Relative Community Size	AI Atka mackerel, Pacific Cod from AI, and/or AI Pollock Engagement							Subsistence Engagement in AI Subarea	
		Locally Owned Vessels				Shore-Based Processing Location	C/P Port Calls	CDQ Quota Ownership	Steller Sea Lions	Atka mackerel, Pacific Cod, and/or Pollock
		Trawl CV	Non-trawl CV	Trawl C/P	Non-trawl C/P					
Adak	●	none	⬤	none	none	○	⬤	none	●	unknown
Atka	●	none	none	none	none	none	●	⬤	⬤	○
Unalaska	○	●	●	none	none	⬤	⬤	none	none	none
Seattle-Tacoma CMSA	⬤	⬤	⬤	⬤	⬤	none	not applicable	not applicable	not applicable	not applicable

Key for Table 10-24

Type/Level of Engagement	●	○	⬤
Community Size	2010 population = less than 1,000	2010 population = 1,000 – 10,000	2010 population = greater than 10,000
Locally Owned Trawl CV	2004–10 annual avg. = 0.1 – 0.9 vessels	2004–10 annual avg. = 1.0 – 3.4 vessels	2004–10 annual avg. = 3.5 or more vessels
Locally Owned Non-trawl CV	2004–10 annual avg. = 0.1 vessels	2004–10 annual avg. = 0.2 – 0.3 vessels	2004–10 annual avg. = 0.4 or more vessels
Locally Owned Trawl C/P	2004–10 annual avg. = 0.1 – 2.9 vessels	2004–10 annual avg. = 3.0 – 5.5 vessels	2004–10 annual avg. = 5.6 or more vessels
Locally Owned Non-trawl C/P	2004–10 annual avg. = 0.1 – 2.9 vessels	2004–10 annual avg. = 3.0 – 5.5 vessels	2004–10 annual avg. = 5.6 or more vessels
Shore-Based Processing Participation	2004–10 annual avg. = 0.1 – 0.5 plants	2004–10 annual avg. = 0.6 – 1.1 plants	2004–10 annual avg. = 1.2 or more plants
C/P Port Calls	2004–10 annual avg. = 0.1 – 9 calls	2004–10 annual avg. = 10 – 19 calls	2004–10 annual avg. = 20 or more calls
CDQ Quota Ownership	NA	NA	CDQ community
Steller Sea Lion Subsistence in AI	2004–08 annual avg. = 0.1 – 20.0 SSL	2004–08 annual avg. = 20.1 – 43.5 SSL	2004–08 annual avg. = 43.6 or more SSL
Atka mackerel and/or Pacific Cod Subsistence in AI	1994 (most recent data year) use = 0.1 – 499.9 lbs.	1994 (most recent data year) use = 500.0 to 999.9 lbs	1994 (most recent data year) use = 1,000 lbs or more

- **Adak**

  Some non-trawl catcher vessels with Adak ownership were involved in the AI subarea fisheries potentially affected by the proposed fishery management changes. Processing of Pacific cod from the AI subarea and AI pollock took place in Adak, and both catcher/processors and catcher vessels made port calls, either before or after fishing for AI Atka mackerel, Pacific cod in the AI subarea, and/or AI pollock. The following bullets provide some additional detail on this engagement.

  - Adak was not engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery through local ownership of trawl catcher vessels during 2004–2010. On an annual average basis for the years 2004–2010, Adak was engaged in the Pacific cod fishery in the AI subarea through local ownership of 0.6 and 0.4 non-trawl catcher vessels fishing in Areas 541 and 542, respectively; no locally owned non-trawl catcher vessel fished in Area 543 during 2004–2010. Average annual ex-vessel gross revenues for the Adak-owned catcher vessels that did participate in the Pacific cod fishery in the AI subarea during 2004–2010 cannot be disclosed. No Adak-owned trawl or non-trawl catcher vessels fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011.
  - No trawl or non-trawl catcher/processors with Adak ownership participated in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery during 2004–2010 or in 2011.
  - An annual average of 1.0, 0.9, and 0.7 Adak shore-based processors accepted deliveries of Pacific cod from AI subarea Areas 541, 542, and 543, respectively, during 2004–2010. In 2011, one Adak shore-based processor accepted deliveries of Pacific cod from Area 541 and one accepted deliveries of Pacific cod from Area 542; no Adak shore-based processors accepted deliveries of Pacific cod from Area 543 in 2011. One Adak shore-based processor accepted deliveries of AI pollock from Area 541 each year 2006–2009 and from Area 542 in 2007, but not from any area in 2004, 2005, or 2010; no Adak shore-based processors accepted deliveries of AI pollock in 2011 or 2012. First wholesale gross revenues for Pacific cod from the AI subarea or AI pollock cannot be disclosed for Adak shore-based processors. No Adak shore-based processor accepted deliveries of AI Atka mackerel during 2004–2010 or in 2011.
  - Adak served as a port of call for catcher/processors (trawl and non-trawl combined) immediately before or immediately after trips targeting AI Atka mackerel and Pacific cod in the AI subarea on an annual average basis 43.6 and 28.9 times, respectively, during 2004–2010; these types of port calls occurred 28 and 13 times, respectively, in 2011. Adak served as a port of call for catcher vessels (trawl and non-trawl combined) immediately before or immediately after trips targeting Pacific cod in the AI subarea on an annual average basis 117.9 times during 2004–2010; these types of port calls occurred 11 times in 2011. The number of similar Adak port calls for catcher vessels targeting AI Atka mackerel during 2004–2010 and 2011 cannot be disclosed.

- **Atka**

  Atka was engaged in the AI subarea fisheries potentially affected by the proposed fishery management changes primarily through CDQ quota ownership. Both catcher/processors and catcher vessels made port calls, either before or after fishing for AI Atka mackerel, Pacific cod in the AI subarea, and/or AI pollock. The following bullets provide some additional detail on this engagement.

- Atka was not engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery through local ownership of trawl catcher vessels or non-trawl catcher vessels during 2004–2010 or in 2011.
- No trawl or non-trawl catcher/processors with Atka ownership participated in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery during 2004–2010 or in 2011.
- No Atka shore-based processors accepted deliveries of Pacific cod from the AI subarea during 2004–2010, with the exception of a small amount of Pacific cod from Area 541 in 2006 (only). First wholesale gross revenues for this processing are confidential, but the order of magnitude of the processing is such that it is likely to either be "noise" in the data or a small amount of incidental catch. No Atka shore-based processors accepted deliveries of Pacific cod from AI subarea in 2011 (although, as noted elsewhere, Pacific cod were run at the local plant in 2012). No Atka shore-based processor accepted deliveries of AI Atka mackerel or AI pollock during 2004–2010 or in 2011.
- No information on Atka serving as a port of call for catcher/processors (trawl and non-trawl combined) or catcher vessels (trawl and non-trawl combined) immediately before or immediately after trips targeting AI Atka mackerel and Pacific cod in the AI subarea during 2004–2010 or in 2011 can be disclosed due to data confidentiality restrictions.

- **Unalaska**

  Very few trawl and non-trawl catcher vessels with Unalaska ownership were engaged in the AI subarea fisheries potentially affected by the proposed fishery management changes. Processing of Pacific cod from the AI subarea took place in Unalaska, and both catcher/processors and catcher vessels made port calls, either before or after fishing for AI Atka mackerel, Pacific cod in the AI subarea, and/or AI pollock. The following bullets provide some additional detail on this engagement.

  - Unalaska, on an annual average basis during 2004–2010, was engaged in the Pacific cod fishery in the AI subarea through local ownership of 0.1 trawl catcher vessels (Area 541 only) and 0.1 non-trawl catcher vessels (Area 542 only); there was no engagement of locally owned catcher vessels in either gear class in the AI Atka mackerel fishery or the AI pollock fishery during 2004–2010. No catcher vessels with Unalaska ownership in either gear class fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011. Average annual ex-vessel gross revenues for the Unalaska-owned catcher vessels that did participate in the Pacific cod fishery in the AI subarea during 2004–2010 cannot be disclosed.
  - No trawl or non-trawl catcher/processors with Unalaska ownership participated in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery during 2004–2010 or in 2011.
  - An annual average of 2.1, 1.1, and 1.0 Unalaska shore-based processors accepted deliveries of Pacific cod from AI subarea Areas 541, 542, and 543, respectively, during 2004–2010. In 2011, two, one, and one Unalaska shore-based processors accepted Pacific cod deliveries from Areas 541, 542, and 543, respectively. First wholesale gross revenues for Pacific cod from the AI subarea can be disclosed for 2008 only, and then only for Area 541 ($146,917), which represented approximately 0.1 percent of total groundfish first wholesale gross revenues for those same Unalaska shore-based processors for that year. First wholesale gross revenues for all species combined (groundfish and non-groundfish) for these same processors in 2008 are confidential. No

Unalaska shore-based processor accepted deliveries of AI Atka mackerel or AI pollock during 2004–2010 or in 2011.

- Unalaska served as a port of call for catcher/processors (trawl and non-trawl combined) immediately before or immediately after trips targeting AI Atka mackerel and Pacific cod in the AI subarea on an annual average basis 32.4 and 36.7 times, respectively, during 2004–2010; these types of port calls occurred 48 and 15 times, respectively, in 2011. Unalaska served as a port of call for catcher vessels (trawl and non-trawl combined) immediately before or immediately after trips targeting Pacific cod in the AI subarea on an annual average basis 33.1 times during 2004–2010; these types of port calls occurred 17 times in 2011. The number of similar Unalaska port calls for catcher vessels targeting AI Atka mackerel during 2004–2010 and 2011 cannot be disclosed.

- **Seattle-Tacoma CMSA**

  Trawl and non-trawl catcher vessels and trawl and non-trawl catcher/processors with Seattle-Tacoma CMSA ownership were engaged in the AI subarea fisheries potentially affected by the proposed fishery management changes. The following bullets provide some additional detail on this engagement.

  - Seattle-Tacoma CMSA, on an annual average basis during 2004–2010, was engaged in the AI Atka mackerel fishery through local ownership of 5.1, 1.3, and 1.0 trawl catcher vessels that fished in Areas 541, 542, and 543, respectively; in 2011, eight, three, and one locally owned trawl catcher vessels fished AI Atka mackerel in Areas 541, 542, and 542, respectively. No AI Atka mackerel ex-vessel gross revenue information can be disclosed for Seattle-Tacoma CMSA locally owned trawl catcher vessels (in this case because sector totals have been disclosed in Chapter 8; given the concentration of the sector in the Seattle-Tacoma CMSA, either a sector total or a Seattle-Tacoma CMSA subtotal can be disclosed, but not both).

  - On an annual average basis during 2004–2010, 12.7, 5.6, and 2.0 Seattle-Tacoma CMSA locally owned trawl catcher vessels were engaged in the Pacific cod fishery in Areas 541, 542, and 543, respectively; in 2011, 13, six, and one locally owned trawl catcher vessels fished Pacific cod in Areas 541, 542, and 542, respectively. Ex-vessel gross revenues for Pacific cod from the AI subarea for locally owned trawl catcher vessels can be disclosed only for Area 542 and then only for 2007 and 2009 ($0.8 million in both cases), which represented approximately 1.2 percent and 2.6 percent, respectively, of total ex-vessel gross revenues for all species fished off of Alaska for those same trawl catcher vessels in 2007 and 2009.

  - Seattle-Tacoma CMSA participated in the AI pollock fishery through local ownership of one trawl catcher vessel each year 2006, 2008, 2009, and 2010 and three trawl catcher vessels in 2007. No AI pollock ex-vessel gross revenue information can be disclosed for Seattle-Tacoma CMSA locally owned trawl catcher vessels.

  - No Seattle-Tacoma CMSA locally owned non-trawl catcher vessels participated in the AI Atka mackerel or AI pollock fisheries during 2004–2010 or in 2011.

  - On an annual average basis during 2004–2010, 0.6, 0.3, and 0.1 Seattle-Tacoma CMSA locally owned non-trawl catcher vessels were engaged in the Pacific cod fishery in Areas 541, 542, and 543, respectively; in 2011, zero, one, and zero locally owned non-trawl catcher vessels fished Pacific cod in Areas 541, 542, and 542, respectively. Ex-vessel gross revenues for Pacific cod from the AI subarea for locally owned non-trawl catcher vessels cannot be disclosed.

- On an annual average basis during 2004–2010, 9.4, 9.0, and 8.1 Seattle-Tacoma CMSA locally owned trawl catcher/processors were engaged in the AI Atka mackerel fishery in Areas 541, 542, and 543, respectively; in 2011, seven, seven, and zero locally owned trawl catcher/processors fished AI Atka mackerel in Areas 541, 542, and 542, respectively. First wholesale gross revenues for AI Atka mackerel for locally owned trawl catcher/processors cannot be disclosed (in this case because sector totals have been disclosed in Chapter 8; given the concentration of the sector in the Seattle-Tacoma CMSA, either a sector total or a Seattle-Tacoma CMSA subtotal can be disclosed, but not both).
- On an annual average basis during 2004–2010, 12.6, 10.1, and 8.9 Seattle-Tacoma CMSA locally owned trawl catcher/processors were engaged in the Pacific cod fishery in Areas 541, 542, and 543, respectively; in 2011, seven, seven, and one locally owned trawl catcher/processors fished Pacific cod in Areas 541, 542, and 542, respectively. First wholesale gross revenues for Pacific cod from the AI subarea for locally owned trawl catcher/processors cannot be disclosed (in this case because sector totals have been disclosed in Chapter 8; given the concentration of the sector in the Seattle-Tacoma CMSA, either a sector total or a Seattle-Tacoma CMSA subtotal can be disclosed, but not both).
- No Seattle-Tacoma CMSA locally owned trawl catcher/processors were engaged in the AI pollock fishery in 2011. One Seattle-Tacoma CMSA locally owned trawl catcher/processor was engaged in the AI pollock fishery in 2007 and 2010. First wholesale gross revenues for AI pollock for locally owned trawl catcher/processors cannot be disclosed.
- On an annual average basis during 2004–2010, 0.4, 0.1, and 0.4 Seattle-Tacoma CMSA locally owned non-trawl catcher/processors were engaged in the AI Atka mackerel fishery in Areas 541, 542, and 543, respectively; in 2011, no locally owned non-trawl catcher/processors fished AI Atka mackerel. First wholesale gross revenues for AI Atka mackerel for locally owned non-trawl catcher/processors cannot be disclosed.
- On an annual average basis during 2004–2010, 7.2, 5.2, and 2.7 Seattle-Tacoma CMSA locally owned non-trawl catcher/processors were engaged in the Pacific cod fishery in Areas 541, 542, and 543, respectively; in 2011, five, five, and zero locally owned non-trawl catcher/processors fished Pacific cod in Areas 541, 542, and 542, respectively. First wholesale gross revenues for Pacific cod from the AI subarea for locally owned non-trawl catcher/processors cannot be disclosed (in this case because sector totals have been disclosed in Chapter 8; given the concentration of the sector in the Seattle-Tacoma CMSA, either a sector total or a Seattle-Tacoma CMSA subtotal can be disclosed, but not both).
- No Seattle-Tacoma CMSA locally owned non-trawl catcher/processors were engaged in the AI pollock fishery in 2004–2010 or in 2011.
- No Seattle-Tacoma CMSA shore-based processors accepted deliveries of AI Atka mackerel, Pacific cod from the AI subarea, or AI pollock during 2004–2010 or in 2011.

10.4.3 Fishery Dependency and Vulnerability to Adverse Community-Level Impacts of the Proposed Action Alternatives

The relative importance of the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and the AI pollock fishery within the larger local fisheries sector and within the larger local economic base varies widely among the engaged Alaska communities. Similarly, the socioeconomic structure of the engaged communities varies widely along with the relative diversity of their respective local economies. The following sections provide a community-by-community characterization of dependency and vulnerability attributes of the relevant communities with respect to potential adverse community-level impacts of the proposed action alternatives.

In general, as noted in Section 10.3, it is not possible to quantitatively differentiate potential impacts of the different proposed action alternatives on an individual community basis, especially for Alaska communities, for a number of reasons importantly including data confidentiality issues as specifically illustrated in Section 10.2. Taken from a community perspective, however, qualitative analysis of the alternatives suggests that, while impacts may be noticeable at the individual operation level for at least a few vessels and/or a few shore-based processors (and potentially at the individual operation level for at least a few local support service providers for those vessels and/or processors), the impacts at the community level for any of the involved fishing communities would likely be less than significant as gauged through the use of existing baseline years data, with the notable exception of Adak. The sustained participation of these fishing communities, aside from Adak, would not clearly be put at risk by any of the proposed action alternatives being considered. The case of Atka is less straightforward, as potential adverse impacts to the community from the implementation of the proposed action alternatives would be less about sustaining historic participation in the fishery and more about preclusion of the community from a fishery previously determined by the community (and the CDQ group of which it is a member [APICDA]) to be a viable component to add to its portfolio of commercial fisheries engagement to help meet the social and economic needs of the community.

Also in general, in terms of community impacts, Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions described for the communities and would not be expected to result in community-level impacts in any of the engaged communities due to restrictions on the AI Atka mackerel fishery or the Pacific cod fishery in the AI subarea in comparison to the baseline.[213] Alternatives 1 (status quo/interim rule/2011 Steller sea lion protection measures), and 6 (no retention of Atka mackerel, Pacific cod, or pollock in the three Aleutian Islands management areas) would be expected to have high and adverse community-level impacts compared to the 2004–2010 baseline conditions, due to the greatest restrictions being placed on AI Atka mackerel and Pacific cod harvesting in the AI subarea, with these community-level impacts largely concentrated in Adak, as described below. The impacts of Alernative 6 would be more adverse than those of Alternative 1.

Based on the proximity and nature of proposed area permanent and/or seasonal closures for AI Atka mackerel and Pacific cod in the AI subarea, Alternative 2 (modified 2011 Steller sea lion protection measures), Alternative 3 (further modified 2011 Steller sea lion protection measures), and Alternative 5

[213] Alternatives 2, 3, 4, and 5 provide for potential increased harvesting opportunities of AI pollock compared to 2004–2010 baseline conditions, which could result in beneficial community-level impacts for Adak, as described in Section 10.4.5.3. Alternative 1 would not change potential AI pollock harvesting opportunities compared to 2004–2010 baseline conditions, so neither beneficial nor adverse community-level impacts related to this fishery are anticipated for any community. Alternative 6 prohibits retention of pollock, and so may have adverse impacts compared to the baseline years.

(preferred alternative) would be expected to have a level of adverse community-level impacts intermediate between those of Alternatives 1 and 4. While little difference is expected in terms of community-level impacts between Alternatives 2 and 3, it is assumed that Alternative 5 would have lower community-level adverse impacts than Alternatives 2 and 3 (but higher than those of Alternative 4) based on the greater access to Pacific cod under Alternative 5 (and the relative dependence of the Alaska communities in particular on Pacific cod versus Atka mackerel) and the sector-linked economic analyses presented in Chapter 8, although the quantification of the likely differences between the alternatives is not possible at the community level.

10.4.3.1 Adak

10.4.3.1.1 General

Adak was not directly engaged in the AI Atka mackerel fishery during 2004–2010 through local ownership of participating catcher vessels (of any gear type), local ownership of participating catcher/processors (of any gear type), or processing operations at the local shore-based processor in the community. Adak was also not directly engaged in the Pacific cod fishery in the AI subarea during 2004–2010 through local ownership of participating trawl catcher vessels or catcher/processors of any gear type; Adak was not directly engaged in the AI pollock fishery during 2004–2010 through local ownership of participating catcher vessels or catcher/processors of any gear type. Adak had essentially no dependency on the AI Atka mackerel fishery, Pacific cod fishery in the AI subarea, or AI pollock fishery through these types of links.

One locally owned non-trawl catcher vessel did, however, participate in the Pacific cod fishery in Areas 541 and 542 in 2006, 2007, and 2008. In 2008, two locally owned non-trawl catcher vessels also participated in the Pacific cod fishery in Area 541. While this is a limited degree of engagement in the fishery in absolute terms, it is important to recognize that the locally owned Adak catcher vessel fleet is small and nascent in its anticipated growth, due at least in part to Adak, in its current configuration as a civilian community, being a relatively new fishing community. As a result, even the participation of one or two locally owned vessels involves a relatively large proportion of the local fleet and presumably equates to a level of dependency not immediately apparent in the low participation numbers, although the data to quantify the degree of dependency are confidential. Adak-owned catcher vessels are also limited in their alternatives to fishing in the AI subarea, due to their size and range, so participation in the AI subarea fisheries is doubly important.

The development of a local residential fleet has been a goal of local leadership and entities involved with the economic development of Adak since its transition from a military installation to a civilian community. Implementation of either Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures), or Alternative 6 (no retention of Atka mackerel, Pacific cod, or pollock from the Aleutian Islands management areas) would likely serve to reduce the already low annual average level of participation in the AI Atka mackerel fishery, Pacific cod fishery in the AI subarea, and/or AI pollock fishery if not preclude development of participation entirely, and otherwise stymie growth for a local fleet with limited alternatives due to geographic, vessel characteristic, and economic factors. The impacts of Alternative 6 would be more adverse than those of Alternative 1.

No Adak-owned catcher vessels (of any gear type) fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011, nor were there any Adak-owned catcher/processors (of any gear type) that fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011. The Adak shore-based processor did not process AI Atka mackerel or AI pollock in 2011.

Adak did, however, have a substantial degree of engagement in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and/or the AI pollock fishery in two other ways during 2004–2010: (1) through shore-based processing of Pacific cod from the AI subarea and AI pollock and (2) as a port of embarkation and disembarkation for catcher/processors and catcher vessels immediately before and immediately after trips targeting AI Atka mackerel, Pacific cod in the AI subarea, and/or AI pollock. As a port of embarkation and disembarkation, Adak receives a substantial amount of economic activity that multiplies locally for a range of goods and services present in the small community. Combined with other social and economic realities, the community's participation in these three fisheries as a shore-based processing location and as port of call is of key importance. These two types of engagement and associated levels of dependency are considered further in the following sections.

10.4.3.1.2 Shore-based Processing of Pacific Cod from the AI Subarea and AI Pollock

During 2004–2010, the one shore-based processor in Adak accepted deliveries of Pacific cod from Area 541 every year. The shore-based processor accepted deliveries from Area 542 for every year 2004–2009, and accepted deliveries from Area 543 for every year 2004–2008. With no other shore-based processor in the community, the Pacific cod processing activity accounted for a large proportion of effort and local employment. As described in a recently completed profile of the community, according to an individual with plant ownership interest, the Pacific cod A season, "overwhelms anything else that happens during the rest of the year, not just in terms of volume at the plant, but in terms of crew utilizing local businesses (the fuel dock, store, and bar); without A season cod, the plant does not survive" (EDAW 2008a). Recent interviews conducted for this analysis reinforced the importance of the Pacific cod A season, with many Adak residents and business owners noting that A season was key to the economic viability of the entire community. As expressed by one community resident, "the major deal here is cod," referencing how processor personnel and fishing vessels that come into the community and the activities that accompany processing operations and vessel traffic create economic opportunities generally not experienced during the rest of the year.

First wholesale gross revenue information for Pacific cod from the AI subarea during 2004–2010 is confidential. Adak Fisheries did, however, provide a confidentiality waiver for harvest volume for the years 2002–2008, as noted in Section 10.3.1.5.3 and shown in Table 10-17. As shown in that table, the volume of Pacific cod landings from the AI subarea processed at Adak Fisheries is substantial, accounting for an average of 63 percent of the total catcher vessels landings of Pacific cod from the AI subarea. In some years, the proportion of Pacific cod from the AI subarea landings processed at Adak Fisheries is over 80 percent, suggesting the fundamental importance the shore-based processing plant in Adak is for the Pacific cod fishery in the AI subarea as a whole. With regard to specific areas within the AI subarea, the vast majority of volume is landed in Adak was from Area 541, with percentages ranging from between 82 and 94 percent for the years 2002–2008, with an average of 88 percent (and 6,623 metric tons).

As a result of this pronounced dependency of Adak on shore-based processing of Pacific cod from the AI subarea, substantial community-level impacts related to this sector are anticipated for Adak under Alternatives 1 and 6, with lesser community-level impacts possible under Alternatives 2, 3, and 5, but quantitative comparisons are not possible with available data. The potential impacts would be compounded by the assumption that Pacific cod from the AI subarea was the cornerstone of the shore-based plant's annual activity during the 2004–2010 baseline years (similar to what would be expected under Alternative 4). While deliveries of Pacific cod from outside the AI subarea do occur, it is assumed that a large proportion of Adak landings come from inside the AI subarea, while shore-based processing entities in other communities that process at least some Pacific cod from the AI subarea on a more-or-less regular basis (e.g., some shore-based processors in Unalaska) have much larger proportions of their

Pacific cod landings come from catch that occurs outside of the AI subarea. In contrast to other communities, declines in harvest efforts in the AI subarea would likely not be largely or completely offset by redirection of Pacific cod harvest efforts to other North Pacific fishery management areas. It is also assumed, based on a general knowledge of the industry, that the Adak shore-based processor has a greater degree of reliance on Pacific cod among all groundfish species than the shore-based processing plants in Unalaska, although the data that would be required to quantify this assumption are confidential.

In 2011, the shore-based processor in Adak accepted deliveries of Pacific cod from Areas 541 and 542. First wholesale gross revenues associated with the processing of these deliveries are confidential, but interviews with community residents suggest the closure of the local shore-based processing plant during the 2011 Pacific cod A season overshadowed any other fishery activity for that year.

During 2004–2010, the one shore-based processor in Adak accepted deliveries of AI pollock from Area 541 in 2006, 2007, 2008, and 2009 and from Area 542 in 2007. First wholesale gross revenue information for AI pollock during 2004–2010 is confidential but, given the known nature of processing operations in the community, it is assumed that development and maintenance of a diversified processing base is important to the community. This is assumed to be particularly true for AI pollock, as the DFA granted to the Aleut Corporation for the benefit of the economic development of Adak inherently presumes the importance or potential importance of the fishery to the community.

10.4.3.1.3 Port Calls of Catcher/Processors and Catcher Vessels Participating in the AI Atka Mackerel Fishery and/or the Pacific Cod Fishery in the AI Subarea

Adak is the location of a key support service sector and is not as diversified with regard to other fisheries as Unalaska, the other Alaska community with a fishery support sector most likely to be directly affected by the proposed Steller sea lion protection measures (with potential differences between the specific proposed action alternatives likely to be similar to those described in the shore-based processor discussion immediately above). Aside from catcher/processors targeting Pacific cod in the AI subarea, the number of catcher/processors and catcher vessels engaged in the AI Atka mackerel and AI Pacific cod fisheries that make port calls in Adak is larger than any other community.

As noted in Section 10.4.2, during 2004–2010, Adak frequently served as a port of call for catcher/processors (trawl and non-trawl combined) immediately before or after trips targeting AI Atka mackerel and Pacific cod in the AI subarea (43.6 and 28.9 times on an annual average basis, respectively) and for catcher vessels (trawl and non-trawl combined) immediately before or after trips targeting Pacific cod in the AI subarea (119.7 times on an annual average basis), with the analogous data related to catcher vessel AI Atka mackerel being confidential.

For catcher/processors (trawl and non-trawl combined), these types of AI Atka mackerel and Pacific cod in the AI subarea related port calls occurred in Adak 28 and 13 times, respectively, in 2011; for Pacific cod catcher vessels (trawl and non-trawl combined), these types of port calls occurred in Adak 11 times in 2011, with analogous data related to catcher vessel AI Atka mackerel being confidential.

Although Adak undoubtedly has a relatively low economic multiplier, the money spent on goods and services by vessels making port calls does circulate in the small economy of Adak. Other economic realities have challenged the resiliency of the community, such that the money spent by vessels and economic viability of the AI Atka mackerel fishery and Pacific cod fishery in the AI subarea has a disproportionate effect on the economy and the residents of Adak. Interviews with community residents and business owners have provided some qualitative detail as to how the community is dependent on the

commercial fishing and how the local economy can be affected by changes in the commercial fishery sector. For example:

- The local commercial fishing fleet of Adak, as described by local residents, has changed from that described in the most recent comprehensive community baseline profiles (EDAW 2008a). Of the five small vessels considered "local" by Adak residents at the time, one has since left the community when the vessel owners moved away (for reasons unrelated to commercial fishing), one has been severely damaged and is not expected to return to the fishery, and two have changed ownership and remain in the community but are currently out of service, illustrating the challenges Adak has had in building and retaining a stable local fleet over time.[214] The remaining vessel, on the other hand, was the vessel considered most like a typical local fishing vessel found in other regional fishing hubs such as King Cove or Sand Point, and still fishes out of Adak (*Larisa M*). According to local residents interviewed for this analysis, the current "local" fleet of Adak includes *Julie Ana*, *Sophia Grace*, *Larisa M*, *Selah*, and *Norcoaster*. Two of these vessels (*Julie Ana* and *Sophia Grace*) are currently undergoing repairs and are not active in the fishery. The three other vessels (*Larisa M*, *Selah*, and *Norcoaster*) are owned by seasonal residents and are not always consistently listed as being owned and/or homeported in Adak in fisheries datasets; thus, existing quantitative data would tend to under-report the importance of these vessels from the perspective of the local economy.

- The local shore-based processor in Adak has gone through a series of operator changes, providing little consistency to vessels interested and willing to deliver to Adak. Since first accepting deliveries in early 1999 through mid-2011, the processing plant in Adak operated variously under the names Adak Seafood, Adak Seafoods, Aleutian Spray, Norquest, and Adak Fisheries. The plant experienced a number of operational difficulties during that time, including a bankruptcy filing in late 2009 (well after Pacific cod A season processing had been concluded), which began a period that saw three different operators in as many years (Adak Fisheries, Adak Seafoods, and Icicle Seafoods). While at least some level of processing did occur in 2010, the processing plant operated intermittently and was closed entirely during the critical Pacific cod A season in 2011, by far the most important processing season of the year, which was described by one resident as "devastating for the community." In July 2011, Icicle Seafoods began operating the processing facility. Icicle reportedly focused on processing Pacific cod at the plant, although some crab was also processed.[215] According to Icicle management, since implementation of the interim final rule, the Pacific cod processed in Adak has been almost exclusively from the state GHL cod fishery. Management readily states that they would like to process more Federal Pacific cod, Atka mackerel, Pacific ocean perch, and pollock in the future; however, current regulations generally preclude any activity in the area for these fisheries and none are considered "robust" in Adak by Icicle management. In 2012, the number of processing personnel present during the Pacific cod A season was estimated at 220 people, with only a handful of local hires. The plant

[214] It is important to note that beyond the vessels considered "local" by residents, a number of vessels also have ongoing connections to the community, although they have outside ownership and may spend only part of the year in the community. These have been characterized by one of these vessel owners as "full-time fishermen with part-time ties to the community" as opposed to the local fleet composed of "part-time fishermen who live [full-time] in the community" (EDAW 2008a).

[215] Although crab processing was important to the plant (and the community) in the years immediately before the implementation of the BSAI crab rationalization program in 2005, there was not sufficient processing history during the earlier qualification years to result in an initial history-based allocation of processing quota shares to an Adak-based processor under the rationalization program. Although a community enhancement feature of the program did provide at least some processor quota to the plant, this was minor compared to levels of crab processing at the plant in the immediate pre-implementation years. From a community perspective, the crab rationalization program served to impede what was at the time an important growth area for shore-based processing in Adak.

was also open during the 2012 Pacific cod B season but, according to Icicle management, "there was almost none [Pacific cod], so it didn't work." In 2013, the number of personnel for the Pacific cod A season was approximately half of what was present in 2012 (approximately 110 people). In 2013 Icicle withdrew from Adak, and a new firm, Adak Cod Cooperative LLC, was formed to process Pacific cod at the plant. The Adak Cod Cooperative planned to begin operations with the 2014 A-season. Residents and business owners cited the variability in the processor's activities as a key economic stressor around which it is difficult to plan. City employees cited the loss of steady fish taxes as another stressor with regard to budgeting development activities.

- Adak has a large fuel sales operation in a strategic geography and can provide tangible benefits to vessels fishing in the AI subarea with regard to time savings. These fuel sales directly affect Aleut Enterprise, LLC, (a subsidiary of the Aleut Corporation), which owns the fuel depot. According to Aleut Enterprise personnel contacted as part of this analysis, marine fuel sales account for between 70 and 80 percent of all fuel sales. It was also estimated that fuel sales under the interim final rule (status quo/2011 Steller sea lion protection measures) are down approximately 55 percent and that a reduction in Amendment 80 vessels in Area 542 and Area 543 are substantially affecting the amount of fuel sold in Adak. Finally, personnel said that marine fuel customers are regularly being lost to entities in Unalaska, which are generally cheaper, closer to key open fishing grounds, and convenient to various, continually operating processor facilities. [216]

- Aleut Enterprise, LLC, also owns and operates the local hotel, owns and maintains a substantial amount of housing in Adak (in which it also houses processor personnel), leases almost all commercial and industrial land uses on the island, operates and maintains almost all material infrastructure on the island, is invested in the local processing plant, and directly employs a number of people in the community. Thus, just about every economic aspect of the island is connected to Aleut Enterprise, LLC, and the company can be affected by changes to almost any industrial sector. It is assumed that if Aleut Enterprise, LLC, is affected adversely in one facet of its activities that the other facets will be indirectly affected.[217]

- Port calls can involve crew transfers. At the time of this analysis (February 2013), Alaska Airlines provides reliable and consistent air service to Adak on a large, jet aircraft (Boeing 737). This reliability reportedly makes Adak a preferred location for crew transfers compared to other communities that are serviced by other airlines with smaller aircraft and less reliable schedules. However, Alaska Airlines recently considered not renewing its Essential Air Service contract with the Alaska Department of Transportation, providing an opportunity for regional carrier PenAir to bid on the contract. After substantial community resistance, Alaska Airlines agreed to a one-year contract extension, which is set to expire in the summer of 2013. Fewer port calls or a

[216] Energy costs in Adak are high for a variety of reasons, including inefficiencies inherent in the use of old infrastructure designed and sized to support a military installation with a much higher level of service demand than the contemporary civilian community (EDAW 2008b). TDX Adak Generating LLC (part of the TDX Power family, whose parent company is Tanadgusix Corporation [TDX], the Alaska Native Corporation for St. Paul) is the current utility operator in Adak, having taken over local operations from the City of Adak in 2008. High energy costs are faced by all service providers in Adak.

[217] The Aleut Corporation and Aleut Enterprise, LLC, have stated that the loss of revenue to Aleut Enterprise, Aleut Fisheries, and the Aleut Corporation caused by the interim final rule will almost certainly result in job losses. "The Aleut Entities project that they will be immediately forced to terminate three of their nine employees in Adak, eliminating the primary means of support for approximately seven residents of Adak…" It is also suggested by the Aleut Corporation and Aleut Enterprise, LLC, that the decrease in fuel sales to commercial fishing vessels would drive up fuel costs for the community of Adak and the local utility, causing a corresponding increase in electricity prices, adversely affecting the residents and businesses in Adak, especially during winters when fuel and electricity are at a premium (Aleut Corporation and Aleut Enterprise LLC 2011).

change in processor activity could result in fewer crew transfers and/or altogether decreased need for air travel to and from the island, which could result in changes to air service. Changes in air service could impede the efficient movement of all goods to and from the island, as no barge services Adak and all materials (including commercially caught fish, when the processor is not in operation) are flown in by air, as well as increase air travel costs for residents and visitors.

- As a newer community, Adak has been making an effort to create a "critical mass" of economic activity on the island—anchored by a robust commercial fishery—that can sustain a residential population over the long term. Since providing goods and services to vessels during port calls (including limited provisioning, boat watch services, crane services, and gear storage, among others) comprises a large proportion of economic activity for individual operations, a decrease in economic output could reverberate throughout the community and threaten the progress made to date by Adak with regard to building a stable residential population. Adak residents and business owners contacted as part of this analysis stated that operational instability at the local processor (including a bankruptcy filing in late 2009), the processor's intermittent operation during the bankruptcy and ownership transition period in general, and non-operation during the critical Pacific cod A season processing window in early 2011 specifically, along with changes in fishery management (including the interim final rule), have already detrimentally affected the economic activity of the island. For example, a restaurant and corner store had recently closed, the local entities providing marine logistical services had seen a decrease in activity, and the general store had substantially decreased the amount of merchandise carried. The remaining restaurants on the island are either operating seasonally or in a staggered manner where only one is open at any time, and the government contractors associated with other activities on the island (see below) had decreased in recent years. Additionally, the nationwide recession that occurred between December 2007 and June 2009 decreased birdwatching- and hunting-related tourism to the island.[218]

- Adak was not a Native Village under the Alaska Native Claims Settlement Act (ANCSA), does not have a village tribal government, and is not a CDQ community, so opportunities provided to other communities in the region through these types of institutions and/or history are not present in Adak. Thus, the community is less economically and institutionally diversified and potentially less resilient to adverse fishery changes than a number of other communities in the region that largely rely economically on the commercial fishery. In the words of one city employee, the community is based, "110 percent on fish and fuel." In an effort to diversify, the City of Adak is currently investigating how to implement hydropower within the community, retrofitting dams constructed on the island during its military days, in an effort to cut electricity costs on the island and spur growth. Additionally, the Adak Community Development Corporation (ACDC) has managed a Western Aleutian Islands golden king crab community allocation and has used revenues generated from that allocation to fund fishery development efforts on the island. For example, the ACDC has recently renovated a restaurant from the island's military days and has secured the contract from Icicle to provide food services for processor personnel. Additionally, the ACDC has been purchasing Community Quota Entity (CQE) halibut quota,[219] providing fishermen in the local fleet the opportunity to earn both themselves and the ACDC money by fishing CQE halibut. In recent years, however, CQE halibut quota share prices have been down

[218] The Aleut Corporation and Aleut Enterprise, LLC, are concerned that "the revenue losses to the Aleut Corporation family of companies will severely undercut the tax revenue available to fund local programs and governmental operations, to a degree that will be difficult, if not impossible, for the Adak community to overcome" (Aleut Corporation and Aleut Enterprise LLC 2011).

[219] Although not yet in regulations, the Council has formally approved CQE status for Adak for Area 4B halibut, with codification in regulation expected in 2014.

and the ACDC is reportedly having trouble finding willing sellers, as most current owners are seemingly waiting for the price to increase before selling to the ACDC. In years when a processor was present in Adak, the ACDC ensured that community allocation was processed locally to generate additional local economic activity, essentially increasing the local multiplier effect gained from the allocation.[220]

- Other economic activities on the island, including government-sponsored environmental remediation efforts and activity associated with the Sea-based X-band (SBX) radar facility either do not provide much local economic activity (remediation) or have not provided the economic output originally anticipated (SBX radar).[221] Recent reports suggest that Shell Oil Company may use Adak as a staging area for oil and gas exploration activities offshore of Alaska; however, these activities are in the early planning stages and residents contacted for this analysis stated that, beyond seeing a few executives during the summer months, very little oil and gas support activity has taken place. Again, this serves to reinforce the key importance commercial fisheries have for the community of Adak.

- In addition to potential private sector related impacts that may be experienced in the community as a result of implementation of the proposed Steller sea lion protection measure alternatives, the City of Adak depends heavily on fishery related sources of public revenues. As noted in Section 8.2.11 (and shown in Table 8-43), approximately 30 percent (or about $500,000) of Adak's FY 2013 estimated $1.6 million in total revenues are projected to derive from the community's portion of state shared Fisheries Business and Resource Landing taxes. Further, the City of Adak derives revenues from local taxes (projected to be approximately $750,000 for FY 2013), including a local sales tax, with about one-third of local sales tax revenues estimated to originate from activities associated with the fishing industry; (Adak substituted a raw fish tax that took effect in January 2013, for the sales tax on local ex-vessel sales of fish). Additionally, as discussed in Section 10.3.1.5.3, while most quantitative data on local landings and associated revenues by species are confidential, local processing operations are clearly substantially dependent on Pacific cod, as presumably would be local raw fish tax revenues. In short, the City of Adak appears heavily dependent on both state and local revenues related to Aleutian Islands fishing that are vulnerable to adverse impacts resulting from restrictions on area commercial fishery harvests and, especially for locally generated revenues, Pacific cod harvests.

10.4.3.1.4 Potential Environmental Justice Concerns

In terms of the potential for high and adverse impacts accruing disproportionately to minority populations or low-income populations (which would trigger environmental justice concerns under Executive Order 12898), as of 2010, based on a combination of race and ethnicity, 81.9 percent of Adak's population was composed of minority residents (including 52.5 percent Asian), and 1.7 percent of Adak's population was considered low-income.[222] Although systematically collected demographic and income information on

[220] When the processor was closed, the community allocation was custom-processed in Unalaska.

[221] The SBX radar facility is a $900 million mobile radar station that was originally planned to be based in Adak. A moorage facility has been constructed in Adak, but the SBX radar facility has never put into port there and has spent almost all of its operational history in Hawaii. As of February 2012, the budget for the SBX program was significantly reduced and was relegated to a "limited test support" role.

[222] While technical classifications of residency and the definition of community population have at times been a contentious issue with respect to the fishing industry-related workforce in rural Alaska communities, the CEQ guidance on environmental justice is straightforward. CEQ suggests using demographic data available from the Bureau of the Census to identify the composition of the potentially affected population (CEQ 1997). In terms of Bureau of the Census methodology, the first U.S. decennial census in 1790 established the concept of "usual residence" as the main principle in determining where

individual fishery participants by sector is not readily available, previous work (EDAW 2008a) and a working familiarity with those sectors does allow for at least some generalized characterizations for minority population engagement. Historically, Adak commercial fishing vessel owners and crew have tended to mirror the general population of the community (exclusive of those residents in group quarters housing), with lower Alaska Native representation than seen in other communities in the Aleutians with an unbroken continuity to historic Alaska Native villages.

In Adak, processing workers have tended to be relatively distinct demographically in relation to the rest of the local population; processing workers are overwhelmingly recruited from a labor pool from outside the community, live in group quarters supplied or leased on-site by the locally operating processing company, and have tended to include a high proportion of non-White and non-Alaska Native minority workers.[223] Due to the almost exclusive use of group quarters by processing workers during the U.S. Census 2010, it is possible to estimate the specific minority population(s) within this locally present workforce and compare it to the population of the community residing outside group of group quarters.

Using 2010 Federal census data, both the group quarters residents and non-group quarters residents in Adak represent high minority populations, but the specific demography of these residence type-based groups varies considerably, particularly with respect to relative proportions of Alaska Native and Asian origin residents. Based on a combination of race and ethnicity, 95.9 percent of Adak's group quarters population was composed of minority residents (including 6.0 percent Black/African American, 76.5 percent Asian, 2.3 percent Native Hawaiian or Other Pacific Islander, and 8.7 percent some other race or two or more races, along with 6.9 percent Hispanic of any origin). In contrast, 54.1 percent of Adak's non-group quarters population was composed of minority residents (including 16.5 percent American Indian or Alaska Native, 4.6 percent Asian, and 33.0 percent some other race or two or more races, along with 12.8 percent Hispanic of any origin) (U.S. Census 2012i). Low-income status by housing type is not available within the 2010 or 2006–2010 5-Year American Community Survey census data.

As a result of the demographic characteristics summarized here, if significant adverse impacts were to accrue to the Adak catcher vessel and/or processing sectors due to implementation of the proposed Steller sea lion protection measure alternatives, environmental justice concerns would apply. Different minority populations, however, would be affected by sector-specific impacts.

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people were to be counted and this concept has been followed in all subsequent censuses. Usual residence has been defined as the place where the person lives and sleeps most of the time and is not necessarily the same as the person's voting or legal residence; noncitizens living in the United States are included, regardless of their immigration status. The State of Alaska uses a specific set of criteria for determining residents of the state (i.e., those who qualify for Permanent Fund dividends). The relative importance of state resident classification has been the subject of some debate during Council management decision-making processes over the years, but in practical terms for the purposes of community or social impact assessment, the nature of interaction and relationship between these workers and their worksite community appears to depend more on living quarters configuration (i.e., industrial enclave style or more integrated with the rest of the community), work schedules, and individual decisions regarding the allocation of personal time, among other factors, than it does on formal state residency status for originally non-local workers—whether they be from elsewhere in Alaska or from another state.

[223] Processing worker housing in Adak, historically, was not in "group quarters" or dormitories *per se*, in contrast to what is commonly seen in other seafood processing facilities in southwestern Alaska. As noted in *Comprehensive Baseline Commercial Fishing Community Profiles: Sand Point, Adak, St. Paul and St. George, Alaska – Final Report* (EDAW 2008a), "Adak Fisheries houses its workers in 35 residential housing units leased on a long-term basis through the Aleut Enterprise Corporation and 13 units leased through individual owners. During peak times, 8 to 10 processors may occupy a given housing unit, with two double bunks in each of the two main bedrooms." Housing at the time of the U.S. Census in 2010 had changed, however, to a more regionally common group quarters housing arrangement due to temporary shutdown of the Adak shore-based processor and the presence of an Icicle Seafoods mobile processing platform in the community. When the plant resumed operations (under Icicle Seafoods management), a housing arrangement similar to what was in place under Adak Fisheries management was reinstituted.

10.4.3.2 Atka

10.4.3.2.1 General

Atka was not directly engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery during 2004–2010 through local ownership of participating catcher vessels (of any gear type), local ownership of participating catcher/processors (of any gear type), or processing operations at the local shore-based processor in the community. Atka had essentially no dependency on the AI Atka mackerel fishery, Pacific cod fishery in the AI subarea, or AI pollock fishery through these types of links.

No Atka-owned catcher vessels (of any gear type) fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011, nor were there any Atka-owned catcher/processors (of any gear type) that fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011. The Atka shore-based processor did not process AI Atka mackerel, Pacific cod from the AI subarea, or AI pollock in 2011.

It should be noted, however, that while Atka is not vulnerable to adverse impacts related to proposed Steller sea lion protection measures based on direct historic engagement of the community in the potentially affected commercial fisheries, Atka is vulnerable to at least two other types of potential adverse impacts related to the proposed fishery restrictions: a decrease in revenues to the City of Atka and preclusion of planned entry into the Pacific cod fishery, the latter of which is discussed in the next section. In terms of public revenues, as discussed in Section 8.2.11 (and shown in Table 8-44), of Atka's total estimated revenues of about $920,000 for FY 2012, about $220,000, or roughly one quarter of total revenues, are projected to derive from the community's portion of State shared Fisheries Business and Resource Landing taxes. As detailed in Section 8.2.11, the portion of state shared fishery related taxes that Atka receives is primarily based on fishing activity in the Aleutian Islands area, a portion of which would be subject to restrictions on commercial fishery harvests under the proposed Steller sea lion protection measures; see that section for additional detail.

10.4.3.2.2 Shore-based Processing of Pacific Cod from the AI Subarea

While no shore-based processing of Pacific cod from the AI subarea took place in Atka during 2004–2010 or in 2011, more recently (in 2012) the local processing plant (Atka Pride Seafoods, owned by an equal partnership of the Atka Fishermen's Association and APICDA), which has historically focused on halibut and sablefish processing, began developing Pacific cod processing. According to senior APICDA staff, Pacific cod is seen as the linchpin for the future of processing in the community, an assessment that has led to substantial infrastructure investments by the group. According to interview data, in 2012 APICDA invested approximately $1.5 million in a new dock to allow deep water vessel access, and plans are being made for an additional $12–15 million dollar investment in the plant in 2013 and 2014 to allow for the processing of approximately 400,000 round pounds of Pacific cod per day and construction of a group quarters that could accommodate approximately 50 processing workers. There is also interest in developing processing capacity for Western Aleutian Islands golden king crab at the plant, with both APICDA and the Atxam Corporation (Atka's ANCSA village corporation) having acquired processor quota shares for that species.[224] According to APICDA staff, impediments to crab processing in the

[224] Under the BSAI crab rationalization program, half of the Western Aleutian Islands golden king crab quota shares have a western share landing/processing region designation and half do not. While processors in Adak and Atka, the two communities in the western share landing/processing region, did not qualify for an initial history-based allocation of Western Aleutian Islands golden king crab processor quota shares, some processor quota shares for Western Aleutian Islands golden king crab were subsequently acquired from Unalaska/Dutch Harbor shore-based processors by APICDA and Atxam through a

community have included lack of deep water vessel access (now addressed through the new dock), and the fact that the Western Aleutian Islands golden king crab fishery is essentially a one-vessel fishery with deliveries made approximately once every two weeks during the fishing season, meaning that, for efficiency's sake, other relatively high volume processing needs to take place at the plant to justify both investment in increased processing capacity and retention of a sufficient number of processing workers, with Pacific cod processing seen as the answer to both of the latter needs.

In terms of overall community development, it is an explicit goal of APICDA to have processing occur year-round in Atka. According to APICDA staff, communities in the region with a stable or growing population base and local economy are those communities with a year-round shore-based processing plant, which has driven the targeted investments in Atka. It is assumed that four or five of the existing vessels in the community fleet could fish Pacific cod, but none of the local vessels are higher volume deep water vessels; developing year-round processing and harvesting capacity is an evolving process and will require additional capital investments in Atka, including additional harbor improvements.

To the extent that the proposed Steller sea lion protection measures would lessen the value of the investments made in the community or otherwise impede the evolving development of Pacific cod shore-based processing (and Western Aleutian Islands golden king crab shore-based processing), adverse community impacts could accrue to Atka.

In terms of differentiating potential impacts between the proposed action alternatives, Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions described for Atka and represents similar conditions to those under which the local processor and APICDA have invested and reportedly plan to further invest in local Pacific cod processing-related infrastructure and processing capacity. Accordingly, this alternative would not be expected to result in community-level impacts due to restrictions on the Pacific cod fishery in the AI subarea serving as an impediment for local expansion into Pacific cod processing as a viable economic development and community stabilization strategy comparison to the baseline.

While the processor wholesale value of trawl catcher vessel Pacific cod in the AI is very similar for Alternatives 1, 2, and 3, Alternatives 2 and 3 incorporate area closures on important fishing grounds just to the east of Adak. It is possible, therefore, that for Atka, Alternative 1 may create smaller impediments to Atka's plans to pursue local Pacific cod processing than Alternatives 2 and 3. While little difference is expected in terms of community-level impacts between Alternatives 2 and 3, it is assumed that Alternative 5 (preferred alternative) would have lower community-level adverse impacts than Alternatives 2 and 3 (and be close to those of Alternative 4) based on the results of sector-linked economic analyses presented in Chapter 8, although the quantification of the likely differences between the alternatives is not possible at the community level in general or for Atka in particular. Alternative 6 prohibits retention of Pacific cod in the AI, and should prevent local Pacific cod processing at Atka.

10.4.3.2.3 Potential Environmental Justice Concerns

In terms of the potential for high and adverse impacts accruing disproportionately to minority populations or low-income populations (which would trigger environmental justice concerns under Executive Order 12898), as of 2010, based on a combination of race and ethnicity, 95.1 percent of the community was

divestiture process described elsewhere (AECOM 2010). To date, processing of these shares has variously occurred in Adak or in Unalaska (with the latter occurring under custom processing agreements when processing capacity was otherwise not available in the western share landing/processing region).

composed of minority residents (all of whom identified themselves as American Indian or Alaska Native; no residents of Atka identified themselves as Hispanic). It is unknown what percentage of Atka's residents was considered low income because the information has been suppressed by the U.S. Census due to confidentiality concerns.

As a result of the demographic characteristics summarized here, if significant adverse impacts were to accrue to Atka due to implementation of the proposed Steller sea lion protection measure alternatives, environmental justice concerns would apply.

10.4.3.3 Unalaska

10.4.3.3.1 General

Unalaska was not directly engaged in the AI Atka mackerel fishery or AI pollock fishery during 2004–2010 through local ownership of participating catcher vessels (of any gear type), local ownership of participating catcher/processors (of any gear type), or processing operations at any of the shore-based processors in the community. Unalaska was not directly engaged in the Pacific cod fishery in the AI subarea during 2004–2010 through local ownership of participating catcher vessels, outside of one trawl catcher vessel fishing in Area 541 in 2007 and one non-trawl catcher vessel fishing in Area 542 in 2006, or through local ownership of participating catcher/processors (of any gear type). In other words, Unalaska had virtually no dependency on the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery through these types of links, such that no community-level (or even individual operation-level) impacts related to these sectors would be anticipated to result from any of the proposed action alternatives.

No trawl or non-trawl catcher vessels with Unalaska ownership fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock in 2011, nor were there any trawl or non-trawl catcher/processors with Unalaska ownership that fished AI Atka mackerel, Pacific cod in the AI subarea, or AI pollock. No Unalaska shore-based processors processed AI Atka mackerel or AI pollock in 2011.

Unalaska did have a greater degree of engagement in the AI Atka mackerel fishery and/or the Pacific cod fishery in the AI subarea in two other ways during 2004–2010: (1) through shore-based processing of Pacific cod from the AI subarea and (2) as a port of embarkation and disembarkation for catcher/processors and catcher vessels immediately before and immediately after trips targeting AI Atka mackerel, Pacific cod in the AI subarea, and/or AI pollock. These two types of engagement and associated levels of dependency are considered further in the following sections.

10.4.3.3.2 Shore-based Processing of Pacific Cod from the AI Subarea

During 2004–2010, more than one Unalaska shore-based processor accepted deliveries of Pacific cod from Area 541 in every year except 2009 (when one processor accepted Pacific cod deliveries from Area 541); one Unalaska shore-based processor accepted deliveries of Pacific cod from Area 542 in every year except 2010 (when two processors accepted Pacific cod deliveries from Area 542); and one Unalaska shore-based processor accepted deliveries of Pacific cod from Area 543 in every year except 2007 and 2010 (when no and two processors, respectively, accepted Pacific cod deliveries from Area 543). Despite this continuity of engagement, however, Unalaska shore-based processors would appear to have very little dependency on processing Pacific cod from the AI subarea.

As noted in Section 10.2.5, the only first wholesale gross revenue information for Pacific cod from the AI subarea during 2004–2010 that can be released for Unalaska shore-based processors is for Pacific cod from Area 541 in 2008. In that year, first wholesale gross revenue from Pacific cod from the AI subarea ($146,917) was equivalent to only 0.6 percent of the first wholesale gross revenues of Pacific cod processed at these same plants from other North Pacific management areas in the same year ($24.6 million) and was only 0.1 percent of the first wholesale gross revenues for all groundfish species from all North Pacific management areas processed at those same plants in that same year ($258.8 million); presumably first wholesale gross revenue from Pacific cod from the AI subarea represented a substantially lower percentage of first wholesale gross revenues for all species (groundfish and non-groundfish combined) from all North Pacific fishery management areas processed at those same plants in that same year, although the data that would be required to quantify that presumption are confidential. Further support for the interpretation of the lack of dependency of Unalaska on processing Pacific cod from the AI subarea is that, while specific first wholesale gross revenue figures for other reporting districts within the AI subarea for all years during 2004–2010 are confidential for Unalaska (as are analogous figures for all years other than 2008 within Area 541), in general terms, it is apparent that for at least some years during the 2004–2010 period, the entirety of processing of Pacific cod from the AI subarea in Unalaska resulted from the processing of incidental catch only.

As a result of this apparent lack of dependency of Unalaska on shore-based processing of Pacific cod from the AI subarea, no community-level impacts related to this sector are anticipated for Unalaska under any of the proposed action alternatives. Similarly, although shore-based processing of Pacific cod from the AI subarea did provide revenues to a number of individual processing operations in Unalaska during 2004–2010, no significant impacts at the individual operational level are anticipated under any of the proposed action alternatives. This is due to the low level of dependency of the involved shore-based processing operations and the assumption that any shortfalls of Pacific cod deliveries to Unalaska from the AI subarea would be made up by declines in harvest efforts in the AI subarea being offset by redirection of Pacific cod harvest efforts to other North Pacific fishery management areas (consistent with the redirection assumptions used in the RIR analysis presented in Chapter 8 of this document).

In 2011, two, one, and one Unalaska shore-based processors accepted deliveries of Pacific cod from Areas 541, 542, and 543, respectively. First wholesale gross revenues associated with the processing of these deliveries are confidential.

10.4.3.3.3 Port Calls of Catcher/Processors and Catcher Vessels Participating in the AI Atka Mackerel Fishery and/or the Pacific Cod Fishery in the AI Subarea

As noted in Section 10.4.2, during 2004–2010, Unalaska frequently served as a port of call for catcher/processors (trawl and non-trawl combined) immediately before or after trips targeting AI Atka mackerel and Pacific cod in the AI subarea (32.4 and 36.7 times on an annual average basis, respectively) and for catcher vessels (trawl and non-trawl combined) immediately before or after trips targeting Pacific cod in the AI subarea (33.1 times on an annual average basis), with the analogous data related to catcher vessel AI Atka mackerel being confidential.

As noted in previous sections, Unalaska is the premier support service center for the BSAI fisheries, and there has been substantial public and private investment in support service infrastructure in the community both historically and in recent years. Local infrastructure services include substantial dockage and moorage facilities, crane service, cold storage, and dry storage, among others. Other related services include vessel support businesses, such as fuel, provisioning, welding, hydraulics, mechanical, power, marine hardware, fishing gear sales and service, dry dock, shipping, and boat watch services, among others.

For catcher/processors, while Adak had more port calls related to trips targeting AI Atka mackerel on an annual average basis 2004–2010 than did Unalaska, Unalaska had more port calls related to Pacific cod in the AI subarea, all groundfish trawl combined for the AI subarea, and all groundfish non-trawl combined for the AI subarea than any other community, including Adak. In other words, Unalaska was the major support port for groundfish catcher/processors operating in the AI subarea, as measured by port calls, with the exception of the AI Atka mackerel fishery. For catcher vessels, on an annual average basis 2004–2010, Unalaska was a distant second to Adak in the number of port calls related to targeted Pacific cod in the AI subarea as well as all trawl groundfish trips in the AI subarea, while all non-trawl groundfish trips in the AI subarea were essentially even between the two communities. In relative terms, while the number of Unalaska port calls related to either AI Atka mackerel and Pacific cod from the AI subarea for both catcher/processors and catcher vessels are modest compared to Unalaska port calls related to Pacific cod from all areas or port calls for all groundfish species (both trawl and non-trawl) from all areas, the numbers are not trivial for the community.

In 2011, for catcher/processors (trawl and non-trawl combined), these types of AI Atka mackerel and Pacific cod in the AI subarea related port calls occurred in Unalaska 48 and 15 times, respectively. These figures represent a relative shift of AI Atka mackerel related port calls from Adak to Unalaska compared to annual averages for the baseline years (2004–2010), but both ports declined substantially for the number of port calls for trips targeting Pacific cod from the AI subarea.

For catcher vessels (trawl and non-trawl combined), port calls associated with targeted Pacific cod trips in the AI subarea occurred in Unalaska 17 times in 2011. This, though a substantial decline, represented a relative shift from Adak to Unalaska in overall distribution of these types of port calls; a similar relative shift was seen for trawl vessels targeting all groundfish species in the AI subarea combined, but caution should be used in interpreting these data due to fluctuations in the overall Pacific cod fishery and issues with shore-based processing capacity in Adak in 2011. Analogous data related to catcher vessel AI Atka mackerel port calls are confidential.

In terms of differentiating potential impacts between the proposed action alternatives, Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions described for Unalaska and represents similar conditions to those under which AI Atka mackerel and Pacific cod fisheries in the AI subarea-related port calls were made during the baseline period. Accordingly, this alternative would not be expected to result in community-level impacts due to local changes in support services demand in comparison to the baseline. Alternatives 1 (status quo/interim rule/2011 Steller sea lion protection measures) and 6 (prohibit retention of Atka mackerel, Pacific cod, and pollock from Aleutian Islands management areas) would be expected to represent the largest potential impacts to Unalaska-based support services. However, while impacts would likely be discernible for at least some individual businesses (depending on the overall diversity of the operation's customer base and specifically on relative dependency on the two fisheries most likely directly affected by the alternatives), it is unlikely that community-level impacts would result in Unalaska. This is due to a relatively low level of local dependence on port calls directly associated with the AI Atka mackerel and Pacific cod fisheries in the AI subarea and the presumed ability of Pacific cod catcher vessels and catcher/processors to redirect efforts into the Bering Sea to at least partially offset potential opportunities otherwise foregone in the AI subarea. Based on the proximity and nature of proposed area permanent and/or seasonal closures, Alternative 2 (modified 2011 Steller sea lion protection measures), Alternative 3 (further modified 2011 Steller sea lion protection measures), and Alternative 5 (preferred alternative) would be expected to represent adverse impacts to Unalaska support service sector businesses intermediate between those of Alternatives 1 and 4. While little difference is expected in terms of local support sector-level impacts between Alternatives 2 and 3, it is assumed that Alternative 5 would have lower local support sector-level adverse impacts than Alternatives 2 and 3 (and have effects close to those of Alternative 4) based on the results of sector-linked economic analyses presented in Chapter 8, although

the quantification of the likely differences between the alternatives is not possible at the community level in general or for Unalaska in particular. Further, community-level impacts, including impacts to public revenues, are not anticipated under any of the proposed action alternatives.

10.4.3.3.4 Potential Environmental Justice Concerns

In terms of potential for high and adverse impacts accruing disproportionately to minority populations or low-income populations (which would trigger environmental justice concerns under Executive Order 12898), as of 2010, based on a combination of race and ethnicity, 67.2 percent of Unalaska's population was composed of minority residents (including 32.6 percent Asian), and 11.5 percent of Unalaska's population was considered low-income. Although systematically collected demographic and income information on individual fishery participants by sector is not readily available, previous work (AECOM 2010) and a working familiarity with those sectors does allow for at least some generalized characterizations for minority population engagement. Historically, Unalaska commercial fishing vessels owners and crew, as well as those individuals in the support service sector, have tended to mirror the general population of the community, exclusive of the population segment housed in group quarters, with a lower proportion of Alaska Native representation than seen in the non-group quarters populations of other communities in the Aleutians that have a historical continuity with an Alaska Native village on site.

In Unalaska, seafood processing workers have tended to be relatively distinct demographically in relation to the rest of the local population; processing workers are overwhelmingly recruited from a labor pool from outside the community, live in group quarters supplied on-site by the locally operating processing company, and have tended to include a high proportion of non-White and non-Alaska Native minority workers. Due to the almost exclusive use of group quarters by processing workers in each community during the U.S. Census 2010, it is possible to estimate the specific minority population(s) within this locally present workforce and compare it to the population of the community residing outside group of group quarters.

Using 2010 Federal census data, both the group quarters residents and non-group quarters residents in Unalaska represent high minority populations, but the specific demography of these residence type based groups varies considerably, particularly with respect to relative proportions of Alaska Native and Asian origin residents. Based on a combination of race and ethnicity, 78.1 percent of Unalaska's group quarters population (assumed to be processing workers) was composed of minority residents (including 12.6 percent Black/African American, 1.5 percent American Indian or Alaska Native, 37.7 percent Asian, 3.5 percent Native Hawaiian or Other Pacific Islander, and 15.2 percent some other race or two or more races, along with 21.6 percent Hispanic of any origin). In contrast, 55.5 percent of Unalaska's non-group quarters population (assumed to not be processing workers) was composed of minority residents (including 1.5 percent Black/African American, 10.4 percent American Indian or Alaska Native, 28.0 percent Asian, 1.0 percent Native Hawaiian or Other Pacific Islander, and 10.9 percent some other race or two or more races, along with 9.3 percent Hispanic of any origin) (U.S. Census 2012i). Low-income status by housing type is not available within the 2010 or 2006–2010 5-Year American Community Survey census data.

As a result of the demographic characteristics summarized here, if significant adverse impacts were to accrue to the Unalaska catcher vessels and/or processing sectors due to implementation of the proposed Steller sea lion protection measure alternatives, environmental justice concerns would apply. Different minority populations, however, would be affected by different sector-specific impacts.

10.4.3.4 Seattle-Tacoma CMSA

10.4.3.4.1 General

The Seattle-Tacoma CMSA was not engaged in the AI Atka mackerel fishery through local ownership of non-trawl catcher vessels during 2004–2010 or in 2011. It also was not engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery through being the locale of shore-based processing plants accepting deliveries of AI Atka mackerel, Pacific cod from the AI subarea, or AI pollock during 2004–2010 or in 2011. Otherwise, however, the Seattle-Tacoma CMSA was substantially engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and the AI pollock fishery during 2004–2010, specifically through local ownership of a large proportion of the catcher vessels and catcher/processors participating in these fisheries. Further, based on a general knowledge of the industry, it is assumed that a large proportion of crew members are drawn from the location of catcher vessel and catcher/processor ownership.

Additionally, most, if not all, of the shore-based processing operations in Alaska accepting deliveries of greater than minimal volumes of AI Atka mackerel, Pacific cod from the AI subarea, and/or AI pollock have management offices, if not ownership, located in the Seattle-Tacoma CMSA. These firms typically recruit processing workers for their Alaska plants from the Seattle-Tacoma CMSA among other locations in the Pacific Northwest.

As a result of these factors, if the implementation of the Steller sea lion protection measures proposed action alternatives were to result in substantial numbers of catcher vessels and/or catcher/processors exiting the affected fisheries with accompanying loss of employment for skippers and crew, these impacts would be largely concentrated in the Seattle-Tacoma CMSA (with the exception of vessels and employment related to the non-trawl catcher vessel sector, the ownership of which is more geographically dispersed).[225] Similarly, if there were to be substantial dislocations of shore-based processor employment as a result of implementation of the proposed action alternatives, while the positions would be lost at plants in Alaska coastal communities, the origin of these workers is typically in the greater Seattle area or the Pacific Northwest where, presumably, at least a number of workers' extended families continue to reside when the processors are resident in enclave-style plant facilities in rural Alaska.

It is important to note, however, that adverse changes to the locally present fishery sectors that would potentially accrue under any of the proposed action alternatives would not result in significant community-level impacts in the greater Seattle area. This is due to the relative lack of dependency on the potentially directly affected fisheries, given the scale and diversity of the greater Seattle socioeconomic context, and would not vary between the proposed action alternatives. On the other hand, adverse impacts may be discernible at the individual vessel operations level and would vary based on specific operational diversity, including relative dependency on the AI Atka mackerel and Pacific cod fisheries in the AI subarea, and the ability of operations to successfully redeploy away from closed areas to offset, at least in part, revenues that would otherwise be foregone under a particular alternative.

In terms of differentiating potential impacts between the proposed action alternatives, Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions described for the various Seattle-owned fleet sectors and represents similar conditions to those under which AI Atka mackerel and Pacific cod fisheries in the AI subarea-related catcher vessel and catcher/processor activities took place during the baseline period. Accordingly, this alternative would

[225] Table 8-17 in Chapter 8 of this EIS provides estimated crew sizes for trawl and non-trawl catcher/processors and catcher vessels operating in the Atka mackerel and Pacific cod fisheries in the AI subarea.

not be expected to result in local sector-level impacts in comparison to the baseline. Alternatives 1 (status quo/interim rule/2011 Steller sea lion protection measures) and 6 (prohibit retention of Atka mackerel, Pacific cod, and pollock from Aleutian Island management areas) would be expected to represent the largest potential impacts to Seattle-owned vessels. However, while impacts would likely be discernible for at least some individual operations (depending on the overall catcher vessel or catcher/processor fishery "portfolio" and specifically on relative dependency on the two fisheries most likely directly affected by the alternatives), it is highly unlikely that community-level impacts would result in Seattle. This is due to a low level of local dependence of a major metropolitan area on vessel activities directly associated with the AI Atka mackerel and Pacific cod fisheries in the AI subarea and the presumed ability of catcher vessels and catcher/processors to successfully redeploy, particularly in the Pacific cod fishery, to at least partially offset potential opportunities that would otherwise be foregone in the AI subarea. Based on the nature of proposed area permanent and/or seasonal closures, Alternative 2 (modified 2011 Steller sea lion protection measures), Alternative 3 (further modified 2011 Steller sea lion protection measures), and Alternative 5 (preferred alternative) would be expected to represent adverse impacts to Seattle fleet sectors intermediate between those of Alternatives 1 and 4. While little difference is expected in terms of local fleet sector-level impacts between Alternatives 2 and 3, it is assumed that Alternative 5 would have lower local fleet sector-level adverse impacts than Alternatives 2 and 3 (but higher than those of Alternative 4) based on the results of sector-linked economic analyses presented in Chapter 8. Further, community-level impacts are not anticipated under any of the proposed action alternatives. The following sections describe the relative dependency of the locally engaged fleets.

10.4.3.4.2 Trawl Catcher Vessels

Trawl catcher vessels participating in the AI Atka mackerel fishery during 2004–2010 in Areas 541, 542, and/or 543 were exclusively owned in the Seattle-Tacoma CMSA, except for one vessel with Oregon ownership that fished in Area 541 in 2007. The degree of dependency of these catcher vessels on the AI Atka mackerel fishery cannot be quantified, as all ex-vessel gross revenue data are confidential. Of the Seattle-Tacoma CMSA-owned trawl catcher vessels that fished AI Atka mackerel 2004–2010, in 2007 one also fished for groundfish off of Washington, Oregon, and/or California in the same year it fished AI Atka mackerel, while three and one trawl catcher vessels did so in 2008 and 2009, respectively.

All trawl catcher vessels participating in the AI Atka mackerel fishery in 2011 in Areas 541, 542, and/or 543 were exclusively owned in the Seattle-Tacoma CMSA. The degree of dependency of these catcher vessels on the AI Atka mackerel fishery cannot be quantified, as all ex-vessel gross revenue data are confidential. Of the Seattle-Tacoma CMSA-owned trawl catcher vessels that fished AI Atka mackerel in 2011, one also fished for groundfish off of Washington, Oregon, and/or California in that same year.

Trawl catcher vessels participating in the AI pollock fishery during 2004–2010 were exclusively owned in the Seattle-Tacoma CMSA. The degree of dependency of these catcher vessels on the AI pollock fishery cannot be quantified, as all ex-vessel gross revenue data are confidential. The only trawl catcher vessel participating in the AI pollock fishery in more than one year during 2004–2010 also fished groundfish off of the Washington, Oregon, and/or California coast each year it participated in the AI pollock fishery. No trawl catcher vessels participated in the AI pollock fishery in 2011.

Trawl catcher vessels participating in the Pacific cod fishery in Area 543 during 2004–2010 were exclusively owned in the Seattle-Tacoma CMSA. The large majority of trawl catcher vessels participating in the Pacific cod fishery in Areas 541 and 542 during 2004–2010 were owned in the Seattle-Tacoma CMSA. Ex-vessel revenue figures for these vessels are confidential except for 2007 and 2009 for Area 542.

- In 2007, ex-vessel gross revenues for Pacific cod from Area 542 ($0.8 million) were equivalent to approximately 14.8 percent of the ex-vessel revenues for Pacific cod caught in other waters off of Alaska[226] ($5.3 million) by these same vessels, approximately 1.34 percent of the ex-vessel revenues for all groundfish caught in North Pacific management areas ($58.6 million) by these same vessels, and approximately 1.23 percent of the ex-vessel revenues for all species caught in North Pacific management areas ($64.1 million) by these same vessels for that same year.
- In 2009, ex-vessel gross revenues for Pacific cod from Area 542 ($0.8 million) were equivalent to approximately 58.5 percent of the ex-vessel revenues for Pacific cod caught in other waters off of Alaska ($1.4 million) by these same vessels, approximately 2.86 percent of the ex-vessel revenues for all groundfish caught in North Pacific management areas ($27.6 million) by these same vessels, and approximately 2.64 percent of the ex-vessel revenues for all species caught in North Pacific management areas ($29.9 million) by these same vessels for that same year.

These relative dependency figures do not take into account any ex-vessel gross revenues from fisheries off of Washington, Oregon, or California that these vessels may have been engaged in during these same years. No trawl catcher vessels owned in the Seattle-Tacoma CMSA that fished for Pacific cod in the AI subarea in 2004 or 2005 fished groundfish off of Washington, Oregon, and/or California during those same years; however, in each year 2006–2010 between two and five Seattle-Tacoma CMSA-owned vessels did so. Ex-vessel gross revenues for groundfish harvested off of Washington, Oregon, and/or California for these vessels are confidential for each year except for 2007 ($1.5 million spread among four vessels) and 2008 ($3.1 million spread among five vessels).[227]

All trawl catcher vessels participating in the Pacific cod fishery in 2011 in Areas 541, 542, and/or 543 were exclusively owned in the Seattle-Tacoma CMSA. (One of these vessels also participated in the groundfish fishery off of Washington, Oregon, and/or California in 2011.)

10.4.3.4.3 Non-trawl Catcher Vessels

No Seattle-Tacoma CMSA-owned non-trawl catcher vessels participated in the AI Atka mackerel fishery or the AI pollock fishery during 2004–2010. No Seattle-Tacoma CMSA-owned non-trawl catcher vessels participated in the AI Atka mackerel fishery or the AI pollock fishery in 2011.

On an annual average basis during 2004–2010, less than one Seattle-Tacoma CMSA-owned non-trawl catcher vessel participated in the Pacific cod fishery in Area 541, 542, or 543 (although the one unique Seattle-Tacoma CMSA-owned non-trawl catcher vessel that fished in Area 543 during 2004–2010 was the only non-trawl vessel to do so). The degree of dependency of these non-trawl catcher vessels on the Pacific cod fishery in the AI subarea cannot be quantified as all ex-vessel gross revenue data are confidential. Only one of these Seattle-Tacoma CMSA-owned non-trawl catcher vessels that fished for Pacific cod in the AI subarea 2004–2010 also fished for groundfish off of Washington, Oregon, and/or California in the same year, and then only in 2007.[228]

[226] "Other waters off of Alaska" refers to the Bering Sea subarea, the Gulf of Alaska, and all Alaska state waters.

[227] Outside of vessels owned in the Seattle-Tacoma CMSA, trawl catcher vessels participating in both the Pacific cod fishery in the AI subarea and the groundfish fishery off of Washington, Oregon, and/or California in the same year 2004–2010 were limited to one Bellingham, Washington, owned vessel each year 2007–2010, one Newport, Oregon, owned vessel in 2008 only, and one Siletz, Oregon, owned vessel in 2008 only.

[228] Outside of vessels owned in the Seattle-Tacoma CMSA, non-trawl catcher vessels participating in both the Pacific cod fishery in the AI subarea and the groundfish fishery off of Washington, Oregon, and/or California in the same year 2004–2010 were limited to one Anacortes, Washington, owned vessel in 2008 only, one Garibaldi, Oregon, owned vessel in 2007 only, and one Wheatland, California, owned vessel in 2008 only.

The only non-trawl catcher vessel participating in the Pacific cod fishery in 2011 in the AI subarea was owned in the Seattle-Tacoma CMSA. This vessel fished Pacific cod in Area 542 in 2011; no non-trawl vessels fished Pacific cod in Areas 541 or 543 in 2011. (This same vessel also participated in the groundfish fishery off of Washington, Oregon, and/or California in 2011.)

10.4.3.4.4 Trawl Catcher/Processors

During 2004–2010, all but one trawl catcher/processor that participated in the AI Atka mackerel fishery; the Pacific cod fishery in each of Areas 541, 542, or 543; and/or the AI pollock fishery were exclusively owned in the Seattle-Tacoma CMSA (and in the city of Seattle within the Seattle-Tacoma CMSA), with the single exception in each area being a unique trawl catcher/processor with Rockland, Maine ownership. The degree of dependency of the Seattle-Tacoma CMSA trawl catcher/processors on the AI Atka mackerel fishery or the Pacific cod fishery in the AI subarea cannot be quantified as all first wholesale gross revenue data are confidential, due to sector totals having been provided in the RIR (Chapter 8 of this document). The degree of dependency of the Seattle-Tacoma CMSA trawl catcher/processors on the AI pollock fishery cannot be quantified as all first wholesale gross revenue data are confidential due to the low number of participating entities. None of the trawl catcher/processors that participated in the AI Atka mackerel fishery and/or the Pacific cod fishery in the AI subarea also participated in the groundfish fishery off of Washington, Oregon, and/or California in the same year 2004–2010. The only trawl catcher/processor that participated more than one year 2004–2010 in the AI pollock fishery did not participate in the AI pollock fishery and the groundfish fishery off of Washington, Oregon, and/or California in the same years.

All trawl catcher/processors participating in the AI Atka mackerel fishery and/or Pacific cod fishery in 2011 in Areas 541, 542, and/or 543 were exclusively owned in the Seattle-Tacoma CMSA. No trawl catcher/processors participated in the AI pollock fishery in 2011. None of these trawl catcher/processors participated in the AI Atka mackerel fishery and/or Pacific cod fishery in the AI subarea and the groundfish fishery off of Washington, Oregon, and/or California in 2011.

10.4.3.4.5 Non-trawl Catcher/Processors

On an annual average basis during 2004–2010, less than one non-trawl catcher/processor participated in the AI Atka mackerel fishery in Areas 541, 542, and 543, but every unique non-trawl catcher/processor that did so had Seattle-Tacoma CMSA ownership (and in the city of Seattle within the Seattle-Tacoma CMSA). The degree of dependency of the Seattle-Tacoma CMSA non-trawl catcher/processors on the AI Atka mackerel fishery cannot be quantified as all first wholesale gross revenue data are confidential. None of these non-trawl catcher/processors participated in both the AI Atka mackerel fishery and the groundfish fishery off of Washington, Oregon, and/or California in the same year 2004–2010.

No non-trawl catcher/processors owned in the Seattle-Tacoma CMSA or elsewhere participated in the AI Atka mackerel fishery in 2011.

No non-trawl catcher/processors owned in the Seattle-Tacoma CMSA or elsewhere participated in the AI pollock fishery 2004–2010 or in 2011.

With the exception of two unique non-trawl catcher/processors with Lynden, Washington, ownership with at least some participation in Areas 541 and 542, all non-trawl catcher/processors that were engaged in the Pacific cod fishery in Areas 541, 542, and 543 during 2004–2010 were exclusively owned in the Seattle-Tacoma CMSA (and with the large majority of those owned in the city of Seattle within the

Seattle-Tacoma CMSA). The degree of dependency of the Seattle-Tacoma CMSA non-trawl catcher/processors on the Pacific cod fishery in the AI subarea cannot be quantified as all first wholesale gross revenue data are confidential. None of these non-trawl catcher/processors participated in both the Pacific cod fishery in the AI subarea and the groundfish fishery off of Washington, Oregon, and/or California in the same year 2004–2010.

All non-trawl catcher/processors participating in the Pacific cod fishery in 2011 in Areas 541, 542, and/or 543 were exclusively owned in the Seattle-Tacoma CMSA (and in the city of Seattle within the Seattle-Tacoma CMSA). None of these non-trawl catcher/processors participated in both the Pacific cod fishery in the AI subarea and the groundfish fishery off of Washington, Oregon, and/or California in 2011.

10.4.3.4.6 Potential Environmental Justice Concerns

In terms of absolute numbers (based on existing participation/engagement patterns), whatever adverse impacts related to trawl catcher vessel, trawl catcher/processor, and non-trawl catcher/processor direct employment and income that would occur as the result of implementation of proposed Steller sea lion protection measures would disproportionately accrue to the Seattle-Tacoma CMSA. As was the case for Alaska communities, it is assumed that catcher vessel skippers and crew are more or less representative of the general population of community of vessel ownership, so environmental justice concerns would not be likely. For catcher/processor crew, however, a different set of assumptions are used.

While no new information on catcher/processor crew demographics was compiled for this community impact analysis, an earlier Steller sea lion protection measure social impact assessment (NMFS 2001) indicated that the workforce population of the BSAI groundfish catcher/processor sector was substantially different demographically from the overall of the greater Seattle area, based on 2000 U.S. Census data for the community and on industry self-reported information for the same year. While the greater Seattle area was 23 percent minority, the catcher/processor workforce was 63 percent minority, according to industry data. The minority component of the various entity workforces within this sector were largely composed of individuals of Hispanic or Asian ancestry. Industry provided data indicated that, in 2000, individual reporting entities were anywhere from about 36 percent minority to about 86 percent minority. Given a general knowledge of the industry, it is assumed that while these demographic patterns may have changed in terms of proportions of specific minority groups represented in the workforce, the overall predominance of a minority workforce for BSAI groundfish catcher/processor crew is still representative of existing conditions. As a result of the demographic characteristics summarized here, if significant adverse impacts were to accrue to the Seattle-based catcher/processor workforce due to implementation of the proposed Steller sea lion protection measure alternatives, environmental justice concerns would apply.

10.4.3.5 Other Directly Engaged Alaska Communities

10.4.3.5.1 General

In addition to the communities profiled as being the most engaged in the potentially affected AI Atka mackerel fishery, Pacific cod fishery in the AI subarea, and/or AI pollock fishery, activities directly related to these fisheries did take place during 2004–2010 in a number of other Alaska communities, as measured by the participation of locally owned vessels and/or shore-based processors operating in the community, including Akutan, Anchor Point, Anchorage, Cordova, Homer, Juneau, Ketchikan, King Cove, Kodiak, Petersburg, Sand Point, Seward, and St. Paul. The specific nature and degree of engagement varies by community and sector. Excluding engagement resulting from participation in the CDQ program, this engagement may be summarized as follows:

- No other Alaska community was engaged in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, or the AI pollock fishery during 2004–2010 or in 2011 through local ownership of catcher/processors of any gear type.
- No other Alaska community was engaged in the AI Atka mackerel fishery or the AI pollock fishery during 2004–2010 or in 2011 through local ownership of catcher vessels (of any gear type) or local operations of a shore-based processor with one apparent exception. AI Atka mackerel does show up in the data for one shore-based processor in Akutan in 2010 only. While the volume and value of this specific processing are confidential, it is assumed that this reported AI Atka mackerel processing was the result of either the processing of incidental catch or "noise" in the data.
- No trawl or non-trawl catcher vessels with ownership in any Alaska community were engaged in the Pacific cod fishery in Area 543 during 2004–2010 or in 2011.
- Anchorage, Kodiak, Petersburg, and Sand Point were engaged in the Pacific cod fishery in the AI subarea through local ownership of trawl catcher vessels during 2004–2010, but this engagement was minimal.
    - Anchorage engagement consisted of one locally owned trawl catcher vessel fishing in Area 542 in 2007 only.
    - Kodiak engagement consisted of one locally owned trawl catcher vessel fishing in Area 541 in 2008 only.
    - Petersburg engagement consisted of one locally owned trawl catcher vessel fishing in Area 541 in 2009 and 2010 (with the same unique vessel involved both years), and one locally owned trawl catcher vessel fishing in Area 542 in 2009.
    - Sand Point engagement consisted of two locally owned trawl catcher vessels fishing in Area 541 in 2009 and two locally owned trawl catcher vessels fishing in Area 542 in 2009.

  In short, none of these communities had more than one unique trawl catcher vessel with local ownership engaged in the Pacific cod fishery in Area 541 or 542 during 2004–2010, with the exception of Sand Point, which had two such vessels; none of these communities had trawl catcher vessels with local ownership engaged in the Pacific cod fishery in Area 541 or 542 for more than one year during 2004–2010, with the exception of Petersburg, which had one such vessel participating in two years during 2004–2010. None of these communities had any locally owned vessels participating in 2010, the last year of the baseline period, with the exception of Petersburg. This low level of engagement in absolute terms, lack of continuity of engagement, and the low level of engagement relative to the size and activities of the local fleets in these communities, the scale of the fishing sector in the local economies of these communities, and the size of the local economy in these communities, suggests a lack of community dependency on this fleet sector engagement in the AI subarea.

  No trawl catcher vessels with Anchorage, Kodiak, Petersburg, or Sand Point ownership were engaged in the Pacific cod fishery in the AI subarea in 2011.
- Anchor Point, Anchorage, Cordova, Juneau, Ketchikan, and Kodiak were engaged in the Pacific cod fishery in the AI subarea through local ownership of non-trawl catcher vessels during 2004–2010, but this engagement was minimal.
    - Anchor Point engagement consisted of one locally owned non-trawl catcher vessel fishing in Area 541 in 2008 only.

- Anchorage engagement consisted of one locally owned non-trawl catcher vessel fishing in Area 541 in 2006 and 2007, one locally owned non-trawl catcher vessel fishing in Area 542 in 2006 and 2007, three locally owned non-trawl catcher vessels fishing in Area 541 in 2008, and three locally owned non-trawl catcher vessels fishing in Area 542 in 2008. In total, three unique Anchorage-owned non-trawl catcher vessels fished in Area 541 during 2006–2008 and three unique Anchorage-owned non-trawl catcher vessels fished in Area 542 during 2006–2008.
- Cordova engagement consisted of one locally owned non-trawl catcher vessel fishing in Area 541 in 2009 only.
- Juneau engagement consisted of one locally owned non-trawl catcher vessel fishing in Area 541 in 2008 and one locally owned non-trawl catcher vessel fishing in Area 542 in 2008.
- Ketchikan engagement consisted of one locally owned non-trawl catcher vessel fishing in Area 541 in 2006 and one locally owned non-trawl catcher vessel fishing in Area 542 in 2006.
- Kodiak engagement consisted of one locally owned non-trawl catcher vessel fishing in Area 541 in 2006, 2007, 2008, and 2009 (with the same unique vessel involved each year) and one locally owned non-trawl catcher vessel fishing in Area 542 in 2006 and 2008 (with the same unique vessel involved both years).

In short, none of these communities had more than one unique non-trawl catcher vessel with local ownership engaged in the Pacific cod fishery in Area 541 or 542 during 2004–2010, with the exception of Anchorage, which had three such vessels; none of these communities had trawl catcher vessels with local ownership engaged in the Pacific cod fishery in Area 541 or 542 for more than one year during 2004–2010, with the exception of Anchorage and Kodiak, which had at least minimal engagement in three and four years, respectively, during 2004–2010. This low level of engagement in absolute terms, lack of continuity of engagement, and the low level of engagement relative to the size and activities of the local fleets in these communities, the scale of the fishing sector in the local economies of these communities, and the size of the local economy in these communities, suggests a lack of community dependency on this fleet sector engagement in the AI subarea.

No non-trawl catcher vessels with Anchor Point, Anchorage, Cordova, Juneau, Ketchikan, or Kodiak ownership were engaged in the Pacific cod fishery in the AI subarea in 2011.

- Akutan, Homer, King Cove, Kodiak, Sand Point, Seward, and St. Paul were engaged in the Pacific cod fishery in the AI subarea through local shore-based processing during 2004–2010, but, with the exception of Akutan, this engagement can be characterized as minimal.
  - Akutan engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541 each year during 2005–2010 (with the same unique processor involved each year) and one shore-based processor accepting deliveries of Pacific cod from Area 542 in 2008 and 2009 (with the same unique processor involved both years). All processing volume and first wholesale gross revenue figures for Akutan are confidential.
  - For Homer, King Cove, Kodiak, Sand Point, Seward, and St. Paul, while specific processing volume and value figures are confidential for these communities, the rough order of magnitude of Pacific cod from the AI subarea processed in these communities

during these years suggests that this was processing of incidental catch only. In terms of specific engagement:

- Homer engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541 in 2008 and 2010 (with the same unique processor involved both years).
- King Cove engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541 each year 2004–2006 and 2008–2010 (with the same unique processor involved each year); one shore-based processor accepting deliveries of Pacific cod from Area 542 in 2008; and one shore-based processor accepting deliveries of Pacific cod from Area 543 in 2004, 2009, and 2010 (with the same unique processor involved each year).
- Kodiak engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541 in 2009 and 2010 (with the same unique processor involved both years), and one shore-based processor accepting deliveries of Pacific cod from Area 542 in 2010.
- Sand Point engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541 in 2004, 2006, and 2008 (with the same unique processor involved each year).
- Seward engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541 in 2004 only.
- St. Paul engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 542 in 2008 only.

In short, patterns of shore-based processing of Pacific cod from the AI subarea during 2004–2010 in Homer, King Cove, Kodiak, Sand Point, Seward, and St. Paul indicate a low level of engagement in absolute terms, and the low level of engagement relative to the size and activities of the local shore-based processing sector in these communities suggests a lack of community dependency on this sector engagement in the Pacific cod fishery in the AI subarea (as does the lack of year-to-year continuity of processing during 2004–2010 for all of these communities, with no communities processing Pacific cod from the AI subarea every year, two communities only processing in one year, and two communities only processing in two years).

- Shore-based processing of Pacific cod from the AI subarea in 2011 occurred in Akutan, Anchorage, and King Cove (in addition to the profiled communities of Adak and Unalaska), but, with the exception of Akutan, this engagement can be characterized as minimal.
  - Akutan engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541. All processing volume and first wholesale gross revenue figures for Akutan are confidential.
  - For Anchorage and King Cove, while specific processing volume and value figures are confidential for these communities, the rough order of magnitude of Pacific cod from the AI subarea processed in these communities in 2011 follows the pattern seen during 2004–2010, suggesting that this was processing of incidental catch only. In terms of specific engagement:
    - Anchorage engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541.

- King Cove engagement consisted of one shore-based processor accepting deliveries of Pacific cod from Area 541.

- Port call information regarding AI Atka mackerel and/or Pacific cod in the AI subarea for Alaska communities other than Adak and Unalaska, or even for all Alaska communities outside of Adak and Unalaska combined, cannot be disclosed due to confidentiality restrictions.

Given the lack of dependence on the AI Atka mackerel and AI pollock fisheries, and relative lack of dependence on the Pacific cod fishery in the AI subarea across all sectors during 2004–2010, community-level impacts would not be anticipated for Anchor Point, Anchorage, Cordova, Homer, Juneau, Ketchikan, King Cove, Kodiak, Petersburg, Sand Point, Seward, or St. Paul under any of the proposed action alternatives. Significant individual operation-level impacts would appear unlikely in any of these communities under any of the proposed action alternatives due to low level of engagement in the relevant fisheries, a lack of year-to-year continuity of engagement during 2004–2010, and/or a lack of engagement in the most recent baseline years.

In the case of Akutan, engagement during 2004–2010 was limited to shore-based processing of AI Atka mackerel and Pacific cod from the AI subarea. While processing volumes and first wholesale gross revenues are confidential, it is assumed that the reported AI Atka mackerel processing was the result of either the processing of incidental catch or "noise" in the data. In the case of processing of Pacific cod from the AI subarea, a general knowledge of the industry would suggest that Akutan shore-based processing operations are focused to a much greater degree (and with a much higher level of dependence) on other fisheries, including Pacific cod from areas outside of the AI subarea.

10.4.3.5.2 Potential Environmental Justice Concerns

Given the anticipated lack of community-level impacts, or significant sector-level impacts, within the communities of Akutan, Anchor Point, Anchorage, Cordova, Homer, Juneau, Ketchikan, King Cove, Kodiak, Petersburg, Sand Point, Seward, or St. Paul, no environmental justice-related concerns are anticipated for these communities.

10.4.3.6 CDQ Communities

10.4.3.6.1 General

As noted in Section 8.2.7, six CDQ groups[229] representing 65 Alaska Native communities scattered throughout the BSAI management area participated in the AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and the AI pollock fishery during 2004–2010. The nature and degree of engagement of the CDQ groups in these fisheries varied by group, but included CDQ ownership; royalties derived from CDQ use; direct participation through ownership interest in catcher vessel, catcher/processor, mothership, and/or shore-based processing; ownership interest in fishery support sector enterprises; and fishery infrastructure investment, among others.

CDQ dependency regarding AI Atka mackerel and/or Pacific cod in the AI subarea is a function of the vulnerability of CDQ groups to changes based on the relative value of CDQ shares in the potentially

[229] The CDQ entities include the Aleutian Pribilof Island Community Development Association, the Bristol Bay Economic Development Corporation, the Central Bering Sea Fishermen's Association, the Coastal Villages Region Fund, the Norton Sound Economic Development Corporation, and the Yukon Delta Fisheries Development Association.

affected fisheries in contrast to the relative value of CDQ shares held in all other CDQ fisheries as well as the value of other investments made by CDQ groups. As noted in Section 8.2.7, Atka mackerel CDQ allocations are not distributed equally among the six CDQ groups, with APICDA receiving 30 percent of the allotment; the Bristol Bay Economic Development Corporation (BBEDC), the Coastal Villages Region Fund (CVRF), the Norton Sound Economic Development Corporation (NSEDC), and the Yukon Delta Fisheries Development Association (YDFDA) receiving allotments ranging from 14 and 18 percent each; and the Central Bering Sea Fishermen's Association (CBSFA) receiving an 8 percent allotment. In contrast, Pacific cod CDQ was distributed relatively evenly among five of the groups, with APICDA receiving a 15 percent allocation, three other groups receiving allocations ranging between 18 and 21 percent each, while the CBSFA received a 9 percent allocation.

Impacts to CDQ communities related to the fluctuations in CDQ royalty income for any given species are potentially minimized by relative diversity (or potentially amplified by the relative lack of diversity) of their portfolio of CDQ holdings (and therefore potential CDQ royalties) across all CDQ species and relative dependence of individual CDQ groups on royalty income as opposed to direct income based on other investments. As noted in Section 8.2.7, about 25 percent of all CDQ revenues in 2011 came from royalties; direct income exceeded royalty income for the first time in 2004 and that pattern has continued over time, with direct income ranging from 55 percent to 83 percent of annual total income in each of the intervening years, but detailed quantitative information that would allow calculation of the relative overall importance of royalties derived from an individual species harvested in a specific geographic area, such as the various areas proposed for fishing restrictions under the different alternatives, for any given CDQ group is not readily available. For groups holding Pacific cod CDQ, potential impacts related to the proposed Steller sea lion protection measures may be minimized to some degree by the fact that CDQ Pacific cod allocations are not specific to the AI subarea and may be harvested elsewhere in the Bering Sea; however, specifically how successful this redeployment of CDQ Pacific cod harvesters would be is unknown and, as discussed in Section 8.3.3, this type of impact minimization strategy of large-scale redeployment would be less possible for holders of CDQ of AI Atka mackerel. In short, it is not possible with existing information to differentiate between the impacts of the different proposed action alternatives on CDQ groups beyond the qualitative rankings provided in Section 8.15. it is assumed, however, that overall such impacts would be most directly tied to AI Atka mackerel CDQ holdings. In absolute terms, APICDA would be the group most vulnerable to adverse impacts to AI Atka mackerel related royalties, all things being equal, simply as a result of their allocation being over 50 percent greater than any other CDQ group.

As noted in Section 8.7.2, APICDA and YDFDA each received 14 percent of the CDQ allocation of AI pollock, three other groups received allocations ranging between 21 and 24 percent each, while the CBSFA received a 5 percent allocation. As noted in that same discussion, however, no AI pollock CDQ allocation has been fished in recent years.

For CDQ groups holding AI pollock CDQ, no adverse impacts would be expected to result from any of the proposed Steller sea lion protection measure alternatives. Under Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures), Steller sea lion protection measure restrictions on the AI pollock fishery would remain unchanged from those in place during the baseline years (2004 through 2010). Alternatives 2, 3, 4, and 5, however, include provisions for a pollock fishery that may allow more opportunity than Alternative 1 to harvest the CDQ (and Aleut Corporation) pollock allocations. While the level of impact in terms of revenue increases to the involved CDQ groups that would accompany the proposed harvest opportunity increases is unknown, these impacts would be beneficial. While Alternative 6 prohibits the retention of pollock in the Aleutian Islands, CDQ pollock allocations from the Aleutian Islands have been rolled over to the Bering Sea in recent years.

10.4.3.6.2 Potential Environmental Justice Concerns

The CDQ program was created to provide the opportunity for the 65 authorized coastal communities to participate in the BSAI fisheries either directly or indirectly and use the funds obtained through participation to improve local infrastructure or otherwise increase economic development. Each CDQ entity is allocated a percentage of the annual BSAI catch limit, depending on species and management area.

To be eligible for the CDQ program, each village had to:

- Be located within 50 nautical miles of the Bering Sea coast;
- Conduct at least half of their commercial or subsistence activities in the BSAI subregions;
- Be recognized as a "native village" according to the definition in ANCSA Public Law 92-203 Sec. 3: Communities either having at least 25 or more Alaska Native residents as of the 1970 census, or, for those communities with less than 25 residents, the majority of the residents being Alaska Native; and
- Have no previously established harvesting or processing capacity sufficient to support substantial participation in the BSAI groundfish industry.[230]

Table 10-25 provides information on total population and proportion of Alaska Native residents for the 65 communities that are a part of the CDQ program. As shown, with few exceptions, these communities remain predominantly populated by Alaska Native residents. The single CDQ community in the Aleutian/Pribilof Islands region where Alaska Natives residents do not make up at least three-quarters of the population is Akutan, where a large seafood processor-related population cohort is present. Akutan is also the only community in the CDQ program that has established processing capacity that substantially participates in the BSAI groundfish industry on an ongoing basis. Only three other CDQ communities have less-than-majority Alaska Native populations (Egegik, King Salmon, and Naknek), with the histories and present-day demographic contexts of those communities differing widely.

Table 10-25 CDQ Communities, Total Population, and Proportion of Alaska Native Residents, 2010

Community	Total Population	Proportion of Alaska Native Residents (%)
Akutan	1,027	5.5
Alakanuk	677	95.0
Aleknagik	219	75.8
Atka	61	95.1
Brevig Mission	388	91.5
Chefornak	418	95.7
Chevak	938	94.9
Clark's Point	62	88.7
Dillingham	2,329	55.9

[230] The City of Akutan, the site of a large shore-based processing plant, was initially determined ineligible for inclusion in the CDQ program. The community successfully appealed this determination, however, based on a low level of socioeconomic interaction between the processing plant and the rest of the community, which was reflected in the geographic separation of processing plant (originally developed as an industrial enclave) and the traditional village of Akutan proper. More recently, the plant and the community have become less isolated from one another, both in terms of physical (road) connectivity and socioeconomic interactions, but Akutan remains demographically and socioeconomically distinct from other CDQ communities due to the local presence of a large shore-based processor.

Community	Total Population	Proportion of Alaska Native Residents (%)
Diomede	115	92.2
Eek	296	97.6
Egegik	109	39.5
Ekuk	(data unavailable)	(data unavailable)
Ekwok	115	90.4
Elim	330	89.7
Emmonak	762	96.3
False Pass	35	77.1
Gambell	681	95.6
Golovin	156	93.0
Goodnews Bay	243	94.7
Grayling	194	87.1
Hooper Bay	1,093	94.6
King Salmon	374	27.8
Kipnuk	639	97.7
Kongiganak	439	95.7
Kotlik	577	97.2
Koyuk	332	88.9
Kwigillingok	321	95.0
Levelock	69	84.1
Manokotak	442	95.7
Mekoryuk	191	93.2
Mountain Village	813	91.9
Naknek	544	30.3
Napakiak	354	97.2
Napaskiak	405	96.5
Nelson Lagoon	52	75.0
Newtok	354	96.1
Nightmute	280	94.6
Nikolski	18	94.4
Nome	3,598	54.8
Nunam Iqua	187	91.4
Oscarville	70	91.4
Pilot Point	68	66.2
Platinum	61	88.5
Port Heiden	102	83.3
Portage Creek	2	50.0
Quinhagak	669	93.4
Savoonga	671	94.5
Scammon Bay	474	99.4
Shaktoolik	251	96.0
South Naknek	79	82.3
St. George	102	88.2
St. Michael	401	92.0
St. Paul Island	479	82.3
Stebbins	556	95.3
Teller	229	96.1
Togiak	817	78.0
Toksook Bay	590	92.0
Tuntutuliak	408	95.8
Tununak	327	94.5
Twin Hills	74	94.6
Ugashik	12	58.3
Unalakleet	688	77.3
Wales	145	84.8
White Mountain	190	81.6

Source: (ADCED 2012f)

With regard to income and economic indicators, Section 8.2.7 notes that these CDQ communities are typically remote and have few commercially valuable natural assets with which to develop and sustain a viable, diversified economic base. Unemployment rates are generally high and many communities are economically depressed. However, CDQ entities do regularly reinvest in their member communities, and construction projects, infrastructure improvement projects, BSAI commercial fishery participation, and dividends do provide some economic opportunity. Poverty rate trends are presented by CDQ entity in Table 10-26, with each entry representing an aggregation of each entity's member communities. These data are compiled and weighted by member community by the Western Alaska Community Development Association (WACDA) in their annual CDQ Sector Report. Data from the 2005–2009 American Community Survey were used in WACDA's latest report and, while not the most currently available data for individual communities, remain valuable due to the weighting done by WACDA. In all cases, the poverty rate is higher than for the state as a whole in 2005–2009 (9.6 percent).

Table 10-26 CDQ Community Poverty Rate, by CDQ Entity, 1990–2009 (percentage)

CDQ Entity	1990	2000	2005–2009 Average
APICDA	18.4	30.8	13.0
BBEDC	17.8	17.7	16.2
CBSFA	7.1	11.9	17.5
CVRF	40.5	26.2	31.0
NSEDC	22.2	17.6	32.9
YDFDA	24.1	26.1	26.6

Source: Western Alaska Community Development Association 2011

As a result of the demographic and poverty characteristics summarized here, if significant adverse impacts were to accrue to the revenue of CDQ entities due to implementation of the proposed Steller sea lion protection measure alternatives, environmental justice concerns would apply.

10.4.3.7 Aleut Corporation

10.4.3.7.1 General

The Aleut Corporation is a regional Native Corporation established in 1972 under the terms of ANCSA. It is included in this discussion because the Aleut Corporation is a major investor in the community of Adak, having formed Aleut Enterprise, LLC, in 1997 to help privatize the navy base at Adak, as discussed in Section 8.2.8. The Aleut Corporation, either directly or through Aleut Enterprise, LLC, Aleut Real Estate, LLC, and/or Aleut Fisheries, LLC, owns and manages many of the industrial, commercial, and residential structures on the island and interfaces with the commercial fishery in Adak in a variety of ways, including, among others, through marine fuel sales, leasing space to commercial fishery operations and fishery support services, and operating the local hotel that is regularly used by commercial fishing vessel operators as temporary lodging for crew during crew transfers and by the local shore-based processor as longer-term housing for processing workers, as described in Section 8.2.8 and Section 10.4.3.1.

The Aleut Corporation is not a CDQ group, so it does not directly collect royalties from CDQ use, nor does it directly participate in the AI Atka mackerel fishery and/or Pacific cod fishery through ownership interest in catcher vessel, catcher/processor, mothership, and/or shore-based processing. However, as discussed in Section 10.2.7, the Aleut Corporation since 2005 has received a DFA for AI pollock. Similar to CDQ allocations, the AI pollock DFA was made to the Aleut Corporation specifically for the purposes of economic development in a particular community or communities (in this case, Adak). Unlike the

relationship of CDQ groups to their constituents, however, the constituents of the Aleut Corporation (that is, its shareholders) are not defined by residence in an individual community or limited set of communities receiving the allocation. In other words, the benefit of economic development in Adak that may result from the AI pollock DFA to the Aleut Corporation was intended to benefit the Aleut Corporation (and therefore its shareholders, very few of whom are residents of Adak) and not the residents of Adak in general (although economic development in Adak would clearly be of benefit to the community as a whole).[231] In that way, the AI pollock DFA is not only different from the CDQ model,[232] it also varies from the ACDC model, whereby that entity, which receives the community's annual Western Aleutian Islands golden king crab allocation under the BSAI crab rationalization program, is intended to specifically benefit the community of Adak and all its residents.

Potential impacts to Aleut Corporation revenues and employment that could result from implementation of the Steller sea lion protection measures proposed action alternatives are discussed in detail in Sections 8.2.8 and 10.4.3.1 and are not recapitulated here. In general, however, aside from Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures), which would continue Steller sea lion protection measures relative to the AI pollock fishery that have been in place since the DFA was granted to the Aleut Corporation and therefore be neither beneficial nor adverse compared to baseline conditions, and Alternative 6, which prohibits retention of AI pollock, and is therefore adverse compared to the baseline conditions, Alternatives 2, 3, 4, and 5 may open new areas for AI pollock fishery compared to baseline conditions, which would likely create a revenue stream from the DFA for the Aleut Corporation. Available information, however, does not allow for a quantitative comparison of the beneficial impacts of Alternatives 2, 3, 4, and 5 to Aleut Corporation shareholders related to potential increases in AI pollock-related revenues, due to the complexity of Aleut Corporation holdings and the range of business practices and decisions that would translate to shareholder benefits, including share and dividend values. It is assumed, however, based on relative scale and location areas opened, that Alternatives 3 and 4 would have the same impacts (as they have identical pollock measures) and would be the alternatives with the greatest potential AI pollock-related beneficial impacts for the Aleut Corporation and its shareholders. Alternative 5 (preferred alternative) may have AI pollock-related beneficial impacts for the Aleut Corporation and its shareholders that would be slightly less than those under Alternatives 3 and 4 (based on specific geographic area closures and potential constraints for local harvests that could result from the additional percentage catch limits included under Alternative 5). All things being equal, potential beneficial impacts would continue to decrease under Alternative 2, Alternative 2 Protective Option, and Alternative 1, in that order, based on the size and location of areas that would remain closed to pollock harvests.

On the other hand, all of the alternatives under consideration in this analysis, other than Alternative 4 (modified 2010 Steller sea lion protection measures), may restrict AI Atka mackerel and Pacific cod fishing in the AI subarea compared to baseline conditions, which would likely decrease revenues to the Aleut Corporation in a number of ways, particularly through the corporation's investments and operations on Adak. Although a quantitative comparison of the impacts of the different proposed action alternatives on Aleut Corporation shareholders is not possible given existing information, the adverse impacts likely

[231] According to data supplied by the Aleut Corporation, of the 3,523 voting shareholders enumerated in 2011, 14 (or approximately 0.4 percent of all voting shareholders) resided in Adak. In 2010, the population of Adak was 326, of which approximately 109 were likely to be permanent residents based on housing type, as discussed in Section 10.3.1.3. This would equate to approximately 4.3 percent of all Adak residents being Aleut Corporation voting shareholders and approximately 12.8 percent of all Adak permanent residents being Aleut Corporation voting shareholders.

[232] It should be noted, however, that while the interests of the Aleut Corporation may not always be identical to the interests of the community of Adak, this is also often the case with CDQ groups and their constituent communities as well. That is, the interests of a CDQ group that represents multiple communities may not always be identical to the interests of each of its individual member communities at any given time. All CDQ groups, with the exception of the CBSFA (St. Paul), represent more than one community.

to accrue to shareholders resulting from restrictions on the AI Atka mackerel fishery and the Pacific cod fishery in the AI subarea would parallel those described for the community of Adak (given that Adak is the nexus for Aleut Corporation involvement in those fisheries). Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions for these fisheries and would not be expected to result in adverse impacts to Aleut Corporation shareholders based on restrictions on the AI Atka mackerel fishery or the Pacific cod fishery in the AI subarea in comparison to the baseline.[233] Alternative 6 would be expected to have the greatest adverse impacts due to the prohibition on retention of Atka mackerel or Pacific cod in the Aleutian Islands management areas. Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures) would be expected to have the second greatest adverse impacts to Aleut Corporation shareholders compared to the 2004–2010 baseline conditions, due to the significant restrictions being placed on AI Atka mackerel and Pacific cod harvesting in the AI subarea. Based on the proximity to Adak and the nature of proposed area permanent and/or seasonal closures, Alternative 2 (modified 2011 Steller sea lion protection measures), Alternative 3 (further modified 2011 Steller sea lion protection measures), and Alternative 5 would be expected to have a level of adverse impacts to Aleut Corporation shareholders intermediate between those of Alternatives 1 and 4. It is assumed that Alternative 5 would have lower adverse impacts to Aleut Corporation shareholders than Alternatives 2 and 3 (and close to those of Alternative 4) based on the sector-linked economic analyses presented in Chapter 8, although the quantification of the likely differences between the alternatives for Aleut Corporation shareholders is not possible. In general, while adverse impacts to Aleut Corporation shareholders would likely track with adverse impacts to the community of Adak, the magnitude of those impacts on individual shareholders presumably would be a function of the Aleut Corporation's level of dependence on other ventures relative to those in Adak specifically.

As a Native Corporation, the Aleut Corporation provides dividends to its shareholders and makes a number of contributions to charitable and non-profit organizations, with the majority of the contributions going to the Aleut Foundation. As described in Section 8.2.8, the Aleut Foundation is a non-profit, formed to "support the economic and social needs of the Aleut people with scholarships for postsecondary education, career development, and burial assistance for shareholders of the Aleut Corporation." Potential community impacts associated with the effects of the alternatives on the Aleut Corporation (beyond direct revenue impacts described in Section 8.2.8 and community-based employment impacts that have presumably been captured in the previous individual community discussions in this chapter) would be determined in part by (1) the communities of residence of the shareholders of the Aleut Corporation and (2) the location of the recipients of benefits provided by the Aleut Foundation.

Based on data provided by the Aleut Corporation,[234] Table 10-27 provides the 2012 location of voting shareholders by community of residence within the Aleutian/Pribilof region, Figure 10-10 provides a breakdown of location of shareholder residences within Alaska, and Figure 10-11 provides a breakdown of shareholder residences by state. For several of the communities within the Aleutian/Pribilof region, shareholders represent a substantial portion of the overall community population, but in absolute terms, many more of the 3,523 shareholders live outside of the region than live within the region.

[233] Alternatives 2, 3, 4, and 5 provide for potential increased harvesting opportunities of AI pollock compared to 2004–2010 baseline conditions, which could result in beneficial community-level impacts for Adak, as described in Section 10.4.5.3. Alternative 1 would not change potential AI pollock harvesting opportunities compared to 2004–2010 baseline conditions, so neither beneficial nor adverse community-level impacts related to this fishery are anticipated for any community. Alternative 6 restricts opportunities of harvesting AI pollock compared to the baseline, and thus has adverse impacts compared to the baseline.

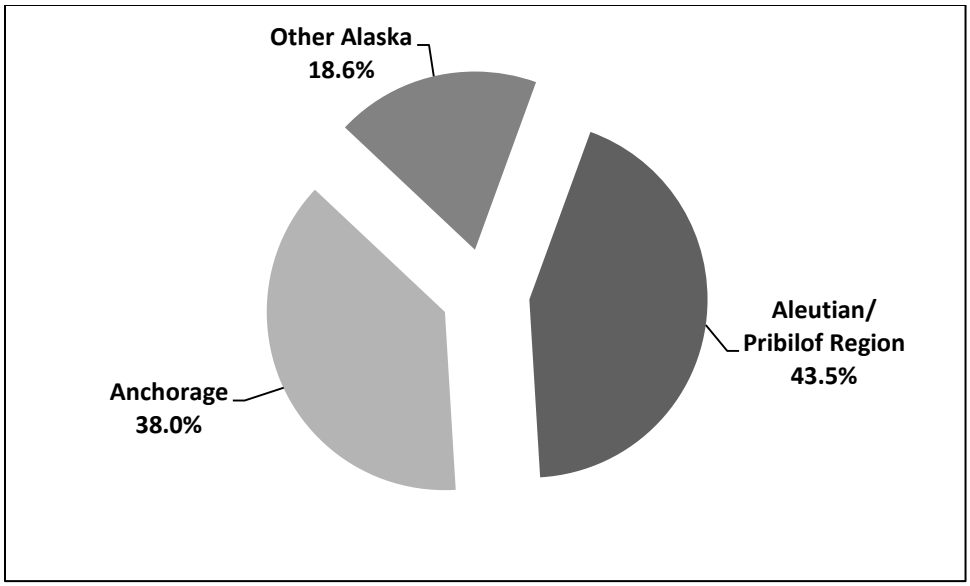
[234] See Section 8.2.8: Angela Bourdukofsky, Shareholder Relations Manager, Aleut Corporation. Spreadsheet of voting shareholder residences supplied December 6, 2012.

According to its 2012 annual report, in FY 2012 the Aleut Corporation contributed $1.1 million to charitable and not-for-profit organizations that benefit shareholders and their descendants, of which $1.0 million was given to the Aleut Foundation. In FY 2012, Aleut Foundation benefits included award of 247 student scholarships, provision of community development training programs in Sand Point and St. Paul attended by 52 persons, funding for training of two individuals at the Southwest Alaska Vocational and Education Center for subsequent job placement, sponsorship of two participants in the First Alaskans Institute Summer Intern Program, and funding for nine high school students to attend the Future Leaders Summit (Aleut Corporation 2012). According to Aleut Corporation staff, shareholders are equally eligible for benefits administered by the Aleut Foundation, regardless of residence location.

Table 10-27 Aleut Corporation Shareholders in Aleutian/Pribilof Region, by Community of Residence, 2012

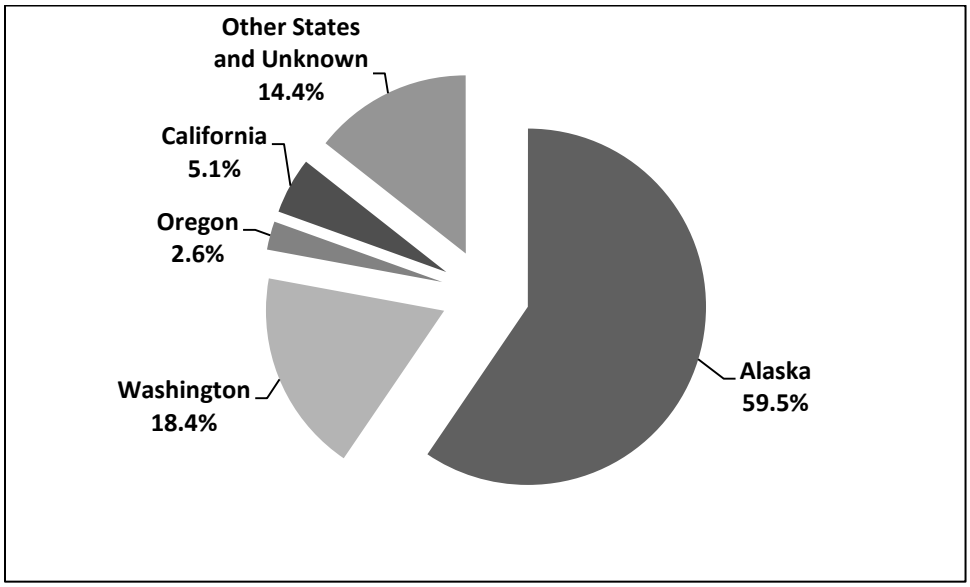
Community	Number of Shareholders (2012)	Community Shareholders as a Percent of all Shareholders within Region	Total Community Population (2011 estimate*)	Shareholders as a Percent of Total Community Population
Adak	14	1.5%	331	4.2%
Akutan	43	4.7%	1,040	4.1%
Atka	40	4.4%	58	69.0%
Cold Bay	5	0.5%	95	5.3%
False Pass	9	1.0%	37	24.3%
King Cove	188	20.6%	948	19.8%
Nelson Lagoon	34	3.7%	45	75.6%
Nikolski	12	1.3%	16	75.0%
Sand Point	193	21.2%	1,016	19.0%
St George	45	4.9%	97	46.4%
St Paul	204	22.4%	481	42.4%
Unalaska/Dutch Harbor	125	13.7%	4,364	2.9%
Total Aleutian/Pribilof Region	912	100.0%	NA	NA

*Note: 2011 population estimates from Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, http://commerce.alaska.gov/dca/commdb/CF_CIS.htm, accessed 13 February 2013.
Source: Spreadsheet of voting shareholder residences supplied by Aleut Corporation December 6, 2012.



Source: Spreadsheet of voting shareholder residences supplied by Aleut Corporation December 6, 2012.

Figure 10-10 Aleut Corporation Shareholders in Alaska, by Region of Residence, 2012



Source: Spreadsheet of voting shareholder residences supplied by Aleut Corporation December 6, 2012.

Figure 10-11 Aleut Corporation Shareholders, by State of Residence, 2012

In community impact assessment terms, Aleut Corporation shareholders represent a "community of interest" (or "interest-based community") rather than a "community of place" (or "place-based community"). Shareholders, whatever their geographic community of residence, share a common interest in the success of the Aleut Corporation; the gains or losses of the Aleut Corporation resulting from Steller sea lion protection measure alternatives would be felt by shareholders in a number communities around the country.

10.4.3.7.2 Potential Environmental Justice Concerns

As a result of ANCSA, shares in the Aleut Corporation were initially issued to persons who were at least one-fourth Alaska Native. While a complex set of rules governs how shares can be distributed and inherited, it is assumed that the vast majority of Aleut Corporation shareholders continue to identify as Alaska Native. By definition, shareholders of the Aleut Corporation are a minority population for the purposes of environmental justice analysis. While as a group not limited to a contemporary place-based community, shareholders do ultimately share what were originally place-based or, perhaps more accurately, place-associated cultural and kinship ties (which, of course, qualified them [or the people from whom they have inherited shares] to become shareholders in the first place).

Thus, if significant adverse impacts were to accrue to Aleut Corporation shareholders (or, in the case of recipients of benefits of the Aleut Foundation, Aleut Corporation shareholders and their descendants) due to implementation of the proposed Steller sea lion protection measure alternatives, environmental justice concerns would apply. As noted in Section 8.2.8, the Aleut Corporation shareholders and the beneficiaries of its charitable works may be affected by actions affecting the restrictions on fishing in the Aleutian Islands in several ways; actions may affect the volume of fuel sales by the Aleut Enterprise Corporation, they may affect the Aleut Enterprise Corporation lease payments from the rental of the processing plant at Adak, they may affect the value of the Aleut Real Estate corporation real estate holdings on the island and its rental income from island properties, and they may make it possible for the Aleut Corporation to obtain royalty income from its rights to the DFA of AI pollock. Preliminary comments from 2011 suggest that interim management decisions in the Aleutian Islands associated with Steller sea lion protection measures have already affected net revenues for Aleut Enterprise, LLC.[235]

10.4.4 Risks to Fishing Community Sustained Participation

As described in Section 10.1.2.3, National Standard 8 specifies the term “sustained participation” as meaning continued access to the fishery within the constraints of the condition of the resource. Based on the analysis presented in Chapter 8, as well as information presented in earlier sections of this chapter, the only community for which sustained participation in the directly affected fisheries is potentially at risk is Adak. This is due to its unique combination of multiple types of engagement, as well as its degree of dependence, vulnerability, and lack of resilience resulting from its particular history, geography, and limited range of other specific fishery and general economic sector engagement options. The risk to sustained participation is multi-faceted and includes risks to Adak’s efforts to build and retain a locally owned catcher vessel fleet; its ability to retain stable, continuously operating local shore-based processing; its ability to remain an important port for catcher vessel and catcher/processor support activities, including fuel services; and its ability to generate sufficient fishing-specific revenues to justify continued or allow new municipal and private sector (especially Aleut Corporation) investments in infrastructure to foster commercial fisheries development, among other factors.

10.4.5 Potential Community-Level Beneficial Impacts

Potential community-level beneficial impacts could accrue through changes to subsistence-related activities, a redistribution of fishing effort between communities, or changes that may allow more

[235] In addition to SSL-protection-measure-related restrictions, sales of fuel by Aleut Enterprise LLC were also likely reduced by disruption in Japanese trade as a result of the earthquake and subsequent tsunami in Sendai, the loss of equipment due to a fire in Adak, and costs related to environmental clean-up activities (Aleut Corporation 2011).

opportunity to harvest the CDQ and Aleut Corporation AI pollock allocations as a result of implementation of the proposed action alternatives when compared to baseline conditions. These are addressed in separate subsections below. Additionally, as noted in Section 8.2.10, an improvement in the health of the Western distinct population segment of Steller sea lions as a result of implementation of the Steller sea lion protection measures could result in increased existence value for the species but, given the lack of geographic/community focus of the beneficiaries of that increased value, this issue is not further considered in this section.

10.4.5.1 Subsistence-Related Activities

For the purposes of this analysis, the discussion of potential impacts to subsistence-related activities is split into three sections: subsistence use of Steller sea lions[236]; subsistence use of Atka mackerel, Pacific cod, and/or pollock; and indirect impacts on other subsistence activities. It is important to note that while subsistence use of other resources is open to a broader spectrum of residents of coastal Alaskan communities, the take of marine mammals is restricted to the Alaska Native portion of the population under the terms of the Marine Mammal Protection Act of 1972 (as reauthorized in 1994 and amended through 2007; the specific subsistence exemption for Alaska Natives is found in Section 101 [16 U.S.C. 1371]). Therefore, any subsistence impacts to Stellar sea lions would be concentrated among Alaska Native residents of the relevant communities.

10.4.5.1.1 Steller Sea Lion Subsistence Related Activities

This section presents the recent historical subsistence harvest of Steller sea lions in Atka and Adak and assesses the potential effects of the proposed alternatives upon Steller sea lion subsistence harvest and use. The overall conclusion is that, even if a causal linkage exists between the commercial AI Atka mackerel fishery, the Pacific cod fishery in the AI subarea, and/or the AI pollock fishery and declining Steller sea lion populations, the short-term effects of the proposed alternatives on subsistence activities are likely to be negligible or only slightly positive. Alternatives that reduce the commercial AI subarea groundfish harvest will logically have neutral or positive effects upon Steller sea lion populations. Whether this will increase the subsistence use of the Steller sea lion resource, however, is not clear from the available information. The proposed alternatives, to the extent that they achieve the stated objectives of assisting in the recovery of Steller sea lion populations and given that they do not restrict existing opportunities or abilities to take Steller sea lions for subsistence purposes, will have no negative effects upon subsistence uses of Steller sea lions.

If it is assumed that the proposed alternatives will have potential effects on the population of Steller sea lions, it is probable that, in the short term, any effects on subsistence would be small in magnitude. Even relatively large changes in Steller sea lion populations may not be accompanied by changes in the rate of subsistence use, for the reasons discussed below. Although subsistence harvest is, to some degree, necessarily related to the total population (and density) of animals to be taken, other factors also affect the rate of harvest, especially at low population levels. Unfortunately, little is known about these relationships, so the threshold at which at population is no longer perceived as “low” is not clear, and no systematic information exists on changes in cultural preferences for, and uses of, traditional foods. Thus, the possibility remains that subsistence use of sea lions would increase in direct proportion to any increase in Steller sea lion population, although that does not appear to be the most likely case from the information available.

[236] Section 8.2.9 of Chapter 8 of this EIS also includes a discussion of Steller sea lion subsistence practices.

Subsistence methods and trends in the AI subarea

Steller sea lions are taken by a number of methods throughout the year. Hunting for sea lions is a relatively specialized subsistence activity, and a relatively small core of highly productive hunters from a limited number of households account for most of the harvest. Once harvested, sea lion is widely distributed among a much wider range of households. Methods of subsistence take in the Aleutians and Pribilof Islands have been documented by the Alaska Department of Fish and Game (ADF&G) (Wolfe & Mishler 1994). Methods vary between the Pribilofs and the Aleutians (and within each region) but, in general, sea lion harvest in the Aleutian Chain (Atka, Unalaska, Akutan, and Nikolski) occurs mostly from skiffs in open water, and hunters target both sexes. When skiff travel is risky or for a change of pace, sea lion hunting is also done from concealed shore stations. Aleutian Chain hunters will concentrate effort near haulout locations and reportedly take more female animals and more older adult male animals than do Pribilof Island hunters.[237] Seasonality of sea lion harvest is quite variable and appears to be dependent on sea lion abundance and distribution.

Statewide, there has been a decline in subsistence harvest of Steller sea lions since 1992. Harvest levels declined sharply between 1992 and 1995, with harvests generally leveling off between 1996 and 2008, although the estimated take for 2008 (the most recent year for which data are available) was the lowest recorded in the data since 1992, representing approximately 27 percent of the total take in 1992. The number of hunters statewide also declined during this time period, falling from a 5-year average of 131 hunters from 1992–1996, to 57 hunters in 2008.

In Atka, however, the number households participating in sea lion harvests increased between 1992 and 2003 (from eight to 19, respectively), with 10 households hunting in 2008. Annual mean harvests tend to fluctuate with no clear trend, ranging from 2.0 to 7.1 per successful hunter in Atka (Wolfe, Fall, and Riedel 2009). The relative importance of Steller sea lion harvest to Atkans may be gauged, at least in part, by data from 1994 that indicated that of the estimated 37,307 total edible pounds of community subsistence harvest, 8,700 edible pounds, or 23.3 percent of the total edible pounds, came from Steller sea lions (Alaska Department of Fish and Game 2012d). More recent data indicate the importance of sharing Steller sea lion subsistence products to Atkans; in 2008, an estimated 40 percent of the households in Atka harvested Steller sea lions, 70 percent received Steller sea lion products, and 60 percent gave away sea lion products (Wolfe, Fall, and Riedel 2009). Sharing of subsistence products is known to occur between residents of Atka and residents of other communities in the region, including the Pribilof Island communities. Table 10-28 presents information on annual total subsistence take of Steller sea lions in Atka for the years 1992–2008.

Subsistence information for Adak is not as developed due to its relatively recent re-establishment as a civilian community; household-level subsistence surveys conducted by ADF&G did not occur in Adak until the early 2000s. Thus, a comprehensive subsistence baseline for Adak has not been established and it is unknown at this time what percentage of the overall subsistence foods total can be attributed to Steller sea lion subsistence products. Since 2003, total Steller sea lion harvests in Adak have ranged from 1 to 4 individual animals, as shown in Table 10-28. In 2008, only 2 households were referred to ADF&G surveyors; both of these households reported harvesting Steller sea lions. Both of these households used, hunted, harvested, and gave away Steller sea lion in 2008 (Wolfe, Fall, and Riedel 2009).

[237] Pribilof hunters are reported to take more male "yearlings" and typically hunt beach sites, with land hunting preferred to skiff hunting due, at least in part, to "a 100 percent recovery rate" of harvested animals. Some hunting of animals in the water from land does reportedly occur in the Pribilofs, with animals retrieved as they wash ashore or near enough to shore to permit land-based retrieval efforts. While reports would indicate that retrieval of the animal can occur up to three days later without unacceptable degradation, recovery rates are still not 100 percent for animals taken in the water when hunted from shore sites.

Table 10-28 Estimated Community Harvest of Steller Sea Lions, Atka and Adak, 1992–2008 (number of animals)

Year	Atka			Adak		
	Harvest	Struck/ Lost	Total Take	Harvest	Struck/ Lost	Total Take
1992	28.6	9.9	38.5	--	--	--
1993	25.1	0.0	25.1	--	--	--
1994	45.5	8.7	54.2	--	--	--
1995	40.0	0.0	40.0	--	--	--
1996	17.3	0.0	17.3	--	--	--
1997	12.2	0.0	12.2	--	--	--
1998	16.8	0.0	16.8	--	--	--
1999	NA	NA	NA	--	--	--
2000	16.8	0.0	16.8	--	--	--
2001	33.3	11.7	45.0	--	--	--
2002	73.5	12.0	85.5	--	--	--
2003	68.8	12.8	81.6	1.0	0.0	1.0
2004	50.7	12.7	63.3	2.0	1.0	3.0
2005	54.9	6.1	61.0	4.0	0.0	4.0
2006	52.0	14.0	66.0	0.0	0.0	0.0
2007	46.0	8.0	54.0	0.0	0.0	0.0
2008	35.0	0.0	35.0	4.0	0.0	4.0

Source: Wolfe et al. 2009

Possible linkage between population decline and declines in subsistence

ADF&G has tried to address the possible linkage between the decline in the overall Steller sea lion population and the decrease in the statewide sea lion subsistence harvest seen between 1992 and 1998. They note that the total number of sea lions harvested has decreased and that this is associated with an equivalent decrease in the number of people hunting sea lions. The apparent rate of hunter success, however, increased substantially in 2008 (87.7 percent). ADF&G states (Wolfe et al. 2009:86–89):

> … there are probably a variety of local factors related to the year-to-year changes in the number of households hunting sea lions in particular communities, including seasonal hunting conditions, local food needs, and personal circumstances of hunters.

Additionally,

> Declines in the numbers of sea lion hunters occurred at a time when sea lions became increasingly harder to find in local hunting areas and consequently more difficult and expensive to hunt. … 67.3% of the Aleutian Island hunters and 55.3% of Kodiak Island hunters reported taking "more time and effort" in hunting sea lions in 2000 compared with 1995–1999.

Further,

> In addition to these factors, it is quite likely that some sea lion hunters chose to reduce their hunting activity because of perceived problems with sea lion populations. Hunters commonly are astute observers of the condition and health of local sea lion stocks. Some portion of the decline in hunting effort during the early to mid 1990s probably reflected hunters choosing not to hunt in order to help conserve sea lion populations.

In earlier documents, ADF&G had also suggested that another factor may be the increased availability of seasonal wage employment in local communities (presumably including work in the groundfish fisheries). Some hunters may be choosing to work rather than to hunt, as a conscious economic choice of time allocation (Wolfe and Mishler 1997; Wolfe and Mishler 1998). This explanation is not stressed as much in subsequent reports, being included in the phrase "… personal circumstances of hunters" (Wolfe et al. 2009:86). It should be noted that hunting Steller sea lions does require a considerable amount of effort and, in most cases, the cooperation of several people, so that time management and allocation could be a substantial factor. An additional possible contribution to a decrease in sea lion subsistence harvest would be a cultural change in taste, so that the consumptive demand for sea lion may have decreased, but no information exists on this possible factor. As noted in Section 8.2.9, publicity about declining stocks and the listing of the animals has apparently been causing widespread misapprehension among subsistence hunters that it is illegal for them to take sea lions; it should be acknowledged that uncertainty about hunting regulations may affect the reporting of harvest, but no information exists on this possible factor as well.

This information provides some support for a direct relationship between the overall Steller sea lion population and the level of subsistence harvest. Such support is not definitive, however, and other factors cannot be excluded. The weighting of factors is also not possible from the evidence available. It does appear that present Steller sea lion harvest methods are likely to be more successful, and certainly more efficient, when resource populations (and density) are higher. In general, the more abundant a subsistence resource is, the more heavily it is used. Thus, while there is clearly some relationship between the Steller sea lion population level and subsistence harvest from that population, the strength of that relationship cannot be determined given other factors in play. This lack of information, both in terms of precise measurement as well as in terms of causal linkages, is not an uncommon problem when examining a wide range of human behavior; behaviors are often "over-determined" in the sense that the same behavior can have several "causes," and sometimes the same "causes" can have different results.

In the case of Atka, an additional complication should be noted, which is the population of potential subsistence hunters has also been changing in recent years. As shown in Table 10-29, between 2000 and 2010, the population of Atka declined from 92 (46 males and 46 females) to 61 (36 males and 25 females). In terms of a potential loss of subsistence hunters, Steller sea lion hunting has traditionally been a largely male pursuit; from 2000 to 2010, the number of males between 10 and 24 years of age in Atka increased from 7 to 12 individuals and the number of males 50 years of age and older stayed the same (13 individuals in each case). Males aged 25 to 49 years, however, likely to be among those in their prime hunting years, declined from 18 individuals in 2000 to 8 individuals in 2010. The specific influence of this age cohort decline on Steller sea lion subsistence take levels in Atka is unknown, however, without more detailed information about local hunting patterns, particularly given the range of year-to-year variation in subsistence total take by Atkans over the longer span of 1992–2008 shown in Table 10-28 (including a number of low-take years that occurred when the population of the community was higher) and a lack of knowledge about the hunting histories and practices of the specific individuals present in the community in 2000 compared to those present in 2010, particularly given that, in a small community, the presence or absence of even a few key individuals could have a marked influence on overall community take levels.

Table 10-29 Atka Population 2000 and 2010, by Age, Range, and Sex

Age Range	2000			2010		
	Male	Female	Both Sexes	Male	Female	Both Sexes
0 to 9 years	7	4	11	2	5	7
10 to 14 years	4	6	10	5	2	7
15 to 19 years	2	6	8	5	0	5
20 to 24 years	1	5	6	2	2	4
25 to 29 years	3	1	4	1	3	4
30 to 34 years	3	3	6	1	2	3
35 to 39 years	4	4	8	2	0	2
40 to 44 years	5	4	9	3	1	4
45 to 49 years	3	3	6	1	1	2
50 to 54 years	4	6	10	4	5	9
55 to 59 years	2	0	2	2	2	4
60 to 64 years	3	1	4	4	1	5
65 to 69 years	1	1	2	1	0	1
70 to 74 years	2	2	4	2	0	2
75 to 79 years	1	0	1	1	0	1
80 years and over	1	0	1	0	1	1
Total	46	46	92	36	25	61

Source: (U.S. Census 2012c)

Impacts of alternatives

If Atka mackerel and Pacific cod fishery removal of prey may have an adverse effect on (causing jeopardy[238] for) the western distinct population segment of Steller sea lions as found in an earlier EA/RIR (NMFS 2010), then it is possible that a decrease in fishing for these species relative to the baseline conditions may result in positive Steller sea lion population effects.[239] This, in turn, could have neutral or positive effects in terms of subsistence use of Steller sea lions.

Given the current depressed population of Steller sea lions in the Central and Western Aleutian Islands, it is not clear that an improvement in their population would be reflected in increased subsistence take. A number of other variables, such as negotiated agreements, and/or other cultural or social variables that may influence long-term subsistence trends may be at work as well. Thus, the potential subsistence effects of restricting Atka mackerel and Pacific cod fishing compared to the baseline period are either neutral or slightly positive.

Given the lack of availability of precise information, it is not possible to distinguish degrees of subsistence impact among the action alternatives, either to order them or to determine whether such impacts would rise to a level of significance. In general, somewhat positive effects could result if reductions in groundfish harvest would lead to increased sea lion populations, and if higher sea lion populations would result in benefits to subsistence users of sea lions. Such benefits could include higher sea lion harvest levels and lower costs associated with those harvests. At this point, however, there is no method to determine whether reductions in groundfish harvest would lead to increasing sea lion populations.

[238] Jeopardy of continued existence or adverse modification or destruction of critical habitat; see Section 8.1.

[239] The baseline pollock fishery was not changed by the fishery management plan biological opinion RPA to ensure no jeopardy for Steller sea lions, so reductions in this fishery from the baseline are not considered in the alternatives. It is not known whether increases in this fishery under the action alternatives may affect Steller sea lion populations, which may further affect subsistence harvests of Steller sea lions.

Table 10-30 Estimated Community Harvest of Steller Sea Lions, Nikolski, Unalaska, Akutan, St. George, and St. Paul, 1992–2008 (number of animals)

	Nikolski			Unalaska			Akutan			St. George			St. Paul		
Year	Harvest	Struck/ Lost	Total Take	Harvest	Struck/ Lost	Total Take	Harvest	Struck/ Lost	Total Take	Harvest	Struck/ Lost	Total Take	Harvest	Struck/ Lost	Total Take
1992	8.2	0	8.2	41.8	16.7	58.5	25.7	4.3	30	14.9	55	69.9	161.7	65.2	226.8
1993	6	0	6	53.4	15.9	69.3	14.5	8.9	23.4	3.7	14.8	18.6	161.7	65.2	226.8
1994	0	0	0	43.6	8.4	51.9	12.7	3.5	16.2	2.8	17.1	19.9	147	26.4	173.4
1995	--	--	--	39	11.1	50.1	6	0	6	4	4	8	53.6	6.3	59.9
1996	3	0	3	15.2	6.3	21.6	11	5	16	4	4	8	28.2	10.2	38.4
1997	3	0	3	29.1	1.3	30.3	6.4	0	6.4	19.6	8.1	27.7	25.9	2.3	28.2
1998	1.1	0	1.1	7.3	5.5	12.7	6.4	0	6.4	11.8	8.5	20.3	41	16.9	57.8
1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2000	1.1	0	1.1	49.2	3.4	52.6	4.1	1.4	5.4	11.8	8.5	20.3	17.3	5.7	23
2001	6.7	0	6.7	23.1	5.3	28.4	15	2.7	17.7	7	7	14	12	12	24
2002	1	0	1	10	5.7	15.7	2.9	0	2.9	6	1	7	18	18	36
2003	0	0	0	10	5.7	15.7	8.7	0	8.7	9.3	4.7	14	13	5	18
2004	2	0	2	11.4	11.4	22.9	4.8	0	4.8	9.3	4.7	14	9	9	18
2005	2	0	2	12	4.5	16.5	4.8	0	4.8	9.3	4.7	14	19	3	22
2006	0	0	0	9	5.4	14.4	2.4	0	2.4	9.3	4.7	14	20	6	26
2007	1.2	0	1.2	9	5.4	14.4	5.1	1.3	6.4	9.3	4.7	14	22	12	34
2008	0	0	0	2.6	2.6	5.1	4.2	0	4.2	9.3	4.7	14	20	2	22

Source: Wolfe et al. 2009

Thus, the degree to which subsistence reliance on Steller sea lions could be affected by the proposed alternatives cannot be quantified given the lack of precise data, but it is not likely to be great. There is the additional complication that subsistence harvest levels normally vary considerably from year to year, due to the natural variability of weather, animal abundance and distribution, and other factors. Thus the long-term direction of change (trend) is more important than short-term measures of magnitudes of change. If there is a linkage between the commercial groundfish fishery and declining Steller sea lion populations, a reduction in or redirection of commercial groundfish harvest is probably a prerequisite for the increased subsistence harvest of Steller sea lions. It is simply not possible to determine how a specific change in one would result in a specific change in the other. ADF&G has concluded that there is a potential but essentially unknown relationship between sea lion population and the level of sea lion subsistence harvest (Wolfe, Fall, and Riedel 2009). While it is clear that if sea lions approach extinction, then subsistence harvest would likely decline, it is much less clear that if the sea lion population increases, then subsistence harvest would also increase. It is likely subsistence harvest changes would "lag behind," and be smaller in magnitude than, potential changes in the overall Steller sea lion population. A number of other variables, such as negotiated agreements or other cultural or social variables that may influence long-term subsistence trends, may be involved.

It is assumed that impacts to Steller sea lion subsistence use would be concentrated in Atka and Adak, the two communities within the AI subarea, for the same reasons that the proposed fishery management action designed to benefit Steller sea lions is concentrated in the AI subarea (the provisions of the RPA and the interim final rule are premised on impacts in the action area and implicitly assume there would be little impact outside). Indirect impacts to subsistence Steller sea lion use in other communities are possible under the proposed action alternatives, however, if localized population increases of Steller sea lions were to cause spillover effects farther to the east in the Aleutians or farther north in the Pribilofs. Table 10-30 summarizes subsistence Steller sea lion use 1992–2008 in the five Aleutian/Pribilof region communities located outside of, but within approximately 150 miles of, the AI subarea.

While some indirect beneficial impacts to subsistence use of Steller sea lions may accrue to these communities, or others within the range of the Western distinct population segment of Steller sea lions, the level of these indirect beneficial impacts is likely to be negligible, given the likely level of direct beneficial impacts to subsistence Steller sea lion use in the action area itself (for all of the reasons outlined above).

10.4.5.1.2 Atka Mackerel, Pacific Cod, and/or Pollock Subsistence Related Activities

As noted in Section 10.1.2.2, while no current information is readily available on subsistence fishing in the AI subarea for Atka mackerel, Pacific cod, or pollock, data from the most recent state study (1994) indicate that residents of Atka engaged in subsistence fishing for Pacific cod and while no subsistence harvest of Atka mackerel was reported, using and receiving subsistence Atka mackerel was reported in that that study; no subsistence harvest or use of pollock was reported (Alaska Department of Fish and Game 2013a; Alaska Department of Fish and Game 2013b). Atka mackerel and pollock are reported to be harvested for subsistence in other Aleutian communities outside of the AI subarea (e.g., Unalaska). No information is available to indicate whether subsistence fishing for Atka mackerel, Pacific cod, or pollock occurs in Adak.

There are no indications that commercial harvest activity in the AI subarea have adversely affected or are adversely affecting whatever level of Atka mackerel, Pacific cod, and/or pollock-specific subsistence activities have occurred or may be occurring. Further, none of the alternatives restrict subsistence fishing. If localized abundance of these species increases as a result of implementation of proposed alternative

commercial fishery management measures, however, it is possible that beneficial impacts could accrue to subsistence fishing for those species (assuming at least some subsistence fishing is taking place).

10.4.5.1.3 Indirect Impacts on Other Subsistence Activities

Beyond direct use of Steller sea lions or Atka mackerel, Pacific cod, and/or pollock as subsistence resources, the commercial groundfish management measures designed to protect Steller sea lions could have impacts on other subsistence pursuits. These types of impacts fall into two main categories:

- **Impacts to other subsistence pursuits as a result of loss of income from the commercial groundfish fishery.** This income could be used to purchase fuel, vehicles, or other subsistence-related gear, or otherwise offset expenses required to engage in a range of subsistence pursuits. These types of impacts could be experienced by anyone engaged in the potentially affected fisheries who uses income derived from the fishery to help capitalize subsistence pursuits, regardless of the community of residence of the individual involved or the location of those subsistence pursuits. These types of impacts, then, could occur in areas far removed from the location of the management action itself (e.g., these types of impacts could, for example, theoretically be felt by residents of relevant CDQ communities if there were a decline in revenues that would have otherwise been put to use in underwriting subsistence efforts).
- **Impacts to other subsistence pursuits as a result of the loss of opportunity to use commercial fishing gear and vessels for subsistence pursuits.** This would result from vessels not being ready to go as a result of being prepared for commercial fishing or from the simultaneous harvest of fish and game resources during commercial fishing forays where these assets are used in such a manner that "commercial and subsistence catches are jointly produced, based on shared use of fixed and variable inputs."

These two types of indirect impacts to subsistence pursuits are discussed in more detail in a separate attachment (Section 10.9.3 Attachment C) at the end of this community impacts section. In general, however, while the indirect impact of the proposed action alternatives on subsistence is difficult to assess for multiple reasons discussed in that attachment, joint production impacts in particular are likely to be concentrated among small vessel owners in a relatively small number of communities, with the residents of Adak and Atka most likely to be the most vulnerable to these kinds of indirect impacts. While quantification of the differences between alternatives with respect to the potential for indirect impacts to joint production in these communities is not possible with existing data, it is assumed that the relative order of potential would impact would track with restrictions on the Pacific cod fishery in nearby waters. This would suggest that the highest level impact would likely be associated with Alternative 6, the second highest with Alternative 1, and no or few impacts relative to baseline conditions would be associated with Alternative 4, and intermediate levels of impact would be associated with Alternatives 2, 3, and 5 (with the potential impacts associated with Alternatives 2 and 3 being closer to those of Alternative 1 and the potential impacts associated with Alternative 5 (preferred alternative) being closer to those associated with Alternative 4).

10.4.5.2 Redistribution of Commercial Fishing Engagement Among Communities

As noted in Section 10.4.1, potential beneficial commercial fishing-related community-level impacts from the proposed Steller sea lion protection measures could also occur if there were a shift in fishery engagement patterns between communities as a result of implementation of those measures. An example of this would be a decrease in engagement in the Pacific cod fishery in the AI subarea in Adak and a

corresponding increase in engagement in the Pacific cod fishery in the AI subarea in Unalaska if the center of gravity of that fishery were to shift eastward with widespread closures in the westernmost districts in the AI subarea. The eastern portion of Area 541 is closer to Unalaska than it is to Adak and there are often benefits for vessels associated with making landings or offloads in Unalaska as opposed to Adak (typically including higher prices paid for fish, lower prices for fuel, access to a wider range of support services, and greater ease of crew transfers), all other things being equal. Some landings of Pacific cod have occurred in Unalaska each year during baseline conditions (2004–2010) and in 2011, but the volume of landings has been highly variable year to year. In terms of community dependency, this would not necessarily be a zero-sum situation, as what could be a relatively large shift (loss) from the perspective of the Adak local fishing economy could be a relatively small shift (gain) from the perspective of the much larger and more diversified Unalaska local fishing economy. Another example would be the apparent shift in port calls in the AI Atka mackerel fishery from Adak to Unalaska in 2011 (status quo/interim rule conditions) when compared to the annual average under baseline conditions (2004–2010). While one year worth of data does not indicate a trend, it is suggestive that the alternatives could result in an eastward, if slight, shift in support services demand.

According to interview data, AI pollock was also historically delivered in Unalaska (that is, after the development of shore-based processing for pollock that accompanied the Americanization of the fishery in the late 1980s and before the fishery was closed due to implementation of Steller sea lion protection measures in 1999). This was before the fishery was re-opened outside of critical habitat (2003), the AI pollock DFA was made to the Aleut Corporation (2005), and shore-based pollock processing was initiated in Adak (2006). It is assumed, however, that as long as there is shore-based processing capacity available in Adak, the AI pollock harvested under the DFA to the Aleut Corporation (itself made for the purposes of economic development in Adak) would be processed in that community, all things being equal. If processing capacity at Adak were to be compromised by the implementation of Steller sea lion protection measure alternatives, however, it is possible that the community of Unalaska would benefit from once again processing AI pollock. Presumably, this could happen with AI pollock as it did with the Adak community allocation of Western Aleutian Islands golden king crab when the Adak shore-based processor was not operating in recent years. Under those circumstances, the Adak allocation of Western Aleutian Islands golden king crab was custom processed at Unalaska plants in an arrangement that was mutually economically beneficial for the community of Adak (as represented by the Adak Community Development Corporation, the holder of the quota) and the involved processing operations in Unalaska, but the community of Adak did not receive the additional value that would have been gained by that processing activity having taken place locally (including, for example, increased local processing employment, increased local fish tax revenues, and additional demand for fishery support services, such as fuel sales).

Two major factors, however, would likely serve to reduce the likelihood of the redistribution of shore-based AI pollock processing from Adak to Unalaska, even if shore-based processing in Adak is compromised by any of the proposed Steller sea lion protection measure alternatives. First, AI pollock that came to Unalaska shore-based processors under historic conditions came, according to interview data, from larger catcher vessels. Under the conditions of the DFA, however, at least half of contemporary harvest of AI pollock must be made by vessels less than 60 feet LOA, effectively limiting their fishing/delivery range to a fleet based at least seasonally in Adak. Second, during the baseline period (2004–2010) catcher/processing capacity was used to run Aleut Corporation DFA AI pollock harvested by catcher vessels when shore-based processing capacity was unavailable in Adak. Presumably, this same strategy could be used in the future if Adak shore-based processing capacity were to again be compromised, with the community of Adak gaining some benefit from the operations of catcher/processors in the local area (including increased port calls and associated support services demand).

10.4.5.3 Increased AI Pollock Harvest Opportunities

The AI pollock fishery has been operating under Steller sea lion protection measures that prevent directed fishing in critical habitat since the fishery re-opened in 2003 and a DFA was given to the Aleut Corporation in 2005. Under Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures), these same Steller sea lion protection measures-related AI pollock harvest restrictions would continue. Alternatives 2, 3, 4, and 5, however, include provisions for a pollock fishery that may allow more opportunity than Alternative 1 to harvest the CDQ and Aleut Corporation pollock allocations. Alternative 6 prohibits retention of pollock in the Aleutian Islands, but any adverse impact should be modest given the limited pollock fishing conducted there during the baseline and under the status quo. While the level of impact in terms of revenue increases to the involved CDQ groups and the Aleut Corporation that would accompany the proposed harvest opportunity increases is unknown, these impacts would be beneficial. Similarly, these increased harvest opportunities would likely translate into beneficial impacts for the community of Adak in terms of increased shore-based processing activity, support service demand, and increased municipal revenues, and could serve to help foster the establishment and growth of a small vessel fleet in the community.

The increased access to pollock grounds that would occur in the AI subarea under Alternatives 2, 3, 4, and 5 may also provide a new fishing opportunity specifically for owners and operators of small trawler catcher vessels, given the requirement that 50 percent or more of the AI pollock DFA be harvested by vessels under 60 feet LOA. No AI pollock has been harvested by vessels under 60 feet LOA since implementation of the DFA to the Aleut Corporation in 2005, such that any successful AI pollock fishing by small vessels would represent both a gain in absolute terms for those vessels and a shift of returns from the fishery from larger to smaller vessels. Communities beyond Adak that would most likely benefit from an increase in AI pollock fishing opportunities may be inferred from existing vessel class distribution patterns in analogous fisheries and previous Aleut Corporation DFA vessel authorization experience.

As discussed in Section 8.7.6, an examination of vessels in this size class using trawl gear off of Alaska from 2005 through 2012 identified as many as 38 unique vessels, with an average of about 26 vessels active in each year; these vessels fished for pollock in the Gulf of Alaska but not in the BSAI. Vessels from Western and Central Gulf of Alaska communities were an especially important component of this sector during these years, with an annual average of 10 vessels from Sand Point, four vessels from King Cove, and two vessels from Kodiak, as measured by homeport designation, with the remaining vessels having Girdwood, Juneau, Petersburg, and Seattle homeports. Based on this historic pattern of analogous fishery participation, if the pollock fisheries in the AI subarea were to be stimulated by the alternatives, Sand Point and King Cove may experience the greatest beneficial impacts from vessels homeported in their communities.[240]

As discussed in Section 10.2.7, since the implementation of the DFA to the Aleut Corporation, the corporation authorized smaller vessels to participate in the AI pollock fishery in 2007 only. While none actually participated in the fishery, three of the authorized vessels had Alaska ownership (two had Sand Point and one had Anchorage ownership), while the other four vessels had Washington state ownership

[240] As noted in Section 8.7.6, there is precedent in recent years for small trawl vessels coordinating participation in both the Gulf of Alaska and AI subarea trawl fisheries. As noted in that section, from 2005 to 2012, nine vessels less than 60 feet LOA trawled in the Aleutian Islands, with three of these vessels fishing six years or more during this period. The nine vessels with any level of participation were in the Aleutian Islands a total of 36 separate vessel-years during this eight-year period. These vessels primarily participated in the Pacific cod trawl fishery in the AI subarea and the state GHL Pacific cod fishery. Activity in these fisheries was largely restricted to the period from late February to the first week of April. There appears to be some correlation between the vessels' activity in the AI subarea and the closure of the Western Gulf of Alaska fisheries, suggesting that these vessels participate in Western Gulf of Alaska fisheries before leaving the Western Gulf to join the Pacific cod fishery in the AI subarea.

(two had Seattle-Tacoma CMSA ownership and two had Bellingham ownership). If this authorization process would serve as a proxy for future participation, beneficial impacts from an increase in small vessel activity in the AI pollock fishery may accrue more-or-less evenly to Alaska and Washington communities.

All things being equal, increases in AI pollock harvesting opportunities under Alternatives 3 and 4 would potentially have the greatest positive impact on the Aleut Corporation, the community of Adak, and the participating vessels and their affiliated communities among the different proposed action alternatives, while Alternative 1 would not be expected to have any impacts relative to the baseline. Alternative 6 may have small adverse impacts because of the prohibition of pollock retention. The other proposed action alternatives would likely be intermediate in their levels of beneficial impacts, with Alternative 5, Alternative 2, and Alternative 2 Protective Option, in that order, moving from greater to lesser potential beneficial impacts for reasons described in Section 10.4.3.7.1.

10.5 Cumulative Impacts

NEPA requires the analysis of cumulative impacts of human actions (Federal, state, and private) that may affect environmental components that are potentially impacted by the alternatives. Cumulative effects may result from past, present, and reasonably foreseeable future actions in addition to direct and indirect effects of the action and alternatives analyzed. Section 1.10.4 of this EIS describes the past, present, and reasonably foreseeable future actions that may affect the various environmental components analyzed in this EIS. Section 8.19 reviews the elements described in Section 1.10.4 that are relevant to the analysis of cumulative economic impacts of the alternatives, including economic impacts to communities, and that analysis is not recapitulated here. This section, organized by community rather than classification of action, focuses on those past, present, and reasonably foreseeable future actions that may result in additional social impacts to communities.

Cumulative impacts would be more likely for the communities of Adak, Atka, and Unalaska than for other communities. Cumulative impacts potentially associated with Adak and Unalaska are based largely on existing (or attempted) participation in the potentially affected fisheries, while those associated with Atka would be based largely on preclusion issues. These two types of impacts are discussed separately below.

10.5.1 Adak and Unalaska

In general, the individual proposed action alternatives would be similar in their rankings with respect to their contributions to cumulative impacts to the communities of Adak and Unalaska, although different past, present, and reasonably foreseeable future actions that would likely contribute to cumulative impacts would vary by community, as noted in the separate Adak and Unalaska discussions below. All things being equal, the proposed action alternatives that would potentially result in the greatest reductions in the AI Atka mackerel fishery and the Pacific cod fishery in the AI subarea would result in the greatest incremental contributions to cumulative impacts in the two communities. As described in previous sections, Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions for these fisheries and would not be expected to result in adverse impacts to Adak or Unalaska based on restrictions on the AI Atka mackerel fishery or the Pacific

cod fishery in the AI subarea in comparison to the baseline.[241] Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures) would be expected to have the greatest adverse impacts to Adak and Unalaska compared to the 2004–2010 baseline conditions, and make the greatest incremental contribution to cumulative impacts, due to the greatest restrictions being placed on AI Atka mackerel and Pacific cod harvesting in the AI subarea. Based on the proximity to the two communities and the nature of proposed area permanent and/or seasonal closures, Alternative 2 (modified 2011 Steller sea lion protection measures), Alternative 3 (further modified 2011 Steller sea lion protection measures), and Alternative 5 (preferred alternative) would be expected to have levels of adverse impacts intermediate between those of Alternatives 1 and 4. It is assumed that Alternative 5 would have lower adverse impacts to both Adak and Unalaska than Alternatives 2 and 3 (and close to those of Alternative 4) based on the sector-linked economic analyses presented in Chapter 8.

10.5.1.1 Adak

The community of Adak has been subject to impacts, or will likely be subject to impacts, of other past, present, and reasonably foreseeable future actions that, when added to the incremental impacts of the proposed action alternatives, may result in significant cumulative impacts. These actions, among others, include Federal non-fishery and fishery-related actions.

Adak has been the subject of considerable Federal investment through the Base Realignment and Closure (BRAC) process. Designed to assist in transitioning former military assets to beneficial non-military uses, the Federal government, through the BRAC process, has expended substantial resources to facilitate the reconfiguration of Adak from a military installation to a viable civilian community, the economy of which, in large part, would be built around commercial fishing and related maritime commerce. Similarly, the Aleut Corporation has made substantial investments from the private sector side of the BRAC process to realize the goal of having an economically viable civilian community in Adak, built largely around commercial fishing and maritime commerce. The incremental impacts of the proposed action, depending on the alternative implemented, has the potential of rendering the local realization of the overall BRAC goals less achievable and decreasing the value of previous investment of Federal and Aleut Corporation resources.

Several other Federal actions, or components of Federal actions, have been designed specifically to foster the growth of a local fishing economy in Adak. These include the previously discussed AI pollock DFA that was made to the Aleut Corporation for the purposes of economic development in Adak; the previously discussed CQE-enabled purchases of individual fishing quota (IFQ) by the ACDC for the purposes of building and sustaining local fishery engagement; and multiple community protection measure elements of the BSAI crab rationalization program that were either designed or have served to foster or protect sustained participation in local commercial fisheries by the community of Adak. The BSAI crab rationalization program features particularly relevant to Adak included a direct allocation of Western Aleutian Island golden king crab to the community of Adak, a western share landing/processing regional designation that functioned as community protection feature for Adak,[242] and processor quota

[241] Alternatives 2, 3, 4, and 5 provide for potential increased harvesting opportunities of AI pollock compared to 2004–2010 baseline conditions, which could result in beneficial community-level impacts for Adak, as described in Section 10.4.5.3. Alternative 1 would not change potential AI pollock harvesting opportunities compared to 2004–2010 baseline conditions, so neither beneficial nor adverse community-level impacts related to this fishery are anticipated for Adak or any other community. Alternative 6 prohibits the retention of pollock, and may have adverse impacts, but if these occur they are likely to be small because of the limited pollock fishing during the baseline years and under the status quo.

[242] It should be noted, however, that the regionalization feature(s) of the crab rationalization program were not intended to benefit any one community. While the western share landing/processing regional designation exclusively benefitted Adak among regional shore-based processors to date, Atka is also in the western region and the local processing entity has plans to

shares that were initially linked to the community of Adak through community protection restrictions on transfers. To date, for a combination of reasons, these actions have made relatively modest contributions to the development of a local fishing economy in Adak.[243] They do, however, have the potential to do so and incremental impacts to the local fishing economy in Adak that could result from the Steller sea lion protection measures proposed action alternatives, in combination with these other actions, could result in a range of beneficial or adverse cumulative impacts.

One relatively recent action that has had a more marked benefit to the local fishing economy in Adak has been the creation of the GHL Pacific cod fishery. As noted in Section 8.2.5, in 2006 a separate state-waters Pacific cod fishery in the Aleutian Islands was established in part to provide long-term economic opportunities for Adak. Managed under a GHL, this fishery is geographically defined by state waters west of 175 degrees west longitude, which crosses the western end of Atka Island approximately 70 miles east of Adak (and approximately 35 miles west of Atka) and east of 178 degrees west longitude, which crosses the western portion of Tanaga Island, approximately 60 miles west of Adak. Figure 10-12 shows the lines of longitude used to bound the fishery relative to Areas 541 and 542 and the communities of Adak and Atka.[244]

Table 10-31 provides information on the number of trawl catcher vessels, by community of ownership that participated in the State GHL fishery over the years 2006–2010 and in 2011. As shown, only one Alaska community (Sand Point) had two unique vessels participate in the fishery for all years 2006–2010, while other Alaska participation was limited to four unique vessels, each from a different community (none of which was Adak). In contrast, 28 unique vessels from Seattle-Tacoma CMSA participated over this same time period. Table 10-32 provides similar participation information for non-trawl catcher vessels. As shown, participation in the non-trawl State GHL fishery was more balanced between unique Alaska vessels (15) and unique Seattle-Tacoma CMSA vessels (19), and did include one vessel with Adak ownership. Clearly, however, the primary direct participation of Adak in this fishery is through local shore-based processing operations, with multiple benefits accruing through vessels and crews utilizing various support services in the community.

enter the fishery through use of processor quota obtained by the local village corporation and APICDA. To the degree that Atka picks up processing of this species, Adak's portion of western region shore deliveries will decline.

[243] BSAI crab rationalization, it should be noted, was a double-edged sword for Adak. While the program contained some measures that benefitted Adak, the local processor did not qualify for processor quota shares that were reflective of the volumes of crab processed at the plant between the end of the qualifying period and the actual implementation of the program. This effectively causes a sharp drop in local crab processing and, from the perspective of the local community economy, represented a substantial setback in an evolving local engagement with the fishery.

[244] At present, this fishery is adjacent to portions of Areas 541 and 542 only; the boundary has changed over time, however, and this fishery has previously included portions of Area 543 as well.

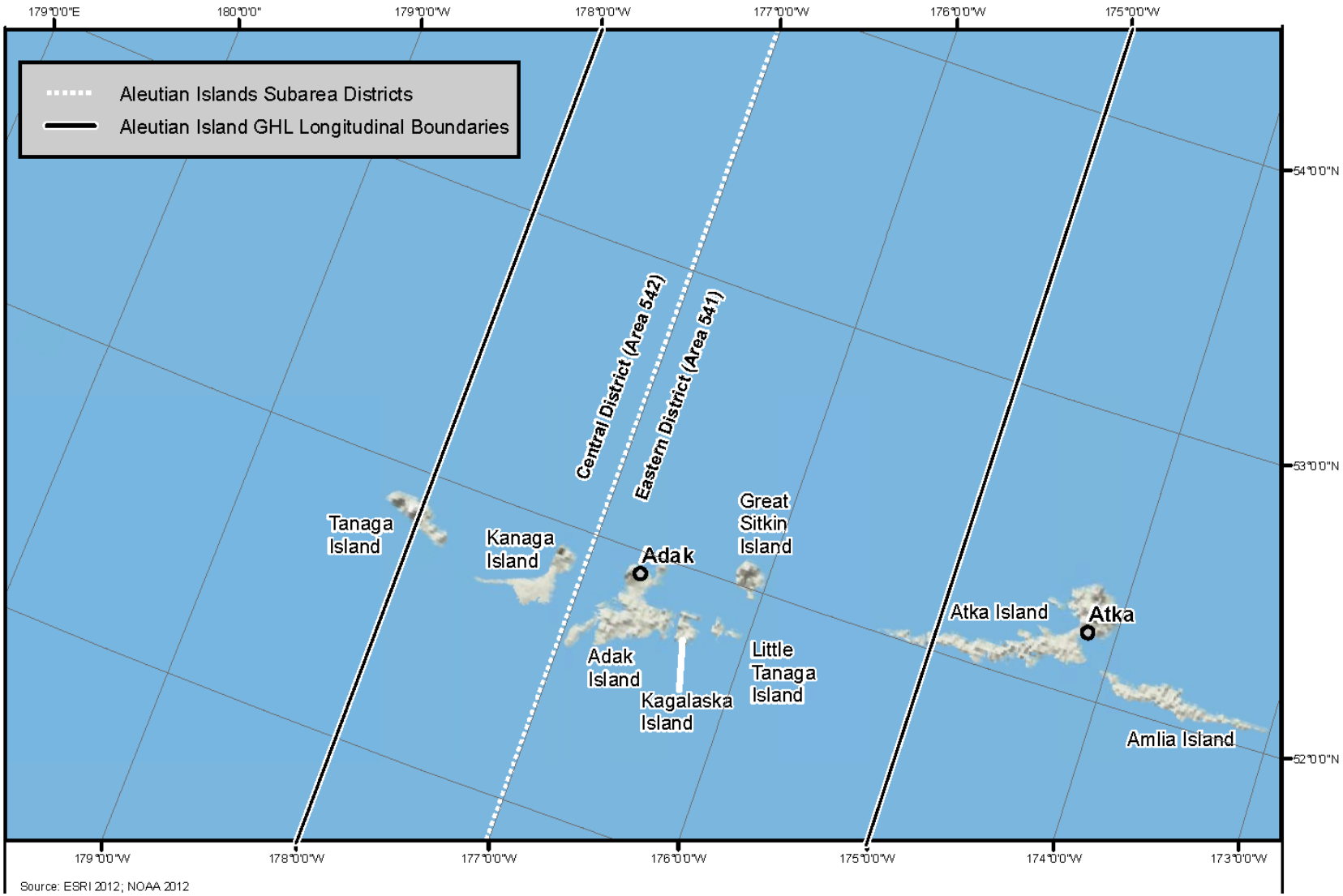


Figure 10-12 State Waters Aleutian Islands GHL Pacific Cod Fishery 2012 Longitudinal Boundaries and Selected Communities

Table 10-31 Trawl catcher vessels with Pacific cod catches in State of Alaska Aleutian Islands GHL fishery, by community of ownership, annual averages 2006–2010 and 2011 (number of vessels)

State	Community	Annual Average 2006–2010			Unique Vessels 2006–2010	2011			Unique Vessels (2011)
		541	542	543		541	542	543	
AK	Girdwood (Anchorage)	0.4	0.2	0.0	1	0	0	0	0
	Kodiak	0.2	0.0	0.0	1	0	0	0	0
	Petersburg	0.6	0.6	0.0	1	0	0	0	0
	Sand Point	0.4	0.4	0.0	2	0	0	0	0
	Unalaska	0.2	0.2	0.0	1	0	0	0	0
	Total	1.8	1.4	0.0	6	0	0	0	0
WA	Seattle-Tacoma CMSA	10.4	6.4	0.0	28	2	0	0	2
	Bellingham	2.0	2.0	0.0	3	0	0	0	0
	Total	12.4	8.4	0.0	31	2	0	0	2
OR	Total	1.6	0.8	0.0	4	0	0	0	0
All Other States	Total	0.6	0.6	0.0	1	0	0	0	0
Grand Total		16.4	11.2	0.0	40	2	0	0	2

Source: AKFIN, January 15, 2013.

Table 10-32 Non-trawl catcher vessels with Pacific cod catches in State of Alaska Aleutian Islands GHL fishery, by community of ownership, annual averages 2006–2010 and 2011 (number of vessels)

State	Community	Annual Average 2006–2010			Unique Vessels 2006–2010	2011			Unique Vessels (2011)
		541	542	543		541	542	543	
AK	Adak	0.4	0.4	0.0	1	1	0	0	1
	Anchor Point	0.2	0.0	0.0	1	0	0	0	0
	Anchorage	1.0	0.6	0.0	3	0	0	0	0
	Cordova	0.2	0.2	0.0	1	0	0	0	0
	Douglas	0.0	0.0	0.0	0	1	1	0	1
	Homer	0.4	0.2	0.0	2	0	0	0	0
	Juneau	0.2	0.0	0.0	1	0	0	0	0
	Ketchikan	0.4	0.0	0.0	1	0	0	0	0
	King Salmon	0.2	0.0	0.0	1	0	0	0	0
	Kodiak	1.0	0.2	0.0	2	0	0	0	0
	Unalaska	1.2	0.4	0.0	3	0	0	0	0
	Total	5.2	2.0	0.0	15	2	1	0	2
WA	Seattle-Tacoma CMSA	3.4	3.0	1.2	19	1	1	0	1
	Total	3.4	3.0	1.2	19	1	1	0	1
OR	Total	0.6	0.2	0.0	3	0	0	0	0
All Other States	Total	0.2	0.2	0.0	1	0	0	0	0
Grand Total		9.4	5.4	1.2	38	3	2	0	3

Source: AKFIN, January 15, 2013.

As noted in Section 10.3.1.5.3, information disclosed under a waiver of confidentially in an earlier NMFS analysis indicated that a substantial amount of the Pacific cod processed in Adak came from the GHL fishery for Pacific cod from the time that fishery began (2006) through the end of the period covered by the waiver (2008). Pacific cod from the GHL fishery accounted for about 14 percent of the Pacific cod deliveries to the plant in 2006 and about 23 percent in each of 2007 and 2008 (NMFS 2010). More recently, Icicle management contacted for this analysis noted that the GHL fishery has remained the primary fishery for the Adak processor since the company re-started local shore-based processing

operations in late 2011, stating that other fisheries (e.g., Atka mackerel, Pacific ocean perch, pollock, Federal Pacific cod[245]) have not been "robust."

The potential for interactive impacts with the reasonably foreseeable establishment of separate Pacific cod total allowable catch splits and/or the more speculative Pacific cod sector allocations between the Aleutian Island and Bering Sea subareas could also contribute to cumulative impacts in Adak, depending on if and how such changes are implemented. These changes could interact with both the proposed action alternative changes related to the Steller sea lion protection measures and the GHL Pacific cod fishery in a dynamic manner, but attempting to predict the cumulative impacts to Adak potentially resulting from these interactions in the absence of more defined information on potential splits or allocations would be speculative.

10.5.1.2 Unalaska

In the case of Unalaska, direct engagement with the fisheries potentially affected by the proposed action alternatives is largely confined to the support service sector, a centrally important sector for the community economy. In recent years, a number of fishery support services businesses have left the community and overall employment in the support service sector appears to have declined due to a number of changes to the regional fisheries, including actions to implement catch share or rationalization programs (AECOM 2010). To the extent that incremental impacts associated with the Steller sea lion protection measures proposed action alternatives would exacerbate this trend, cumulative impacts to the community of Unalaska could result, but it is assumed that these impacts would be relatively modest, given the modest overall level of dependency of the community on the potentially affected fisheries. The potential for interactive impacts with the reasonably foreseeable establishment of separate Pacific cod total allowable catch splits and/or the more speculative Pacific cod sector allocations between the Aleutian Island and Bering Sea subareas could also contribute to cumulative impacts in Unalaska, depending on if and how such changes are implemented.

10.5.2 Atka and Potential Cumulative Small/Rural Community and Cultural Context Issues

This community impacts analysis has largely focused on impacts associated with the implementation of proposed Steller sea lion protection measures through the use of quantitative fishery information and through characterizations of a number of Alaskan communities that describe the magnitude of social- and community-level engagement and dependency on those fisheries. This approach provides a relatively comprehensive analysis of anticipated socioeconomic impacts that could occur as a result of the implementation of Steller sea lion protection measures. It should be noted, however, that fishing regulatory actions can result in a wide range of social and sociocultural impacts in rural fishing communities. For many residents of these communities, fishing is not seen as merely a commercial venture, but an integral part of self-identity. This relationship is compounded for those residents who come from families with multi-generational experience in commercial and/or subsistence fishing, particularly for those Alaska Native residents for whom fishing is part of a larger, integrated traditional subsistence and economic sustenance practice rooted in thousands of years of history. A number of

[245] Icicle staff also noted that potential changes to the Federal BSAI Pacific cod fishery resulting from the reasonably foreseeable establishment of separate total allowable catch splits and/or more speculative sector allocations between the Bering Sea and the Aleutian Islands subareas may further limit the amount of Pacific cod processed in Adak, depending on if and how these potential changes are implemented and how GHL is calculated.

researchers have explored the relationship between contemporary fishery management actions (e.g., individual fishing quotas, catch-shares, rationalization, limited entry) and the sociocultural impacts that can result, including impacts to identity. A brief survey of existing literature is included in a separate attachment (Section 10.9.4 Attachment D) at the end of this community impacts section. This survey is not meant to be comprehensive, but is instead provided to indicate the types of research being conducted within rural Alaska on these issues and the potentially interactive nature of the present proposed management actions with other management actions that have taken place in recent years.

With the possible exception of Adak, the sustained participation of fishing communities in the AI subarea groundfish fisheries would not appear to be directly at risk from implementation of the proposed action alternatives, but the literature reviewed in Attachment D (Section 10.9.4), along with recent Council analyses, including the crab rationalization 5-year program review social impact assessment (AECOM 2010) among others, underlines the fact that the proposed action is not taking place in isolation. Existing trends suggest that sustained participation in a range of commercial fisheries by residents of small communities in the region has become more challenging in recent years, with less inherent flexibility to adjust to both short- and long-term fluctuations in resource availability (as well as to changing markets for seafood products). This flexibility is widely perceived in the communities as a key element in an overall adaptive strategy practiced in subsistence and economic contexts in the region for generations. This strategy involves piecing together individual livings (and often local economies) with an employment and income plurality approach. This plurality approach is particularly important given that the availability of non-fishing alternatives for income and employment are limited and, like the natural resources (and market factors) that underpin commercial fishing opportunities, tend to be subject to both short- and long-term fluctuations. This ongoing fluctuation in non-fishing opportunities further reinforces the importance of flexibility in the pursuit of a range of commercial fishing opportunities to enable individuals and communities the ability to successfully combine fishing and non-fishing as well as commercial and subsistence pursuits considered critical to long-term socioeconomic and sociocultural survival if not stability. To the extent that the proposed action alternatives would serve to further restrain that flexibility, overall sustained participation in a range of local fisheries by residents of the smaller communities in particular would be made all the more challenging.

Additionally, while this community impact analysis has focused primarily on impacts related to engagement, dependency, and sustained participation in the potentially affected fisheries, due to the provisions of National Standard 8, it is important to note that fishery management actions can also effectively preclude the entry of new participants and communities into the fishery. While some villages may not be participating in the fisheries directly (at least partially because that relationship was difficult if not impossible to develop due to different combinations of historical circumstances), commercial fisheries still represent the economic opportunities most available to these villages.

As noted in Section 10.3, the specific case of Atka is less than straightforward. For Atka, engagement in the Pacific cod commercial fishery in the AI subarea did not begin until 2012. In other words, the community was not engaged under baseline conditions (2004–2010); rather, participation was initiated only after fishery management under the interim final rule was in place (2011/status quo conditions). While, clearly, planning and investment for engagement in the fishery occurred before the implementation of management under interim final rule, potential adverse impacts to the community from the implementation of the proposed action alternatives would be less about sustaining historic participation in the fishery and more about preclusion of the community from a fishery previously determined by the community (and APICDA) to be a viable component to add to its portfolio of commercial fisheries engagement to help meet the social and economic needs of the community.

The timeliness of the desire to broaden and stabilize the commercial fisheries base of the local economy is driven in part by the lack of long-term stability in the population of Atka and in part by adverse

conditions currently being experienced within the fisheries sector of the community economy. As shown in Table 10-33, Atka has faced the challenge of a widely fluctuating population for over a century as seen in decennial census data, including a one-third decline in population from 2000 to 2010. In recent years, according to APICDA leadership, the local fishermen and shore-based processor (itself owned in part locally and in part by APICDA), largely dependent upon the halibut fishery, have also faced the challenge of reductions in revenues from that species for two primary reasons. First, after ex-vessel prices hit record highs in 2011 and 2012, correspondingly higher prices for consumers resulted in a decline in demand, such that Atka Pride Seafoods in 2013 still has unsold halibut from 2011 and 2012. Second, halibut quota in Area 4b (within which Atka is located) has coincidentally been dropping over the past decade. According to APICDA, their 2013 halibut quota is 290,000 pounds, down 12 percent from 2012, with further substantial reductions expected in the coming years, while "ten years ago we had CDQ quotas in the range of 700,000 to 800,000 pounds."[246]

Table 10-33 Atka Decennial Census Population, 1880–2010

Year	Total Population
1880	132
1890	132
1900	128
1910	0
1920	56
1930	103
1940	89
1950	85
1960	119
1970	88
1980	93
1990	73
2000	92
2010	61

Source: Alaska Department of Commerce, Community, and Economic Development website accessed April 12, 2013. http://commerce.alaska.gov/cra/DCRAExternal/community/Details/1416bd82-ae8b-413c-a12c-5c56c233e3e3

In short, Atka, beyond sharing potential fishery management cumulative/cultural context issues with a number of other small rural fishing communities, could be precluded from or impeded in larger-scale entry into the Pacific cod fishery as a result of impacts from the Steller sea lion protection measures proposed action, depending on which alternative is implemented.[247] Atka, as a participating community

[246] E-mail from L. Cotter, CEO, APICDA, April 14, 2013.

[247] As noted in Section 10.4.3.2.2, in terms of differentiating potential impacts between the proposed action alternatives, Alternative 4 (modified 2010 Steller sea lion protection measures) would most closely approximate the 2004–2010 baseline conditions described for Atka and represents similar conditions to those under which the local processor and APICDA have invested and reportedly plan to further invest in local Pacific cod processing-related infrastructure and processing capacity. Accordingly, this alternative would not be expected to result in community-level impacts due to restrictions on the Pacific cod fishery in the AI subarea serving as an impediment for local expansion into Pacific cod processing as a viable economic development and community stabilization strategy comparison to the baseline. Alternative 6 would be expected to impose the greatest impediment to Atka's plans to pursue local Pacific cod processing due to the prohibition on the retention of Pacific cod in fisheries taking place in nearby waters. Alternative 1 (status quo/interim rule/2011 Steller sea lion protection measures) would be expected to provide the second greatest impediment to Atka's plans, due to the greatest restrictions being placed on Pacific cod harvesting in the AI subarea among all of the proposed action alternatives. Based on the proximity and nature of proposed area permanent and/or seasonal closures, Alternative 2 (modified 2011 Steller sea lion protection measures), Alternative 3 (further modified 2011 Steller sea lion protection measures), and Alternative 5 (preferred alternative) would be expected to represent impediments to planned local development of Pacific cod processing capacity intermediate between those of

in the CDQ program, a previous action, has seen substantial investments by APICDA, with additional investments planned, to achieve the goal of establishing year-round shore-based processing focused on Pacific cod and crab to supplement the halibut and sablefish processing that has been the mainstay of seasonal processing to date. It is APICDA's assessment that the long-term sustainability of Atka as a community, in terms of population retention or growth, is dependent upon such year-round processing. Incremental impacts resulting from the Steller sea lion protection measures proposed action alternatives that may impede that efficacy of these other actions in achieving that goal could be considered cumulative impacts. The potential for interactive impacts with the reasonably foreseeable establishment of separate Pacific cod total allowable catch splits and/or the more speculative Pacific cod sector allocations between the Aleutian Island and Bering Sea subareas could also contribute to cumulative impacts in Atka, depending on if and how such changes are implemented.

10.6 Summary

For the purposes of community impact assessment, a two-pronged approach to analyzing the community or regional components of changes associated with the implementation of proposed management measures was utilized. First, tables based on existing quantitative fishery information for the period 2004–2010 (inclusive) were developed to identify patterns of participation, by community, in the various components of the relevant fisheries. However, because of confidentiality restrictions, substantial limitations are placed on the data that can be utilized for these purposes. The second approach involved selecting a subset of Alaska communities shown in the data as most heavily engaged in the relevant fisheries for characterization to describe the range, direction, and order of magnitude of social- and community-level engagement and dependency on those fisheries. A series of profiles were compiled for those communities, which included Adak, Unalaska, and Seattle; Atka was also profiled as a community in the Aleutian Islands subarea that could be affected through potential impacts to subsistence use of Steller sea lions as well as commercial fisheries participation. A number of other Alaska communities are engaged in the potentially affected fisheries in the Aleutian Islands subarea, but none have the range, consistency, and/or level of engagement of the communities profiled, especially in the last few years, although Akutan and King Cove shore-based processors saw at least some level of processing of Pacific cod from the Aleutian Islands subarea in most if not all years over the 2004–2010 baseline period.

In general, it is not possible to quantitatively differentiate potential impacts of the different Steller sea lion protection measures alternatives on an individual community basis. Qualitatively, however, it is possible to anticipate the communities where adverse impacts would most likely take place, along with the nature, direction, and at least rough order of magnitude of those impacts. Adverse impacts would likely be felt at the individual operation level for at least a few vessels in a number of Alaska communities due to increased costs and/or a drop in revenues associated with either changing fishing patterns and/or practices than would have been the case under 2004–2010 baseline conditions. Additionally, recent community and social impact assessments for North Pacific fishery management actions suggest that, as locally operating vessels experience adverse impacts, indirect impacts are also soon felt by at least some local support service providers to the degree that those individual enterprises are dependent upon customers who participate in the specific fishery or fisheries affected (and the relative dependence of those customers on those specifically affected fisheries). Given the scope of overall impacts anticipated to result from any of the management alternatives assessed, however, community-level impacts would likely

Alternatives 1 and 4. While little difference is expected in terms of community-level impacts between Alternatives 2 and 3, it is assumed that Alternative 5 would have lower community-level adverse impacts than Alternatives 2 and 3 (and close to those of Alternative 4) based on the results of sector-linked economic analyses presented in Chapter 8, although the quantification of the likely differences between the alternatives is not possible at the community level in general or for Atka in particular.

not be discernible for most of the engaged communities. The three communities where community-level impacts are a greater possibility are Adak, Atka, and Unalaska, with the vulnerability to adverse impacts varying among these communities.

Factors that would minimize the potential for possible adverse impacts in Atka include lack of current dependence on the potentially affected fisheries, although planned expansion into the Pacific cod fishery could be made more difficult depending on the alternative selected. Factors that would minimize the potential for possible adverse impacts in Unalaska include virtually no dependence of the local fleet on the potentially affected fisheries and a low level of dependence of shore-based processors on Pacific cod from the Aleutian Island subarea, although support service sector businesses in the community do depend to a larger (but still relatively modest) degree on port calls of catcher vessels and catcher/processors making targeted trips to the potentially affected fisheries in the Aleutian Islands subarea.

Adak was not directly engaged in the Atka mackerel or Pacific cod fisheries through participation of locally owned vessels in 2004–2010, with the exception of one or two locally owned non-trawl catcher vessels each year in 2006–2008. While this is a limited degree of engagement in the fishery in absolute terms, it is important to recognize that the locally owned Adak catcher vessel fleet is small and nascent in its anticipated growth, due at least in part to Adak, in its current configuration as a civilian community, being a relatively new fishing community. As a result, even the participation of one or two locally owned vessels involves a relatively large proportion of the local fleet and presumably equates to a level of dependency not immediately apparent in the low participation numbers, although the data to quantify the degree of dependency are confidential. Adak-owned catcher vessels are also limited in their alternatives to fishing in the Aleutian Islands subarea, due to their size and range, so participation in the Aleutian Islands subarea fisheries is doubly important.

Adak did have a substantial degree of engagement in the Atka mackerel fishery, the Pacific cod fishery in the Aleutian Islands subarea, and/or the Aleutian Islands pollock fishery in two other ways during 2004–2010: (1) through shore-based processing of Pacific cod and pollock and (2) as a port of embarkation and disembarkation for catcher/processors and catcher vessels immediately before and immediately after trips targeting Atka mackerel, Pacific cod in the Aleutian Islands subarea, and/or Aleutian Islands pollock. As a port of embarkation and disembarkation, Adak receives a substantial amount of economic activity that multiplies locally for a range of goods and services present in the small community. Combined with other social and economic realities, the community's participation in these three fisheries as a shore-based processing location and as port of call is of key importance.

In general, with the exception of Adak, adverse community-level impacts are not likely to be significant for any of the involved communities and the sustained participation of these fishing communities in the potentially affected fisheries would not be put at risk by any of the proposed Steller sea lion protection measure alternatives being considered. For some individual operations, however, adverse impacts may be felt at the operational level, based on level of dependency on Atka mackerel and/or Pacific cod in the Aleutian Islands subarea, although especially in the case of Pacific cod, potential impacts would ultimately depend on the ability of a given operation to successfully redirect fishing efforts into other areas not affected by the proposed alternatives.

Based on the analysis presented in Chapter 8, as well as information presented in the community impacts analysis, the sustained participation in the directly affected fisheries is potentially at risk for Adak. This is due to its unique combination of multiple types of engagement, as well as its degree of dependence, vulnerability, and lack of resilience resulting from its particular history, geography, and limited range of other specific fishery and general economic sector engagement options. The risk to sustained participation is multi-faceted and includes risks to Adak's efforts to build and retain a locally owned catcher vessel fleet; its ability to retain stable, continuously operating local shore-based processing; its

ability to remain an important port for catcher vessel and catcher/processor support activities, including fuel services; and its ability to generate sufficient fishing-specific revenues to justify continued or allow new municipal and private sector (especially Aleut Corporation) investments in infrastructure to foster commercial fisheries development, among other factors. If Adak were to experience disproportionate high and adverse impacts, environmental justice issues may be of concern, both in terms of impacts to segments of the community population and impacts to Aleut Corporation shareholders.

Potential community-level beneficial impacts could accrue from the implementation of Steller sea lion protection measures through changes to Steller sea lion subsistence-related activities, a redistribution of fishing effort between communities, or changes that may allow more opportunity to harvest the CDQ and Aleut Corporation Aleutian Islands pollock allocations as a result of implementation of the proposed action or alternatives when compared to baseline conditions. In terms of potential impacts to Steller sea lion subsistence activities, it is not possible to distinguish degrees of impact among the action alternatives, either to order them or to determine whether such impacts would rise to a level of significance. There is the potential for redistribution of fishing effort through a decrease in Adak's engagement in the Pacific cod fishery in the Aleutian Islands subarea and a corresponding increase in Unalaska's engagement in the same fishery if the center of gravity of that fishery were to shift eastward with, for example, widespread closures in the westernmost districts in the Aleutian Islands subarea. In terms of community dependency, this would not necessarily be a zero-sum situation, as what could be a relatively large shift (loss) from the perspective of the Adak local fishing economy could be a relatively small shift (gain) from the perspective of the much larger and more diversified Unalaska local fishing economy. In terms of beneficial impacts to CDQ groups and the Aleut Corporation, Alternatives 2, 3, 4, and 5 include provisions that may allow more opportunity than Alternative 1 to harvest the CDQ and Aleut Corporation pollock allocations. While the level of impact in terms of revenue increases to the involved CDQ groups and the Aleut Corporation that would accompany the proposed harvest opportunity increases is unknown, these impacts would be beneficial. Similarly, these increased harvest opportunities would likely translate into beneficial impacts for the community of Adak in terms of increased shore-based processing activity, support service demand, and increased municipal revenues, and could serve to help foster the establishment and growth of a small vessel fleet in the community.

Cumulative impacts would be more likely for the communities of Adak, Atka, and Unalaska than for other communities. Cumulative impacts potentially associated with Adak and Unalaska are based largely on existing (or attempted) participation in the potentially affected fisheries, while those associated with Atka would be based largely on preclusion issues. Cumulative impacts would likely be more substantial in Adak than the other potentially affected communities.

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10.9 Community Impacts Attachments

10.9.1 Attachment A: Community Detailed Fishery Engagement Tables

The following tables are included in this Attachment.

- Trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels) (Table 10-34)
- Non-trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels) (Table 10-35)
- Trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels) (Table 10-36)
- Non-trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels) (Table 10-37)
- Shore-based processors receiving landings of Atka mackerel and/or Pacific cod catches from the Aleutian Islands, by community of operation, 2004–2011 (number of plants) (Table 10-38)
- Catcher/processor and catcher vessel port calls in Adak and Unalaska immediately before and/or after targeted Atka mackerel or Pacific cod trips in the AI subarea and all of Alaska, 2004–2011 (number of calls) (Table 10-39)

Table 10-34 Trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels)

			Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
State	Community	Year	541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
AK	Anchorage	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2007	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.0	0.1	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kodiak	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Petersburg	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.4	0.3	0.1	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sand Point	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
AK (Cont.)	Sand Point (Cont.)	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.4	0.3	0.3	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unalaska	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Alaska Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
		2007	0.0	0.0	0.0	1.0	1.0	1.0	0.0	2.0	1.0	1.0	0.0	2.0
		2008	0.0	0.0	0.0	2.0	1.0	0.0	0.0	2.0	1.0	0.0	0.0	2.0
		2009	0.0	0.0	0.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0
		2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.4	0.9	0.6	0.0	1.4	0.9	0.6	0.0	1.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	3.0	5.0	4.0	0.0	6.0	5.0	4.0	0.0	6.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WA	Bellingham	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	2.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
		2008	0.0	0.0	0.0	1.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
		2009	0.0	0.0	0.0	3.0	0.0	1.0	0.0	3.0	0.0	1.0	0.0	3.0
		2010	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
		Annual Average 2004–2010	0.0	0.0	0.0	1.1	0.0	0.9	0.0	1.4	0.0	0.9	0.0	1.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Edmonds	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
WA (Cont.)	Gig Harbor	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.6	0.1	0.3	0.0	0.6
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lakewood	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lynnwood	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2008	1.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2009	1.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2010	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.3	0.1	0.0	0.3	0.6	0.4	0.0	0.4	0.6	0.4	0.0	0.4
		Unique Vessels 2004–2010	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mercer Island	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
WA (Cont.)	Renton	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2008	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.4	0.3	0.3	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Seattle	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	2.0	0.0	1.0	16.0	2.0	2.0	2.0	17.0	2.0	2.0	2.0	17.0
		2007	11.0	3.0	1.0	20.0	22.0	12.0	2.0	23.0	22.0	12.0	2.0	23.0
		2008	10.0	1.0	2.0	15.0	22.0	5.0	4.0	22.0	22.0	5.0	4.0	22.0
		2009	4.0	4.0	3.0	11.0	17.0	7.0	3.0	15.0	17.0	7.0	3.0	15.0
		2010	7.0	0.0	0.0	14.0	18.0	4.0	3.0	17.0	18.0	4.0	3.0	17.0
		Annual Average 2004–2010	4.3	1.0	0.9	9.5	10.1	3.8	1.8	11.8	10.1	3.8	1.8	11.8
		Unique Vessels 2004–2010	17.0	5.0	3.0	24.0	26.0	17.0	5.0	29.0	26.0	17.0	5.0	29.0
		2011 (only)	8.0	3.0	1.0	8.0	13.0	6.0	1.0	13.0	13.0	6.0	1.0	13.0
	Washington Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	2.0	0.0	1.0	16.0	2.0	2.0	2.0	17.0	2.0	2.0	2.0	17.0
		2007	11.0	3.0	1.0	25.0	24.0	19.0	2.0	31.0	24.0	19.0	2.0	31.0
		2008	11.0	2.0	2.0	17.0	24.0	8.0	4.0	28.0	24.0	8.0	4.0	28.0
		2009	5.0	4.0	3.0	14.0	19.0	12.0	3.0	22.0	19.0	12.0	3.0	22.0
		2010	7.0	0.0	0.0	17.0	20.0	4.0	3.0	21.0	20.0	4.0	3.0	21.0
		Annual Average 2004–2010	5.1	1.3	1.0	12.7	12.7	6.4	2.0	17.0	12.7	6.4	2.0	17.0
		Unique Vessels 2004–2010	18.0	6.0	3.0	30.0	30.0	24.0	5.0	38.0	30.0	24.0	5.0	38.0
		2011 (only)	8.0	3.0	1.0	8.0	13.0	6.0	1.0	13.0	13.0	6.0	1.0	13.0
OR	Newport	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2007	1.0	0.0	0.0	2.0	1.0	1.0	0.0	2.0	1.0	1.0	0.0	2.0
		2008	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
		2009	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2010	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.1	0.0	0.0	1.0	0.1	0.1	0.0	1.0	0.1	0.1	0.0	1.0
		Unique Vessels 2004–2010	1.0	0.0	0.0	3.0	1.0	1.0	0.0	3.0	1.0	1.0	0.0	3.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
OR (Cont.)	Siletz	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Oregon Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2007	1.0	0.0	0.0	2.0	1.0	1.0	0.0	2.0	1.0	1.0	0.0	2.0
		2008	0.0	0.0	0.0	2.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	3.0
		2009	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2010	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.1	0.0	0.0	1.0	0.1	0.1	0.0	1.1	0.1	0.1	0.0	1.1
		Unique Vessels 2004–2010	1.0	0.0	0.0	3.0	1.0	1.0	0.0	4.0	1.0	1.0	0.0	4.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HI	Kailua Kona	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2007	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
		2008	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.1	0.0	0.0	0.4	0.3	0.3	0.0	0.6	0.3	0.3	0.0	0.6
		Unique Vessels 2004–2010	1.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALL	Grand Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	2.0	0.0	1.0	17.0	2.0	2.0	2.0	21.0	2.0	2.0	2.0	21.0
		2007	12.0	3.0	1.0	29.0	26.0	22.0	2.0	36.0	26.0	22.0	2.0	36.0
		2008	11.0	2.0	2.0	22.0	26.0	9.0	4.0	34.0	26.0	9.0	4.0	34.0
		2009	5.0	4.0	3.0	15.0	22.0	15.0	3.0	26.0	22.0	15.0	3.0	26.0
		2010	8.0	0.0	0.0	19.0	22.0	4.0	3.0	24.0	22.0	4.0	3.0	24.0
		Annual Average 2004–2010	5.4	1.3	1.0	14.6	14.0	7.4	2.0	20.1	14.0	7.4	2.0	20.1
		Unique Vessels 2004–2010	20.0	6.0	3.0	37.0	37.0	30.0	5.0	49.0	37.0	30.0	5.0	49.0
		2011 (only)	8.0	3.0	1.0	8.0	13.0	6.0	1.0	13.0	13.0	6.0	1.0	13.0

Note: “Other Alaska” includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-35 Non-trawl catcher vessels with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels)

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
AK	Adak	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	2.0	1.0	0.0	1.0	2.0	1.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.6	0.4	0.0	0.1	0.6	0.4	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	1.0	0.0	1.0	2.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Anchor Point	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.0	0.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Anchorage	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	3.0	3.0	0.0	1.0	3.0	3.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.7	0.7	0.0	0.3	0.7	0.7	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	3.0	3.0	0.0	2.0	3.0	3.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Cordova	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
AK (Cont.)	Juneau	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ketchikan	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Kodiak	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.4	0.6	0.3	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unalaska	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.1	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0	0.0	1.0	0.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
AK (Cont.)	Alaska Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	4.0	5.0	0.0	1.0	4.0	5.0	0.0	1.0
		2007	0.0	0.0	0.0	0.0	3.0	2.0	0.0	4.0	3.0	2.0	0.0	4.0
		2008	0.0	0.0	0.0	0.0	9.0	6.0	0.0	7.0	9.0	6.0	0.0	7.0
		2009	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.0	0.0	0.0	2.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	2.4	1.9	0.0	2.1	2.4	1.9	0.0	2.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	10.0	8.0	0.0	11.0	10.0	8.0	0.0	11.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WA	Anacortes	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bellevue	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bellingham	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
WA (Cont.)	Kirkland	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Seattle	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	3.0	1.0	0.0	0.0	3.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	3.0	1.0	0.0	0.0	3.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shoreline	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.4	0.3	0.1	0.1	0.4
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
	Washington Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	3.0	0.0	0.0	5.0	3.0	0.0	0.0	5.0
		2008	0.0	0.0	0.0	0.0	2.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.7	0.4	0.1	1.0	0.7	0.4	0.1	1.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	4.0	3.0	1.0	6.0	4.0	3.0	1.0	6.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
OR	Garibaldi	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Reedsport	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Oregon Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.1	0.1	0.0	0.3
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA	Wheatland	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

State	Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
			541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
HI	Kailua Kona	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.6
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALL	Grand Total	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	0.0	0.0	0.0	0.0	4.0	6.0	0.0	2.0	4.0	6.0	0.0	2.0
		2007	0.0	0.0	0.0	0.0	6.0	2.0	0.0	11.0	6.0	2.0	0.0	11.0
		2008	0.0	0.0	0.0	0.0	13.0	10.0	1.0	11.0	13.0	10.0	1.0	11.0
		2009	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.0	0.0	0.0	2.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0
		Annual Average 2004–2010	0.0	0.0	0.0	0.0	3.4	2.6	0.1	4.0	3.4	2.6	0.1	4.0
		Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	16.0	13.0	1.0	19.0	16.0	13.0	1.0	19.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0

Note: “Other Alaska” includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-36 Trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels)

			Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
State	Community	Year	541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
WA	Seattle	2004	10.0	10.0	9.0	9.0	15.0	12.0	9.0	15.0	15.0	12.0	9.0	15.0
		2005	10.0	10.0	10.0	9.0	13.0	11.0	11.0	13.0	13.0	11.0	11.0	13.0
		2006	11.0	10.0	9.0	9.0	13.0	11.0	10.0	13.0	13.0	11.0	10.0	13.0
		2007	10.0	10.0	8.0	10.0	15.0	13.0	9.0	15.0	15.0	13.0	9.0	15.0
		2008	9.0	7.0	7.0	8.0	11.0	8.0	8.0	11.0	11.0	8.0	8.0	11.0
		2009	8.0	9.0	7.0	8.0	10.0	9.0	8.0	10.0	10.0	9.0	8.0	10.0
		2010	8.0	7.0	7.0	8.0	11.0	7.0	7.0	10.0	11.0	7.0	7.0	10.0
		Annual Average 2004–2010	9.4	9.0	8.1	8.7	12.6	10.1	8.9	12.4	12.6	10.1	8.9	12.4
		Unique Vessels 2004–2010	14.0	10.0	10.0	15.0	16.0	13.0	11.0	16.0	16.0	13.0	11.0	16.0
		2011 (only)	7.0	7.0	0.0	5.0	7.0	7.0	1.0	7.0	7.0	7.0	1.0	7.0
ME	Rockland	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2006	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
		2007	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		2008	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2009	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
		2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Annual Average 2004–2010	0.4	0.3	0.1	0.3	0.6	0.3	0.1	0.6	0.6	0.3	0.1	0.6
		Unique Vessels 2004–2010	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALL	Grand Total	2004	10.0	10.0	9.0	9.0	15.0	12.0	9.0	15.0	15.0	12.0	9.0	15.0
		2005	10.0	10.0	10.0	9.0	13.0	11.0	11.0	13.0	13.0	11.0	11.0	13.0
		2006	12.0	11.0	9.0	10.0	14.0	12.0	10.0	14.0	14.0	12.0	10.0	14.0
		2007	11.0	11.0	9.0	11.0	16.0	14.0	10.0	16.0	16.0	14.0	10.0	16.0
		2008	9.0	7.0	7.0	8.0	12.0	8.0	8.0	12.0	12.0	8.0	8.0	12.0
		2009	9.0	9.0	7.0	8.0	11.0	9.0	8.0	11.0	11.0	9.0	8.0	11.0
		2010	8.0	7.0	7.0	8.0	11.0	7.0	7.0	10.0	11.0	7.0	7.0	10.0
		Annual Average 2004–2010	9.9	9.3	8.3	9.0	13.1	10.4	9.0	13.0	13.1	10.4	9.0	13.0
		Unique Vessels 2004–2010	15.0	11.0	11.0	16.0	17.0	14.0	12.0	17.0	17.0	14.0	12.0	17.0
		2011 (only)	7.0	7.0	0.0	5.0	7.0	7.0	1.0	7.0	7.0	7.0	1.0	7.0

Note: “Other Alaska” includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-37 Non-trawl catcher/processors with Atka mackerel and/or Pacific cod catches in the Aleutian Islands, by community of ownership, 2004–2011 (number of vessels)

Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
		541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
Everett	2004	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2009	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.6	0.6	0.1	0.1	0.6
	Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lynden	2004	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2005	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.3	0.3	0.3	0.0	0.3
	Unique Vessels 2004–2010	0.0	0.0	0.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Seattle	2004	0.0	0.0	0.0	0.0	4.0	2.0	2.0	4.0	4.0	2.0	2.0	4.0
	2005	0.0	0.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	0.0	3.0
	2006	1.0	0.0	0.0	1.0	10.0	2.0	1.0	10.0	10.0	2.0	1.0	10.0
	2007	1.0	0.0	0.0	0.0	7.0	4.0	3.0	8.0	7.0	4.0	3.0	8.0
	2008	1.0	0.0	0.0	0.0	8.0	10.0	5.0	11.0	8.0	10.0	5.0	11.0
	2009	0.0	0.0	2.0	0.0	6.0	7.0	3.0	8.0	6.0	7.0	3.0	8.0
	2010	0.0	1.0	1.0	0.0	10.0	9.0	5.0	11.0	10.0	9.0	5.0	11.0
	Annual Average 2004–2010	0.4	0.1	0.4	0.1	6.9	4.9	2.7	7.9	6.9	4.9	2.7	7.9
	Unique Vessels 2004–2010	1.0	1.0	2.0	1.0	21.0	14.0	8.0	20.0	21.0	14.0	8.0	20.0
	2011 (only)	0.0	0.0	0.0	0.0	5.0	5.0	0.0	6.0	5.0	5.0	0.0	6.0

Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Vessels)			
		541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
Grand Total	2004	0.0	0.0	0.0	0.0	6.0	3.0	3.0	6.0	6.0	3.0	3.0	6.0
	2005	0.0	0.0	0.0	0.0	4.0	1.0	0.0	4.0	4.0	1.0	0.0	4.0
	2006	1.0	0.0	0.0	1.0	11.0	2.0	1.0	11.0	11.0	2.0	1.0	11.0
	2007	1.0	0.0	0.0	0.0	7.0	4.0	3.0	8.0	7.0	4.0	3.0	8.0
	2008	1.0	0.0	0.0	0.0	8.0	10.0	5.0	11.0	8.0	10.0	5.0	11.0
	2009	0.0	0.0	2.0	0.0	7.0	8.0	3.0	9.0	7.0	8.0	3.0	9.0
	2010	0.0	1.0	1.0	0.0	11.0	9.0	5.0	12.0	11.0	9.0	5.0	12.0
	Annual Average 2004–2010	0.4	0.1	0.4	0.1	7.7	5.3	2.9	8.7	7.7	5.3	2.9	8.7
	Unique Vessels 2004–2010	1.0	1.0	2.0	1.0	25.0	17.0	9.0	24.0	25.0	17.0	9.0	24.0
	2011 (only)	0.0	0.0	0.0	0.0	5.0	5.0	0.0	6.0	5.0	5.0	0.0	6.0

Note: “Other Alaska” includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 27, 2012; January 15, 2013.

Table 10-38 Shore-based processors receiving landings of Atka mackerel and/or Pacific cod catches from the Aleutian Islands, by community of operation, 2004–2011 (number of plants)

		Atka mackerel				Pacific Cod				Combined (Unique Processors)			
Community	Year	541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
Adak	2004	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2005	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0
	2006	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2007	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2008	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2009	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	1.0	0.9	0.7	0.9	1.0	0.9	0.7	0.9
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
	2011 (only)	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
Akutan	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2005	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2006	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2007	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2009	0.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2010	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	Annual Average 2004–2010	0.1	0.0	0.0	0.3	0.9	0.3	0.0	0.9	0.9	0.3	0.0	0.9
	Unique Processors 2004–2010	1.0	0.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
Anchorage	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2011 (only)	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
Atka	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Processors)			
		541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
Homer	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.3	0.0	0.0	0.3
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
King Cove	2004	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0
	2005	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2006	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2009	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0
	2010	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	1.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.3	0.9	0.1	0.4	0.9	0.9	0.1	0.4	0.9
	Unique Processors 2004–2010	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2011 (only)	0.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
Kodiak	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2009	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.3	0.3	0.1	0.0	0.3
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sand Point	2004	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.4	0.0	0.0	0.4
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Community	Year	Atka mackerel				Pacific Cod				Combined (Unique Processors)			
		541	542	543	Other Alaska	541	542	543	Other Alaska	541	542	543	Other Alaska
Seward	2004	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St. Paul	2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2008	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
	2009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
	Unique Processors 2004–2010	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
	2011 (only)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unalaska	2004	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
	2005	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
	2006	0.0	0.0	0.0	0.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
	2007	0.0	0.0	0.0	0.0	3.0	1.0	0.0	3.0	3.0	1.0	0.0	3.0
	2008	0.0	0.0	0.0	0.0	3.0	1.0	1.0	3.0	3.0	1.0	1.0	3.0
	2009	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	2010	0.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Annual Average 2004–2010	0.0	0.0	0.0	0.4	2.1	1.1	1.0	2.1	2.1	1.1	1.0	2.1
	Unique Processors 2004–2010	0.0	0.0	0.0	2.0	3.0	2.0	2.0	3.0	3.0	2.0	2.0	3.0
	2011 (only)	0.0	0.0	0.0	2.0	2.0	1.0	1.0	2.0	2.0	1.0	1.0	2.0
Grand Total	2004	0.0	0.0	0.0	0.0	6.0	2.0	3.0	6.0	6.0	2.0	3.0	6.0
	2005	0.0	0.0	0.0	0.0	5.0	2.0	2.0	4.0	5.0	2.0	2.0	4.0
	2006	0.0	0.0	0.0	0.0	7.0	2.0	2.0	6.0	7.0	2.0	2.0	6.0
	2007	0.0	0.0	0.0	0.0	5.0	2.0	1.0	5.0	5.0	2.0	1.0	5.0
	2008	0.0	0.0	0.0	0.0	8.0	5.0	2.0	9.0	8.0	5.0	2.0	9.0
	2009	0.0	0.0	0.0	3.0	5.0	3.0	2.0	5.0	5.0	3.0	2.0	5.0
	2010	1.0	0.0	0.0	4.0	7.0	3.0	3.0	7.0	7.0	3.0	3.0	7.0
	Annual Average 2004–2010	0.1	0.0	0.0	1.0	6.1	2.7	2.1	6.0	6.1	2.7	2.1	6.0
	Unique Processors 2004–2010	1.0	0.0	0.0	4.0	12.0	7.0	4.0	12.0	12.0	7.0	4.0	12.0
	2011 (only)	0.0	0.0	0.0	4.0	6.0	2.0	1.0	6.0	6.0	2.0	1.0	6.0

Note: “Other Alaska” includes Federal waters in the Bering Sea subarea and the Gulf of Alaska as well as all Alaska state waters (except for the portion of the BSAI Pacific cod fishery in state waters that is managed by the Federal government as a parallel fishery).
Source: AKFIN, August 29, 2012; January 22, 2013.

Table 10-39 Catcher/processor and catcher vessel port calls in Adak and Unalaska immediately before and/or after targeted Atka mackerel or Pacific cod trips in the AI subarea and all of Alaska, 2004–2011 (number of calls)

Vessel Type	Community	Year	Aleutian Islands Subarea			All Alaska			AI Subarea as a Percent of All Alaska		
			Atka Mackerel	Pacific Cod	All Groundfish	Atka Mackerel	Pacific Cod	All Groundfish	Atka Mackerel	Pacific Cod	All Groundfish
Catcher/ Processors (all gear types)	Adak	2004	32	23	63	32	23	70	100.0%	100.0%	90.0%
		2005	35	11	54	35	11	59	100.0%	100.0%	91.5%
		2006	45	21	80	45	22	91	100.0%	95.5%	87.9%
		2007	38	24	81	38	25	86	100.0%	96.0%	94.2%
		2008	41	36	104	41	36	109	100.0%	100.0%	95.4%
		2009	59	32	121	59	32	126	100.0%	100.0%	96.0%
		2010	55	55	141	55	56	143	100.0%	98.2%	98.6%
		Annual Average 2004–2010	43.6	28.9	92.0	43.6	29.3	97.7	100.0%	98.5%	94.2%
		2011 (only)	28	13	97	28	14	99	100.0%	92.9%	98.0%
	Unalaska	2004	29	29	78	68	663	1,560	42.6%	4.4%	5.0%
		2005	29	29	87	80	524	1,388	36.3%	5.5%	6.3%
		2006	33	36	104	71	474	1,339	46.5%	7.6%	7.8%
		2007	32	35	104	64	400	1,242	50.0%	8.8%	8.4%
		2008	33	42	121	45	358	1,442	73.3%	11.7%	8.4%
		2009	35	34	126	42	397	1,328	83.3%	8.6%	9.5%
		2010	36	52	167	36	368	1,435	100.0%	14.1%	11.6%
		Annual Average 2004–2010	32.4	36.7	112.4	58.0	454.9	1,390.6	55.9%	8.1%	8.1%
		2011 (only)	48	15	139	50	418	1,637	96.0%	3.6%	8.5%
Catcher Vessels (all gear types)	Adak	2004	NA	102	112	NA	103	113	NA	99.0%	99.1%
		2005	NA	62	75	NA	63	79	NA	98.4%	94.9%
		2006	NA	99	133	NA	101	140	NA	98.0%	95.0%
		2007	*	202	252	*	202	254	*	100.0%	99.2%
		2008	*	191	281	*	196	291	*	97.4%	96.6%
		2009	*	117	176	*	118	177	*	99.1%	99.4%
		2010	*	52	108	*	52	117	*	100.0%	92.3%
		Annual Average 2004–2010	*	117.9	162.4	*	119.3	167.3	*	98.8%	97.1%
		2011 (only)	*	11	84	*	12	86	*	91.7%	97.7%
	Unalaska	2004	NA	19	55	NA	794	2,594	NA	2.4%	2.1%
		2005	NA	17	44	NA	742	2,371	NA	2.3%	1.9%
		2006	NA	25	76	NA	761	2,503	NA	3.3%	3.0%
		2007	*	46	94	*	734	2,501	*	6.3%	3.8%
		2008	*	56	113	*	760	2,195	*	7.4%	5.1%
		2009	*	36	117	*	418	1,534	*	8.6%	7.6%
		2010	*	33	119	*	518	1,829	*	6.4%	6.5%
		Annual Average 2004–2010	*	33.1	88.3	*	675.3	2,218.1	*	4.9%	4.0%
		2011 (only)	*	17	106	*	595	2,376	*	2.9%	4.5%

Notes: * = data suppressed to retain confidentiality; NA = not applicable (data not available)
Source: AKFIN, September 4, 2012.

10.9.2 Attachment B: Community Engagement Ranking Exercise

The goal of this exercise[250] is to determine which communities are the most engaged in commercial fishing for Pacific cod (pcod) and Atka mackerel (atka) in the Aleutian Islands (AI) subarea of Alaska (hereafter AI pcod/atka), and therefore which communities would be most directly affected by restrictions to commercial fishing for AI pcod/atka.[251]

Communities are defined as a port (using the ADF&G port code) or a city/village name when an ADF&G port code does not exist. In those cases, the self-reported owner's city is used. Eight variables were determined that reflect community engagement in the AI pcod/atka fisheries, which are included in Table 10-40 and defined as their average value from 2008–2011, where CV = catcher vessel and CP = catcher/processor.

Table 10-40 Description of variables used in the community engagement ranking

Variable	Source	Description
disemb_ssltrips	Observer data	CP trips to catch AI pcod/atka that disembarked to the community
emb_ssltrips	Observer data	CP trips to catch AI pcod/atka that embarked from the community
ton_pcat	CFEC Fish Tickets	Metric tons of AI pcod/atka landed in the port by CVs
port_shton	CFEC Fish Tickets	The share of total CV landings in a community that were from AI pcod/atka
shton_pcat	CFEC Fish Tickets	The community's share of total CV landings of AI pcod/atka
shton_pcat_cas	Catch Accounting System and CFEC Fish Tickets	The community's share of total catch (CPs and CVs) of all AI pcod/atka. CP catch is attributed to the vessel owner's community
cvcount	AKFIN	Number of CVs with vessel owner's residence in the community
cpcount	AKFIN	Number of CPs with vessel owner's residence in the community

These eight variables are included to account for five main factors affecting a community's engagement in the AI pcod/atka commercial fisheries: catcher/processor visits, pounds delivered to shoreside processors, shoreside processor dependence on AI pcod/atka, a community's share of the total catch of AI pcod/atka, and ownership of vessels participating in these commercial fisheries. Firstly, *disemb_ssltrips* and *emb_ssltrips* reflect the number of times a catcher/processor stopped in a community prior to or immediately after fishing for AI pcod/atka to either get fuel and crew or offload their catch, which can have an important economic impact for small communities. Secondly, *ton_pcat* represents the total pounds of AI pcod/atka delivered to shoreside processors, which will impact processing employment in these communities. Thirdly, *port_shton* is the percentage of total shoreside deliveries in a community that are from AI pcod/atka, which reflects how dependent a community is on these commercial fisheries. Fourthly, *shton_pcat and shton_pcat_cas* reflect the importance of these communities in regard to total

[250] This attachment consists of notes written by Stephen Kasperski and represents work carried out by Stephen Kasperski, Industry Economist, and Amber Himes-Cornell, Social Scientist, of the Economic and Social Science Research Program at the NMFS Alaska Fisheries Science Center. These notes have been edited slightly for inclusion in this document.

[251] It is important to note that this engagement exercise was used as an initial screening device to determine which communities should be considered for closer characterization (through the development of community profiles) in the community impacts analysis found in Chapter 10 of the Steller Sea Lion Protection Measures EIS (to which this document is an attachment) based on their absolute and relative engagement in the potentially directly affected Atka mackerel and Pacific cod fisheries. As described in Chapter 10, communities were also included in the community profiles in the analysis based on their proximity to the area potentially affected by the management action and/or based on their engagement in other natural resource-based activities of local importance that could potentially be affected by the proposed fishery management action or alternatives, such as subsistence use of Steller sea lions in the AI subarea, engagement in the AI pollock fishery, or subsistence use of Atka mackerel, Pacific cod, and/or pollock in the AI subarea. This community engagement ranking exercise was used primarily to determine which communities outside the AI subarea itself should be further examined for dependency on the AI Atka mackerel fishery or the Pacific cod fishery in the AI subarea as part of the community impact assessment process, as discussed in Chapter 10 (specifically Section 10.1.2.2).

AI pcod/atka catch. The variable *shton_pcat* reflects the community's share of all shoreside landings of AI pcod/atka, and *shton_pcat_cas* is the total catch of all AI pcod/atka (much of which is not delivered to shoreside processors), where CP catch is attributed to the vessel owner's community since rents from these fisheries are likely to flow into that community. Lastly, *cvcount* and *cpcount* incorporate vessel ownership of both catcher vessels and catcher/processors that participate in this fishery because resource rents are likely to flow into those communities.

There are 34 communities that had values greater than zero for at least one of the above variables. A principal components analysis was run on the data for these 34 communities. Overall, 90.7 percent of the variance is explained in this analysis. Results from the varimax rotated principal components analysis, keeping only eigenvalues greater than 1, are shown in Table 10-41.

Table 10-41 Principal components analysis results

Factor analysis/correlation			Number of observations = 34	
Method: principal–component factors			Retained factors = 2	
Rotation: orthogonal varimax (Kaiser on)			Number of parameters = 15	
Factor	Variance	Difference	Proportion	Cumulative
Factor1	4.52175	1.78580	0.5652	0.5652
Factor2	2.73595	-	0.3420	0.9072

LR test: independent vs. saturated: chi2(28) = 1611.18 Prob>chi2 = 0.0000

Rotated factor loadings of the variables are presented in Table 10-42. There are two principal components from these eight variables that can be described as (1) CV pounds and CP visits, the first five variables from Table 10-42: *disemb_ssltrips, emb_ssltrips, ton_pcat, port_shton, shton_pcat*; and (2) *index_ssl_2* = index score for the 2nd component (Vessels and CP pounds, the last three variables from Table 10-42: *shton_pcat_cas, cvcount,* and *cpcount*). Communities with the same value for all variables will have the same index scores and are ranked together as a tie.

Table 10-42 Rotated factor loadings (pattern matrix) and unique variances from the principal components analysis

Variable	Factor1	Factor2	Uniqueness
disemb_ssltrips	0.9600	-0.0112	0.0782
emb_ssltrips	0.9462	-0.0120	0.1045
ton_pcat	0.9984	-0.0075	0.0031
port_shton	0.8433	0.0007	0.2888
shton_pcat	0.9978	-0.0074	0.0043
shton_pcat_cas	0.0160	0.9138	0.1648
cvcount	-0.0237	0.9583	0.0811
cpcount	-0.0157	0.9911	0.0174

Using the results from the principal components analysis, we use the regression method to calculate index scores for each community for each factor (*index_ssl_1* = index score for the 1st component and *index_ssl_2* = index score for the 2nd component), and then sum both index scores to get a combined index score for each community (*c_index_ssl = index_ssl_1+ index_ssl_2*, which implies that each factor is equally weighted as is common in the literature).[252] This combined index score represents the

[252] An alternative to equal weighting of each factor would be to weight each factor by the amount of variation the factor explains. Therefore the weighted index score would equal .5652 times the *index_ssl_1* plus .3420 times *index_ssl_2*. However, since there were only two factors, and they are not too different from .5, this new weighting scheme only alters the rankings

community's engagement in the AI pcod/atka fisheries relative to other communities. This means that the index scores are relative and does not mean that a community with a value of 2 is twice as engaged as a community with a score of 1, but the index scores can be used to rank communities relative to one another. Index scores and ranks for the 35 communities are listed in Table 10-43.

Table 10-43 Community engagement index scores and rankings

Port	City	index_ssl_1	rank_ssl_1	index_ssl_2	rank_ssl_2	c_index_ssl	c_rank_ssl
SEA	Seattle	-0.20351	4	5.413402	1	5.209896	1
ADA	Adak	4.759231	1	0.004887	3	4.764118	2
DUT	Unalaska (Dutch Harbor)	2.916209	2	-0.08672	4	2.829489	3
RENTON	RENTON	-0.2123	5	1.455307	2	1.243003	4
BEL	Bellingham	-0.24424	34	-0.13004	5	-0.37428	5
ROCKLAND	ROCKLAND	-0.24342	7	-0.15924	6	-0.40267	6
EVT	Everett	-0.24363	8	-0.16789	7	-0.41152	7
ANC	Anchorage	-0.24398	11	-0.17953	8	-0.42351	8
KOD	Kodiak	-0.24415	32	-0.18518	9	-0.42932	9
LYNNWOOD	LYNNWOOD	-0.24415	32	-0.18518	9	-0.42932	9
AKU	Akutan	-0.19788	3	-0.25858	30	-0.45647	11
GIG HARBOR	GIG HARBOR	-0.2441	28	-0.21275	11	-0.45684	12
KAILUA KONA	KAILUA KONA	-0.2441	28	-0.21275	11	-0.45684	12
PBG	Petersburg	-0.2441	28	-0.21275	11	-0.45684	12
SHORELINE	SHORELINE	-0.2441	28	-0.21275	11	-0.45684	12
MILL CREEK	MILL CREEK	-0.24388	9	-0.23467	15	-0.47855	16
HOM	Homer (& Iliamna)	-0.24398	12	-0.24031	16	-0.48428	17
ANA	Anacortes	-0.24405	15	-0.24032	17	-0.48437	18
ANCHOR POINT	ANCHOR POINT	-0.24405	15	-0.24032	17	-0.48437	18
COOS BAY	COOS BAY	-0.24405	15	-0.24032	17	-0.48437	18
COR	Cordova	-0.24405	15	-0.24032	17	-0.48437	18
HNS	Haines	-0.24405	15	-0.24032	17	-0.48437	18
JNU	Juneau	-0.24405	15	-0.24032	17	-0.48437	18
LAKEWOOD	LAKEWOOD	-0.24405	15	-0.24032	17	-0.48437	18
MERCER ISLAND	MERCER ISLAND	-0.24405	15	-0.24032	17	-0.48437	18
NIKOLAEVSK	NIKOLAEVSK	-0.24405	15	-0.24032	17	-0.48437	18
NPT	Newport	-0.24405	15	-0.24032	17	-0.48437	18
REEDSPORT	REEDSPORT	-0.24405	15	-0.24032	17	-0.48437	18
SEQUIM	SEQUIM	-0.24405	15	-0.24032	17	-0.48437	18
SILETZ	SILETZ	-0.24405	15	-0.24032	17	-0.48437	18
STP	St Paul	-0.22939	6	-0.26785	32	-0.49724	31
WOODINVILLE	WOODINVILLE	-0.244	13	-0.26758	31	-0.51157	32
KCO	King Cove	-0.24389	10	-0.26786	33	-0.51176	33
SPT	Sand Point	-0.244	14	-0.26788	34	-0.51188	34

Based on the index scores, Seattle is the most heavily engaged community, mainly due to the sheer number of vessels that are owned by people in Seattle (the average is nearly 20 CVs and 15 CPs) and those vessels account for a large percentage of the AI pcod/atka catch. Adak is a close second due to the number of times CPs visited the port, the high proportion of AI pcod/atka pounds in the total pounds delivered in Adak, and the large share of AI pcod/atka shoreside deliveries occurring in Adak. Dutch Harbor/Unalaska is third for the same reasons as Adak, with the exception that AI pcod/atka account for a much smaller share of the total deliveries into Dutch Harbor. Renton, Washington, is another engaged community in the AI pcod/atka fisheries because, while there are 3 CPs and 0.5 CV vessel owners in Renton (on average), those vessels account for a substantial portion of the catch of AI pcod/atka. Given that Seattle and Renton are close to one another within a common metropolitan area, are engaged in the AI pcod/atka fishery in the same manner (number of vessels and the share of total AI pcod/atka catch),

slightly, as Adak moves to number 1, Seattle moves to number 2, while Dutch Harbor and Renton retain their same rankings. These four communities are still the only communities with positive index scores.

and the AI pcod/atka fishery makes up a small amount of the total economic activity in these cities, it seems reasonable to combine the two cities into a larger regional entity for the purposes of profiling the communities.

For both the combined index scores and the weighted index scores: Seattle, Adak, and Unalaska are 2 standard deviations above the mean index score and Renton is just below the mean plus 1 standard deviation. None of the other communities are even above the mean for either index. These four communities are clearly the only communities with meaningful levels of participation in the commercial fisheries for AI pcod/atka. Only Adak and Dutch Harbor have averaged more than 1 CP visit immediately before or after a AI pcod/atka fishing trip per year. These two are also the only communities to have more than 225 tons of AI pcod/atka delivered shoreside (Akutan has slightly less than 225 tons delivered, and no other community has more than 1 ton). The vessels that are owned by entities in Seattle and Renton combine to catch nearly 75 percent of all AI pcod/atka. While the choice of variables to include in the principal components analysis is subjective, the data show a divide between the engagement of these four communities and all others. The principal components analysis is used as a tool to confirm what is clearly shown in the data.

10.9.3 Attachment C: Indirect Impacts on Subsistence Activities other than Direct Use of Steller Sea Lions, Atka mackerel, Pacific Cod, and/or Pollock

10.9.3.1 Overview

As noted in Section 10.4.5.1.3, beyond direct use of Steller sea lions or Atka mackerel and/or Pacific cod as subsistence resources, the commercial groundfish management measures designed to protect Steller sea lions could have impacts on other subsistence pursuits. These types of impacts fall into two main categories:

- Impacts to other subsistence pursuits as a result of loss of income from the commercial groundfish fishery. This income could be used to purchase fuel, vehicles, and other subsistence-related gear, or otherwise offset expenses required to engage in a range of subsistence pursuits.

- Impacts to other subsistence pursuits as a result of the loss of opportunity to use commercial fishing gear and vessels for subsistence pursuits. This would result from vessels not being ready to go as a result of being prepared for commercial fishing or from the simultaneous harvest of fish and game resources during commercial fishing forays where these assets are used in such a manner that "commercial and subsistence catches are jointly produced, based on shared use of fixed and variable inputs."

These two main categories are discussed in turn below.

10.9.3.2 Impacts Related to Loss of Income

With regard to the first type of potential impact, loss of income resulting in funds not being available for subsistence pursuits, this is a very complex issue. Among the factors involved:

- Loss of income can impact everyone associated with the fishery, and people associated with the fishery live in communities ranging across Alaska and the Pacific Northwest. Of the income that

is lost to individuals who live in communities where subsistence is pursued, income may or may not be used for subsistence expenses.

- Income specifically contributed by groundfish pursuits may be a larger or smaller proportion of the funds used for subsistence by individuals or families.

- The relationship between loss of income to specific subsistence outcomes is not entirely straightforward. Clearly, income is required for contemporary subsistence pursuits and a loss of income could and would decrease subsistence efforts if the loss of income were of a sufficient magnitude across the groups that pool resources (e.g., extended families or entire communities in some cases) or engage in subsistence harvests or sharing. However, factors that influence participation in subsistence activities are many and complex. An increase of income may decrease subsistence activity (e.g., if the source of the income requires a time commitment away from subsistence pursuits) or an increase in subsistence activity (e.g., if the income is used to increase the efficiency of subsistence pursuits that are undertaken). A decrease in income may decrease subsistence involvement (e.g., it is more difficult to afford fuel for vessels used for subsistence) or increase subsistence involvement (e.g., subsistence represents a more attractive alternate activity of income producing activities are curtailed). This type of analytic difficulty in assessing the indirect subsistence outcomes of alternatives that may impact income—i.e., there is not a linear relationship between income and subsistence—is further discussed below.

- Previous field experience would indicate that subsistence strategies are, at least in part, flexible in nature and are readily adapted to the level of cash flow available. For example, when cash is relatively plentiful, subsistence activities may take place over a wider geographic area as new areas are explored for what may be marginal returns, but when cash becomes less available, subsistence is pursued with a more economic strategy, with the activity becoming more focused and cash efficient.

- Income associated with the groundfish fishery can derive from direct participation (e.g., employment), investment (e.g., vessel or processor ownership), and/or control of quota (e.g., CDQ related revenues).

- CDQ communities represent a special case in that these are virtually the only communities where subsistence is heavily practiced and that benefit from the fishery primarily through investment (and control of quota).

- Different CDQ groups have chosen different organizational structures and strategies for use of funds derived from the program (and have had varying degrees of success with investments). As a result, there are effectively different levels of income to individuals and families in different CDQ communities.

- CDQ programs focused on employment and training may, in turn, indirectly influence individual subsistence spending and participation decisions.

10.9.3.3 Impacts Related to Loss of Joint Production Opportunities

The second type of potential impact, loss of opportunity for joint production, applies to groundfish communities with direct participation in the fishery (i.e., only vessels that currently participate in the commercial fishery can be used for joint production). Below are some general points about the vessels involved, followed by points about the communities involved.

- Not all vessels in the commercial groundfish fishery are used for subsistence in addition to commercial fishing.

- Depending on the community involved, a greater or lesser proportion of the fleet engaged in the local commercial groundfish fishery is a non-resident fleet.

- Joint production can occur in at least two fundamentally different ways. Subsistence fish can be retained during what are otherwise commercial trips, or separate trips may be taken that focus on subsistence.

- As a general rule, trips specifically dedicated to subsistence are uneconomic for the larger vessels engaged in the groundfish fishery. Larger vessels also tend to fish more away from the community of residence of owner, skipper, and crew; therefore, subsistence use is not practical even during what could otherwise be combined commercial/subsistence trips. For the largest vessels participating in the fishery, there is no indication of any subsistence utilization in any form. (For the large vessels that are based in communities were subsistence does take place, dedicated subsistence trips for fishing may be unusual, but it is known from field interviews that sometimes larger vessels are used to make hunting trips with several persons going at once.)

- Smaller vessels are most likely to be involved in joint production.

- The proportion of the total subsistence production for individual communities that results from joint production from these particular vessels during the groundfish fishery is unknown, but as a general rule of thumb, the smaller vessel classes are less likely to be narrowly specialized than the larger vessels. Nearly all of the smaller class vessels that engage in the groundfish fishery are also involved in some combination of (or all of) the salmon, halibut, sablefish, and herring fisheries. Joint production opportunities would presumably still exist during pursuit of fisheries other than those potentially altered or reduced by the proposed alternatives. This is true both for the vessels engaged in the groundfish fishery, as well as for other vessels in the community that are not engaged in the groundfish fishery. As most if not all vessels are going to be gearing up anyway, the vessel will have had its annual maintenance (fixed costs) taken care of regardless, as long as the vessel is operating in some (any) fishery. Variable costs of subsistence may increase if vessels have to make more dedicated subsistence trips to achieve desired catch levels.

- For those small vessels engaging in other fisheries in addition to the groundfish fishery, the time of the year that the vessel would be available for joint production may decrease if the reduction of the commercial groundfish fishery were of a sufficient magnitude. For example, if a vessel owner decided not to prepare the vessel for pursuit of Pacific cod in March, but rather waited to get the boat ready for the year until a salmon opener in May, there may be subsistence opportunities forgone in the period the vessel was not available. Similarly, some vessel owners may put their vessels to bed for the winter sooner than they otherwise would have, such that other joint production subsistence opportunities are forgone at the end of the year.

- In practical terms, joint production opportunities vary by gear type as well as vessel size. Although quantitative data are slim, knowledge of the industry would suggest that little subsistence takes place using trawl vessels compared to other gear types. Among the non-trawl classes, much more time is directed toward sablefish, salmon, and herring than is devoted to groundfish; therefore, the joint production opportunities in this class would remain relatively independent of the groundfish management alternative chosen.

- Previous field observations and discussions would indicate that almost all commercial vessel owners resident in communities where subsistence takes place also own at least one skiff from which they can engage in subsistence pursuits, so even if the larger commercial vessel is not available for any number of reasons, it will not mean the discontinuation of subsistence efforts. Even if a commercial vessel owner does not individually own a skiff, it is a truism of village life that there will always be other vessels owned by sons, fathers, brothers, other kin, or neighbors. It is also important to note that if commercial fishing time goes down, it is likely that subsistence activities will increase, because the relative importance of subsistence in the household economy (e.g., supplying food for the table) will increase.

- Previous field observations would indicate that different individuals look at the balance between commercial and subsistence catches during times of scarcity or forced decision making in very different ways. From one point of view, if the fishing is poor, the vessel owner should direct effort to the greatest extent possible toward the commercial catch in order to get at least some economic return out of a scarce resource for the family or household economy. From the other point of view, if conditions are bad, subsistence fishing should be accomplished first, because subsistence takes care of the basic need to put food on the table in the most direct way possible. Clearly both points of view are held, and both strategies are pursued by different individuals, and this is illustrative of another dimension of the complex relationship between commercial and subsistence pursuits.

- CDQ-owned vessels that participate in the groundfish fishery largely do not participate in subsistence activities. Although CDQ communities in general have relatively high levels of subsistence engagement, CDQ-owned vessels participating in the groundfish fishery may not be based in those communities (i.e., they are an investment that is not directly run out of one of the communities, as is the case for ownership interest in catch processors). Other CDQ-owned vessels do not participate in the groundfish fishery (or those portions of the groundfish fishery that could change as a result of the alternatives) at all, or at only very low levels. For example, some CDQ-owned vessels concentrate nearly exclusively on the salmon fishery, while others focus on halibut and sablefish.

- As noted earlier, factors involved in whether or not individuals engage in subsistence pursuits are multiple and complex, and this applies to vessels as well. Some data from ADF&G (and mentioned in the Steller sea lion subsistence section (Section 10.4.5.1.1), above) suggest that, in at least some instances, level of engagement in subsistence activities declines when individuals are engaged in commercial pursuits. Therefore, it may be the case for at least some individuals that if their commercial groundfishing activity declines, their direct participation in subsistence activities may increase. Field interviews and other studies (Wolfe et al. 2010; see also Wolfe & Walker 1987) suggest that, in other cases, households that are the most economically successful in a given community are considered "super-households" and are often among the highest subsistence producers, sharing their subsistence resources with other households.[253] This likely results from these individuals having access to more income to purchase better or more efficient equipment (and to be able to afford to engage in activities that require cash outlay for longer periods of time), and the flexibility of schedule that often comes with higher paying employment, among other individual or personal factors. In sum, the factors leading to subsistence participation are many and even appear to be contradictory in some cases.

[253] This general point is also developed on the ADF&G website Subsistence FAQ at http://www.adfg.alaska.gov/index.cfm?adfg=subsistence.faqs#QA5.

In summary, the indirect impact of the alternatives on subsistence is difficult to assess for the reasons discussed in this attachment. In general, however, a loss of income that would have been otherwise used to underwrite subsistence pursuits may influence subsistence activities in a wider range of communities, including the CDQ communities, while joint production impacts in particular are likely to be concentrated among small vessel owners in a relatively small number of communities. Given the nature of the fisheries, vessels, and geographies involved, the residents of Adak and Atka are those individuals likely to be the most vulnerable to the latter kind of indirect impacts to subsistence.

10.9.4 Attachment D: Overview of Research on Contemporary Fishery Management Actions and Sociocultural Impacts

As discussed in Section 10.5.2, fishing regulatory actions can result in a wide range of social and sociocultural impacts in rural fishing communities. For many residents of these communities, fishing is not seen as merely a commercial venture, but an integral part of self-identity. A number of researchers have explored the relationship between contemporary fishery management actions and the sociocultural impacts that can result, including impacts to identity. This attachment provides a brief survey of existing literature. It is not meant to be comprehensive but is intended to indicate the types of research being conducted within rural Alaska on these issues and the potentially interactive nature of the present proposed management actions with other management actions that have taken place in recent years.

- Dr. Courtney Carothers has focused regularly on marine resource conservation and management in Alaska in her academic work. In her article in *Human Organization* entitled, "Equity and Access to Fishing Rights: Exploring the Community Quota Program in the Gulf of Alaska" (Carothers 2011), Carothers discusses the Community Quota Program, which instead of giving a quota to an individual or single vessel, gives quota to a community that has created a formal organization (501[c]3) or Community Quota Entity. Its purpose is described by Carothers: "The Community Quota Program was designed to redistribute fishing opportunities by enabling small remote fishing communities in the Gulf of Alaska to utilize collective resources to purchase and retain fishing rights" (Carothers 2011). Carothers suggests that these organizations help, but do not alleviate, the inequality to access experienced by small fishing-dependent communities and individuals. In discussing the status of the Community Quota Program, Langdon and Springer point out that the traditional pattern for many communities is for broad participation by many, rather than privatized quotas owned and fished by the few (Langdon and Springer 2006). The authors describe the impacts and note that, "Opportunities for entry participation in fisheries are virtually nonexistent and they are the most available opportunities in villages" (Langdon & Springer 2006).

- In "Fishing Rights and Small Communities: Alaska Halibut IFQ Transfer Patterns" (Carothers et al. 2010), the authors discuss quota share emigration and how halibut IFQ has resulted in small rural fishing communities (especially those with populations of 1,500 or less) having disproportionately lost fishing rights and how Alaska Native communities are more likely to sell than buy quota. Since quotas have an attached monetary value, many small community residents tend to sell their quotas in tough financial times. The authors also discuss how the quota share market behavior is linked to these small rural fishing communities through the redistribution process of the community selling their quota shares to larger communities, or collectives. The authors describe how, in order to make the program more equitable, the Council started the "Community Purchase Program" for 42 communities of 1,500 people or less.

- Focusing specifically on Aleut and Alaska Native fisheries, Dr. Katherine Reedy-Maschner discusses similar issues. She recently published an ethnographic view of Alaska Native fisheries and the attitudes and beliefs of those that fish the fishery (Reedy-Maschner 2010). Maschner suggests that Alaska Native fishermen's views on marine resources and management can be at odds with environmentalists and conservation/management programs because their use of the marine environment differs from that of at least some other commercial fishermen. She finds that a number of programs more broadly targeted at commercial fishermen in general do not take into account the particular context and operational realities of a substantial portion of Alaska Native fishing operations and suggests that some programs serve to undercut the ability of Alaska Native fishermen to follow traditional cultural patterns of marine resource utilization.

- "'Rationalized Out': Discourses and Realities of Fisheries Privatization in Kodiak, Alaska" (Carothers 2008a) discusses how the rationalization framework is biased toward maximizing profit each season, rather than accommodating seasonal ups and downs in both profit and biomass. Carothers suggests, "By prioritizing efficient profit generation, the rationalization framework is not embraced as rational, but rather as antithetical to village-based fisheries. The flexible nature of village fishing (i.e., fishing when income is needed and living with the ups and downs) is constrained by rationalization policies that commodify fishing rights." Carothers quotes a resident of Ouzinkie as saying, "The young people have been aced out of the fishing…you know, permits…which we are going to try to change." As described by Carothers, individualization and privatization of fishing rights have been linked by many small village residents to their community's decrease in fishing participation.[254]

- Emilie Springer's thesis, *Through a Cod's Eye: Exploring the Social Context of Alaska's Bering Sea Groundfish Industry,* is another example of the kind of research being done that looks at broader social issues and effects of marine resource management (Springer 2007). Springer discusses how fishermen of groundfish in the Bering Sea (specifically cod), describe their participation in commercial fishing. Springer presents Bering Sea cod fishermen as a representative sample of individuals in other groundfish fisheries, as well as Bering Sea crab fisheries and Alaska state water fisheries. With the exception of vessels using pot gear, Springer notes that, during the 1990s, fishermen in the Bering Sea cod fleet experienced a number of changes, including those resulting from the Community Development Quota program, the License Limitation Program, and Stellar sea lion protection measures. Springer suggests that, as a result of those changes, the fleet matured and opportunities for new, young fishermen were reduced as the fleet was able to fish on a more consistent schedule.[255]

- Dr. Meredith Marchioni explores personal belief and intention in her doctoral dissertation, *Attitudes Towards the Marine Environment and Implications for Marine Resource Management in Seward, Alaska* (Marchioni 2009), and notes that each individual's attitudes [of those studied] toward the marine environment is influenced by the role they play in the marine environment, whether as a commercial fisherman or non-participant. Marchioni notes that each group has their own intentions and ideas about the marine environment, and that, while they may be consistent within each group, these ideas differ widely between groups. She suggests that regional

[254] Many of the issues explored by Carothers in recent articles are presented either in full or in part in her doctoral dissertation, *Privatizing the Right to Fish: Challenges to Livelihood and Community in Kodiak, Alaska* (Carothers 2008a), in which Carothers explores the difficulties experienced by fishermen in Kodiak, Alaska, as a result of rationalization and IFQs. She also discusses the halibut IFQs distributive outcomes and associated predictable patterns of participation in the quota market by different groups of quota holders.

[255] Springer's conclusions do not include vessels using pot gear; she suggests more opportunities for younger crew members are present on pot gear vessels due to the physically demanding nature of the gear.

commercial and sport fishermen more closely engaged in day-to-day fishing operations tend foremost to hold a pragmatic view of marine resources and environment while the views of those more closely engaged in day-to-day management and conservation initiatives tend to be more influenced by what could be termed a more generalized environmental science or Western environmentalist perspective.

10.10 Index

ACDC, 10-68, 10-90, 10-106
Adak, 10-5, 10-6, 10-8, 10-9, 10-13, 10-15, 10-17 to 10-34, 10-53, 10-56 to 10-58, 10-62 to 10-71, 10-75, 10-84, 10-85, 10-89 to 10-96, 10-101 to 10-107, 10-109 to 10-111, 10-113 to 10-115, 10-124, 10-130, 10-139, 10-142, 10-144 to 10-146, 10-150
Akutan, 10-15, 10-17, 10-20, 10-23, 10-53, 10-54, 10-81 to 10-85, 10-87, 10-92, 10-95, 10-100, 10-113, 10-139, 10-145, 10-146
Aleut Corporation, 10-20, 10-22, 10-23, 10-25, 10-28, 10-30, 10-31, 10-52, 10-65, 10-67, 10-68, 10-86, 10-89 to 10-94, 10-103 to 10-106, 10-115
Anacortes, 10-6, 10-13, 10-79, 10-132, 10-145
Anchor Point, 10-13, 10-81 to 10-83, 10-85, 10-109, 10-130
Anchorage, 10-11, 10-13, 10-15, 10-17, 10-22, 10-25, 10-39, 10-81 to 10-85, 10-104, 10-109, 10-125, 10-130, 10-139, 10-145
APICDA, 10-24, 10-34, 10-36, 10-37, 10-54, 10-62, 10-71, 10-72, 10-86, 10-89, 10-106, 10-111 to 10-113
Atka, 10-1, 10-5, 10-6, 10-8, 10-9, 10-15, 10-17, 10-20, 10-24, 10-33 to 10-39, 10-54, 10-56 to 10-59, 10-62, 10-71 to 10-73, 10-87, 10-92, 10-95, 10-96, 10-98, 10-101, 10-102, 10-105 to 10-107, 10-110 to 10-115, 10-139, 10-150
Attu, 10-25, 10-34, 10-53, 10-54
Bellevue, 10-6, 10-132
Bellingham, 10-6, 10-11, 10-13, 10-22, 10-79, 10-105, 10-109, 10-126, 10-132, 10-145
CDQ, 10-22, 10-28, 10-30, 10-36, 10-43, 10-44, 10-54, 10-57, 10-58, 10-62, 10-68, 10-82, 10-85 to 10-87, 10-89, 10-94, 10-102, 10-104, 10-113, 10-115, 10-148, 10-150
Cold Bay, 10-92
Cordova, 10-13, 10-81 to 10-83, 10-85, 10-109, 10-130, 10-145
CQE, 10-68, 10-106
crab rationalization, 10-3, 10-66, 10-71, 10-90, 10-106, 10-107, 10-111
Edmonds, 10-6, 10-126
environmental justice, 10-1, 10-8, 10-9, 10-69, 10-72, 10-76, 10-81, 10-87, 10-93
Everett, 10-6, 10-15, 10-16, 10-137, 10-145
False Pass, 10-54, 10-88, 10-92
Gig Harbor, 10-6, 10-127, 10-145
homeport, 10-3, 10-19, 10-20, 10-24, 10-104
Homer, 10-15, 10-17, 10-81, 10-83 to 10-85, 10-109, 10-140, 10-145
IFQ, 10-106, 10-151, 10-152
Juneau, 10-3, 10-13, 10-81 to 10-83, 10-85, 10-104, 10-109, 10-131, 10-145
Ketchikan, 10-13, 10-81 to 10-83, 10-85, 10-109, 10-131
King Cove, 10-3, 10-15, 10-17, 10-23, 10-66, 10-83 to 10-85, 10-92, 10-104, 10-113, 10-140, 10-145
Kirkland, 10-6, 10-133
Kodiak, 10-11, 10-13, 10-15, 10-17, 10-23, 10-43, 10-81 to 10-85, 10-97, 10-104, 10-109, 10-125, 10-131, 10-140, 10-145, 10-152
Lakewood, 10-6, 10-127, 10-145
Lynden, 10-6, 10-15, 10-16, 10-80, 10-137
Lynnwood, 10-6, 10-127, 10-145
Mercer Island, 10-6, 10-127, 10-145
National Standard 8, 10-1, 10-2, 10-9, 10-94, 10-111
Nelson Lagoon, 10-54, 10-88, 10-92
Nikolski, 10-54, 10-88, 10-92, 10-95, 10-100
Petersburg, 10-11, 10-81, 10-82, 10-85, 10-104, 10-109, 10-125, 10-145
Preclusion, 10-24, 10-62, 10-105, 10-111, 10-115
Renton, 10-6, 10-128, 10-144 to 10-146
Sand Point, 10-11, 10-15, 10-17, 10-22, 10-23, 10-66, 10-81 to 10-85, 10-92, 10-104, 10-107, 10-109, 10-125, 10-126, 10-140, 10-145
Seattle, 10-6, 10-10 to 10-16, 10-22, 10-39, 10-47 to 10-53, 10-56, 10-57, 10-60, 10-61, 10-77 to 10-81, 10-104, 10-105, 10-107, 10-109, 10-113, 10-128, 10-133, 10-136, 10-137, 10-144 to 10-146
Seward, 10-15, 10-17, 10-81, 10-83 to 10-85, 10-141, 10-152
Shemya, 10-53
Shoreline, 10-6, 10-133, 10-145
St. George, 10-23, 10-39, 10-54, 10-88, 10-100
St. Paul, 10-15, 10-17, 10-20, 10-23, 10-39, 10-54, 10-81, 10-83 to 10-85, 10-88, 10-90, 10-92, 10-100, 10-141
Sustained Participation, 10-2, 10-8, 10-9, 10-24, 10-62, 10-94, 10-106, 10-111, 10-114

Unalaska, 10-6, 10-8 to 10-9, 10-11, 10-13, 10-15, 10-17 to 10-21, 10-23, 10-25, 10-33, 10-34, 10-39 to 10-47, 10-53, 10-54, 10-56, 10-57, 10-59, 10-60, 10-64, 10-65, 10-67, 10-69, 10-71, 10-73 to 10-76, 10-84, 10-85, 10-92, 10-95, 10-100, 10-101, 10-103, 10-105, 10-109, 10-110, 10-113 to 10-115, 10-124, 10-126, 10-131, 10-141, 10-142, 10-145, 10-146

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11.0 RESEARCH NEEDS

As the research branch of NMFS, the Alaska Fisheries Science Center (AFSC) is responsible for research on living marine resources in the coastal oceans off Alaska and off parts of the west coast of the United States. The mission of the AFSC is to plan, develop, and manage scientific research programs that generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. Information required to understand, manage and conserve living marine resources includes information on fisheries, oceanography, marine mammals, and environmental characteristics. These data are used to develop policies and strategies for fisheries management within the U.S. Exclusive Economic Zone, monitor and assess the health of the region's marine mammal populations, and develop the scientific understanding and predictive methodologies needed to implement NMFS's ecosystem approach to management.

The periodic surveys used for groundfish fisheries stock assessments were analyzed in the 2010 FMP Biological Opinion, and the conservation recommendations of that biological opinion included studies of fisheries interactions with Steller sea lions (NMFS 2010). The implementation of any research projects described here is dependent on funding.

If research is likely to have an effect on an ESA-listed species, then an Endangered Species Act (ESA) consultation is required before the research may be permitted. This requirement has made it difficult to implement research on fisheries interactions with Steller sea lions in the past because the amount of time needed to conduct a consultation has prevented the issuance of the scientific research permit in time to use the available research funding. By including in this environmental impact statement (EIS) the analysis of research to support fisheries management and to further understand potential fisheries interaction with Steller sea lions, any future ESA consultation can refer to proposed research analyzed in this EIS, thereby facilitating timely completion of the research permitting process.

11.1 Groundfish Fisheries

11.1.1 Fisheries Surveys

11.1.1.1 On-Going Groundfish Surveys

The purpose of the AFSC Resource Assessment and Conservation Engineering Division groundfish surveys is to estimate the distribution and abundance and age structure of groundfish species. This information is essential to the annual stock assessments used in the determination of the annual acceptable biological catches and total allowable catches. Survey information is also used to allocate Atka mackerel catch in the Aleutian Islands among Statistical Areas 541, 542, and 543. The relevant surveys are echo integration-trawl surveys and bottom trawl surveys for pollock and bottom trawl surveys for Atka mackerel and Pacific cod. In addition, sablefish (*Anoplopoma fimbria*) and other groundfish resources such as Pacific cod and rockfish (*Sebastes* spp.) are surveyed with longlines.

Summer bottom trawl surveys of the eastern Bering Sea (EBS) shelf have been conducted annually since 1972, with the current standardized time series beginning in 1979. These surveys follow a systematic grid of sampling stations. A bottom trawl survey of the Bering Sea continental slope was conducted triennially from 1979 to 1991 and then continued on a biennial schedule starting in 2000 (the planned 2006 survey was canceled due to lack of funding). Triennial summer bottom trawl surveys for the Aleutian Islands began in 1980. The Aleutian Islands survey moved to a biennial schedule in 2000 with the 2008 survey canceled due to lack of funding. The Aleutian Islands and EBS continental slope surveys are based on area and depth-stratified random sampling among a set of predetermined stations. Echo integration-trawl (EIT) surveys in the Bering Sea have been conducted in a series of winter and summer annual and biennial surveys. Annual winter EIT surveys were initiated in 1988 to study pollock abundance in the vicinity of Bogoslof Island (except in 1990 and 2004). Summer EIT surveys of pollock on the Bering Sea shelf were conducted triennially from 1979 to 1994 and in 1996, 1997, and 1999 and then changed to a biennial schedule in 2000. The NMFS has surveyed the eastern Aleutian Islands biennially since 1996 and the EBS biennially since 1997. The Aleutian Islands were surveyed by longline in 2010 (Lunsford, Rodgveller, and Rutecki 2010). In summary, current surveys for Steller sea lion groundfish prey in the action area are as follows:

- Annual summer bottom trawl surveys of the EBS shelf
- Biennial summer bottom trawl surveys in the Aleutian Islands
- Annual winter EIT surveys in the Bogoslof area for pollock
- Biennial summer EIT survey of EBS shelf pollock
- Biennial summer longline survey of sablefish and other groundfish resources in the Aleutian Islands

Improving survey estimates for Pacific cod and Atka mackerel would require adding an additional vessel during the limited sampling window. This additional vessel could be used to substantially add sampling stations or sample alternative stations for targeted species in a synthetic sampling design that builds upon the long-term bottom trawl survey. Changes to survey design to optimize estimation of biomass for a single species would jeopardize its utility as a long-term multispecies survey. Additional data collection beyond the scope of the existing Aleutian Islands survey would require significant increases in AFSC funding and staffing.

Table 11-1, below, shows the survey catches of fisheries management species and other species inside and outside Steller sea lion critical habitat during the 2012 Aleutian Islands bottom trawl survey. Table 11-2 shows the survey catches of Pacific cod, Atka mackerel, and Pacific ocean perch inside and

outside Steller sea lion critical habitat for the same surveys in the past (1990–2012). Table 11-3 shows the survey catches during the 2012 Bogoslof area EIT survey. Table 11-4 shows the survey catches during the 2012 longline survey in the Aleutian Islands.

Table 11-1 2012 survey catches (kg) of fisheries management species and other species from the AFSC Bottom Trawl Survey in the Aleutian Islands outside and within Steller sea lion (SSL) critical habitat (CH)

Species	Outside SSL CH	Inside SSL CH	Total
Pollock	293.6	17,201.2	17,494.8
Pacific cod	562.3	12,879.1	13,441.4
Sablefish	35.1	625.5	660.7
Yellowfin sole		28.3	28.3
Greenland turbot	59.2	164.5	223.7
Arrowtooth Flounder	855.6	9,612.2	10,467.8
Rock soles	576.2	8,614.7	9,190.9
Flathead sole	39.4	1,042.3	1,081.7
Other flatfish	541.7	7,750.0	8,291.8
Pacific ocean perch	35,430.4	219,706.4	255,136.9
Northern rockfish	18,235.0	23,654.1	41,889.1
Shortraker rockfish	475.1	1,534.1	2,009.2
Rougheye rockfish	3.2	43.1	46.2
Other rockfish	916.6	6,678.4	7,595.0
Atka mackerel	15,869.3	46,130.7	62,000.0
Squid	530.0	356.2	886.1
Shark		8.7	8.7
Skate	1,499.0	4,726.1	6,225.1
Sculpin	552.3	3,333.2	3,885.5
Octopus	43.3	290.6	333.9
Pacific halibut	261.2	4,283.1	4,544.4
Chum salmon		16.9	16.9
Golden king crab	151.4	409.8	561.1
Tanner crab	0.0	15.2	15.3
Forage Fish Species	0.4	55.8	56.2
Non-FMP Fish	698.4	8,100.2	8,798.7
Non-FPM Invertebrate	4,575.2	15,016.3	19,591.5
Total	**82,204.0**	**392,276.9**	**474,481.0**

Table 11-2 Past (1990–2012) average, maximum, and minimum annual catches (kg) and 2012 survey catches of Pacific cod, Atka mackerel, and Pacific ocean perch from the AFSC Bottom Trawl survey inside and outside Steller sea lion (SSL) critical habitat (CH) in the Aleutian Islands management area

	Average	Maximum	Minimum	2012
Pacific Cod				
Southern Bering Sea	3,771	12,032	1,187	1,187
Inside SSL CH	3,771	12,032	1,187	1,187
Eastern Aleutians	9,992	26,043	3,992	6,806
Outside SSL CH	621	1,739	156	339
Inside SSL CH	9,371	24,305	3,729	6,467
Central Aleutians	6,833	17,218	2,805	3,270
Outside SSL CH	281	1,822	5	43
Inside SSL CH	6,552	17,034	2,795	3,227
Western Aleutians	4,219	6,451	2,178	2,178
Outside SSL CH	279	765	29	181
Inside SSL CH	3,940	5,794	1,997	1,997
AI Outside CH	**1,181**	**3,446**	**230**	**562**
AI Inside CH	**23,633**	**57,309**	**12,879**	**12,879**
AI Total	**24,814**	**59,538**	**13,441**	**13,441**
Atka Mackerel				
Southern Bering Sea	13,021	48,572	296	296
Inside SSL CH	13,021	48,572	296	296
Eastern Aleutians	23,530	68,609	129	7,718
Outside SSL CH	2,957	25,428	1	99
Inside SSL CH	20,573	43,182	125	7,620
Central Aleutians	47,231	81,670	20,811	20,811
Outside SSL CH	2,251	5,654	6	2,764
Inside SSL CH	44,980	81,315	18,047	18,047
Western Aleutians	41,121	96,206	16,660	33,174
Outside SSL CH	17,902	35,605	9,969	13,007
Inside SSL CH	23,219	60,600	5,753	20,168
AI Outside CH	**23,109**	**43,135**	**12,614**	**15,869**
AI Inside CH	**101,793**	**200,749**	**46,131**	**46,131**
AI Total	**124,902**	**239,684**	**62,000**	**62,000**
Pacific Ocean Perch				
Southern Bering Sea	8,554	19,334	950	9,377
Inside SSL CH	8,554	19,334	950	9,377
Eastern Aleutians	37,178	76,385	18,519	76,385
Outside SSL CH	9,707	14,680	1,338	7,133
Inside SSL CH	27,471	69,251	9,712	69,251
Central Aleutians	50,648	81,824	21,079	81,824
Outside SSL CH	3,565	9,679	705	2,629
Inside SSL CH	47,082	79,195	11,400	79,195
Western Aleutians	61,870	87,550	33,015	87,550
Outside SSL CH	25,896	43,745	12,250	25,668
Inside SSL CH	35,974	61,882	20,513	61,882
AI Outside CH	**39,168**	**62,751**	**23,520**	**35,430**
AI Inside CH	**119,082**	**219,706**	**50,043**	**219,706**
AI Total	**158,250**	**255,137**	**73,563**	**255,137**

Table 11-3 2012 survey catches (kg) from the Bogoslof Area echo integration-trawl survey. All catches are from Steller sea lion critical habitat.

Common name	Scientific name	kg	Nos.
pollock	*Theragra chalcogramma*	22,390.3	17,325
salmon shark	*Lamna ditropis*	89.3	5,830
brokenline lampfish	*Lampanyctus jordani*	8.8	6
lanternfish unidentified	Myctophidae (family)	4.1	546
northern smoothtongue	*Leuroglossus schmidti*	4.1	72
Pacific ocean perch	*Sebastes alutus*	4	2
squid unidentified	Teuthoidea (order)	3	10
Chinook salmon	*Oncorhynchus tshawytscha*	1.4	24
lamprey unidentified	Petromyzontidae	1.2	5
shrimp unidentified	Decapoda (order)	1	38
crested bigscale	*Poromitra crassiceps*	0.5	1
blackmouth eelpout	*Lycodapus fierasfer*	0.4	18
sea nettle	*Chrysaora melanaster*	0.2	109
pinpoint lampfish	*Lampanyctus regalis*	<0.1	1

Table 11-4 Catch in number by species for the 2012 NMFS longline survey in the Aleutian Islands

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
35[1]	8	1393	195	94	35	0	47	1	656	255
37[1]	203	114	1256	112	45	9	3	26	208	193
38	646	147	1432	94	195	64	79	278	65	24
39	360	555	1818	458	53	7	22	56	62	497
40	367	240	1262	111	73	47	26	179	48	186
42[2]	243	415	222	73	53	4	93	23	377	187
53	1124	112	404	85	127	11	270	292	146	313
54[2]	56	803	148	111	40	7	72	9	122	485
55	285	336	853	158	31	1	91	178	157	279
57	122	148	998	113	40	1	63	48	168	32
58[1]	153	161	679	196	44	2	219	250	218	65
59[1]	136	403	1262	241	50	0	260	62	90	572
60	125	757	157	222	12	0	1118	28	33	468
61[1,2]	71	0	426	0	2	1	0	77	36	15

SF = sablefish, PC = Pacific cod, GR = giant grenadier, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland turbot, RF = rougheye and shortraker rockfish, ST = shortspine thornyheads, SK = skate, OS = Other Species.

[1] Station catch was entirely or partially impacted by killer whale depredation.
[2] Station catch was partially impacted by gear loss.

11.1.1.2 Develop Pacific Cod Stock Assessment for the Aleutian Islands

Pacific cod (*Gadus macrocephalus*) is a transoceanic species, occurring at depths from shoreline to 500 meters. The southern limit of the species' distribution is about 34° N latitude, with a northern limit of about 63° N latitude. Pacific cod are distributed widely over the EBS as well as in the Aleutian Islands (AI) area. The resource in these two areas is managed as a single unit. Tagging studies (Shimada 1994) have demonstrated significant migration both within and between the EBS, AI, and Gulf of Alaska. However, recent research indicates the existence of discrete stocks in the EBS and AI (Canino, Spies, and Hauser 2005), (Canino et al. 2010), (Cunningham et al. 2009), and (Spies 2012). An evaluation of the effects of Pacific cod stock dynamics and the Pacific cod fishery on Aleutian Islands Steller sea lions would be improved if there were a separate Aleutian Islands stock assessment for Pacific cod. A separate Aleutian Islands stock assessment would likely result in improved fisheries management that could benefit Pacific cod and species that depend on Pacific cod for prey, such as marine mammals.

11.1.2 Fisheries Interaction with Steller Sea Lions

In late 2000 the Fishery Interaction Team (FIT) of the AFSC Resource Ecology and Fisheries Management Division was formed to investigate the effects of commercial fishing on top trophic level consumers. Members of the team are currently conducting studies to determine whether commercial fishing operations are capable of impacting the foraging success of Steller sea lions either through disturbance of prey schools or through direct competition for a common prey. The present research focus is on the three major groundfish prey of sea lions: walleye pollock, Pacific cod, and Atka mackerel.

FIT investigates the potential effects of commercial fishing on sea lion prey fields in two ways. First, by conducting field studies to directly examine the impact of fishing on sea lion prey fields and to evaluate the efficacy of trawl exclusion zones. The impetus for this work is to evaluate the hypothesis that commercial fishing may reduce the availability of prey in localized areas. The home range of a foraging Steller sea lion could be considered a localized area. A reduction in prey availability may result from a reduction in prey abundance and/or a disruption in the spatial patterns of sea lion prey.

The second way that FIT investigates the potential effects of commercial fishing on sea lion prey is by studying fish abundance, distribution, behavior, and life history at spatial scales relevant to sea lion foraging in 10 nm zones at Steller sea lion sites. This scale is much smaller than the spatial scales at which groundfish population dynamics are usually studied and at which stocks are assessed. This information is needed to construct a localized, spatially-explicit model of sea lion prey field dynamics that can be used to predict spatial and temporal shifts in the distribution and abundance of sea lion prey and potential effects of fishing on these prey fields. Studies of fish movement are a critical first step toward developing such a model. For example, regulations that assume fish remain stationary may not be effective if small-scale fish distributions are fluid. Likewise, localized consequences of fishing may be rendered undetectable using methods that assume that fish are stationary in time and place. Studies of fish reproductive dynamics are needed to assess variability in spawning condition over space and time and thus to improve our understanding of the processes underlying fish movement. In addition, spawning condition affects the nutritional value of prey seasonally. Fish food habits and growth are also important components of a model of sea lion prey field dynamics. FIT scientists thus are engaged in several studies of local fish ecology (e.g., movement, reproduction, and feeding).

Estimating the cost of fisheries interaction research is difficult. Many factors affect the cost of the research including where the funding comes from (Federal, state, industry cooperative agreements, non-profit organizations), who conducts the research (Federal, state, industry, university, or a combination of participants), disposition of fish harvested, number of days at sea needed for the project, weather, time of

the year, which vessels are used, pilot study work, and the vessel effort needed to complete the research. Much of fisheries interaction research is conducted through partnerships between government and industry, with funding coming from several sources. We therefore do not have information available to provide estimates of the total funding needed to complete various Steller sea lion fisheries interaction research projects.

11.1.2.1 Winter Season Groundfish Surveys

Winter season groundfish surveys are not, at present, routinely conducted by AFSC, so this is an unfulfilled research need. Winter is a critical season for Steller sea lions; of particular concern is the ability of females with pups to forage successfully and support the health and survival of their offspring while potentially carrying a developing fetus. Without an understanding of the wintertime distribution and abundance of sea lion groundfish prey, it is difficult to quantify the impact of commercial removals, the bulk of which occur in the winter season. Analyses of the potential for commercial fishing to impact the recovery of sea lions in the Aleutian Islands, detailed in the biological opinion on the Alaska groundfish fisheries (NMFS 2010), highlighted the need for data on the winter distribution of sea lion groundfish prey. Winter groundfish surveys are also needed to create seasonal models of fish biomass distribution relative to Steller sea lion critical habitat. Pacific cod, Atka mackerel, and other groundfish would be surveyed using bottom trawls, and pollock would be surveyed with echo integration-trawl methods. Because winter season groundfish surveys are not currently conducted, it is difficult to project the required survey catches. However, it is reasonable to expect that catches would be on a similar order of magnitude to those occurring during summer surveys described above (and see Table 11-2 and Table 11-3).

11.1.2.2 Tagging Studies of Pacific Cod and Atka Mackerel

Groundfish stocks in Alaska are assessed and managed at large “regional” spatial scales; however, important ecological interactions such as predation, spawning, and habitat selection occur on local spatial scales (Walters and Kitchell 2001). Furthermore, commercial fishing is a local activity with potential for localized effects (Fritz and Brown 2005). Improved understanding of the local abundance and movement patterns of fish is critical to understanding the potential for localized depletion of Steller sea lion prey by commercial fishing (Conners and Munro 2008).

Tag release-recovery methods are ideal for studying local fish abundance and movement. NMFS researchers have successfully conducted tag release-recovery studies of Atka mackerel at several locations in the Eastern and Central Aleutian Islands, Areas 541 and 542 (McDermott, Fritz, and Haist 2005) and (McDermott and Haist, in review), and of Pacific cod at Cape Sarichef in the Eastern Aleutian Islands (Conners, Munro, and Neidetcher 2004). Tagging methods for pollock are in development.

Tagging studies of Atka mackerel in the Western Aleutians Islands, Area 543, are needed, as are tagging studies of Pacific cod throughout the Aleutian Islands. In addition, sites of Atka mackerel tagging in the Eastern and Central Aleutians will need to be revisited to update biomass and movement data through time. To evaluate the potential for localized depletion and to study the efficacy of trawl exclusion zones, researchers need to tag and recover fish inside and outside of Steller sea lion habitat. Commercial fisheries have proven to be a good source of recovery of tagged fish outside of critical habitat, but much of that critical habitat is closed to commercial fishing, including the area-wide closure of Area 543 under the interim final rule (75 FR 77535, December 13, 2010). Thus, tagged fish must be recovered in these closed areas by conducting scientific tag recovery cruises.

To ensure adequate numbers of tagged fish recoveries, catches during these cruises are higher than typical for surveys such as the groundfish bottom trawl surveys described above. For example, during the 2011–2012 Atka mackerel tag release-recovery study, in Area 541, 770 metric tons of Atka mackerel were caught in the fall and 787 metric tons were caught in the spring; in Area 542, 740 metric tons were caught in the fall, and 746 metric tons were caught in the spring (McDermott, NMFS/AFSC personal communication, December 2012). Table 11-5 shows the anticipated removals for Atka mackerel tag recovery for future studies. The estimated amount of incidental catch of other species during the tagging and recovery cruises is also shown in Table 11-6.

Table 11-5 Anticipated survey catches for Atka mackerel tag recovery studies (mt) inside and outside Critical Habitat (CH) for a given cruise and year (fall or winter/spring)

	NMFS area								
	541			542			543		
Species	**Inside CH**	**Outside CH**	**Total**	**Inside CH**	**Outside CH**	**Total**	**Inside CH**	**Outside CH**	**Total**
Atka mackerel	400	400	800	800	400	1200	600	550	1150
Northern rockfish	69	69	137	137	69	206	77	94	171
Pacific cod	24	24	48	48	24	72	27	33	60
POP	69	69	137	114	48	162	54	66	120
Pollock	9	9	17	17	9	26	10	12	21

The Atka mackerel tagging project in recent years has also assessed the distribution and abundance of other groundfish (such as Pacific cod, Pacific ocean perch, northern rockfish, and pollock) using catch-per-unit-effort (CPUE) abundance indices derived from trawls conducted opportunistically during the tag recovery cruises. For the funded 2014-2015 study, these CPUE data will come from trawl tows already planned for recovery of tagged Atka mackerel. However, if funding should become available in future years for additional vessel time, principal investigators would propose conducting opportunistic trawl tows solely for the purpose of assessing the prey field distribution (Table 11-6).

Table 11-6 Anticipated survey catches during opportunistic prey field studies (mt)

	NMFS area				
	541	**542**	**543**	**518**	**610**
Species	**Inside CH**	**Inside CH**	**Outside CH**	**Inside CH**	**Inside CH**
Atka mackerel	910	560	150	140	140
Pacific cod	55	34	9	8	8
POP	156	96	18	24	24
Northern rockfish	156	96	26	24	24
Pollock	20	12	3	3	3

The anticipated catches of Atka mackerel described above are small compared to Allowable Biological Catch (ABC) and AFSC groundfish trawl survey biomass. To account for high inter-annual variability in Atka mackerel ABC, the research catches were compared to the 2000-2014 mean ABC in each Area. Similarly, research catches were compared to AFSC groundfish trawl data from survey strata in each Area averaged over years 2000-2012. The anticipated catches of Atka mackerel during tag recovery cruises range from 3.9% to 4.6% of the mean ABC, depending on Area. They range from 0.4% to 0.5% of mean AFSC groundfish trawl survey biomass (Table 11-7). Anticipated catches during opportunistic prey field studies range from 4.4% to 1.9% of mean ABC and 0.07% to 0.46% of mean survey biomass (Table 11-7).

Table 11-7 Anticipated survey catches of Atka mackerel in relation to Allowable Biological Catch (ABC) and AFSC groundfish trawl survey biomass

	NMFS area		
	541	**542**	**543**
Atka mackerel ABC (mt, mean 2000-2014)	20,624	29,518	24,935
Atka mackerel survey biomass (mt, mean 2000-2012)	198,594	252,884	216,817
Anticipated catch during recovery cruises (mt)	800	1,200	1,150
% of mean ABC	3.88%	4.07%	4.61%
% of mean survey biomass	0.40%	0.47%	0.53%
Anticipated catch during opportunistic prey field studies (mt)	910	560	150
% of mean ABC	4.41%	1.90%	0.60%
% of mean survey biomass	0.46%	0.22%	0.07%
Total anticipated catch (mt)	1,710	1,760	1,300
% of mean ABC	8.29%	5.96%	5.21%
% of mean survey biomass	0.86%	0.70%	0.60%

In order to assess interannual variability in local Atka mackerel abundance, researchers would need ideally to conduct these studies biennially at selected areas. The Atka mackerel tagging study and opportunistic prey field study shown in Table 11-5 and Table 11-6 have received funding from the North Pacific Research Board and will be conducted in 2014 and 2015. The principal investigators have received funding to conduct tagging work in Areas 541 and 543 in June or July 2014. Tag Recovery trawls will be conducted in September 2014 and again in March 2015. Bycatch is based on species composition of previous Atka mackerel tag recovery cruises and fishery catch composition in these areas. If funding is available in future years (beyond 2015), the principal investigators will tag and recover Atka mackerel in other combinations of Areas, such as Area 542 and 541. In any given year, a reasonable expectation is that Atka mackerel would be caught in the projected amounts in two of the three Areas

NMFS has yet to conduct Pacific cod tag recovery cruises, having relied solely on commercial fishing to recover tagged fish. We anticipate that Pacific cod tag recovery cruises would require similar, if not higher, catches as the Atka mackerel cruises. A pilot study to assess the required number of fish to tag and the amount to catch during tag recovery cruises is needed before the research catches for Pacific cod tagging studies in the Aleutian Islands can be estimated.

11.1.2.3 Steller Sea Lion Interactive Predator-Prey (SLIP) model

There have been at least four previous attempts over the last 15 years to design an adaptive management experiment to examine the potential indirect effects of commercial groundfish fisheries on the western distinct population segment (DPS) of Steller sea lions (NMFS 1999), (NMFS 2000), (Bowen et al. 2001), and (National Research Council 2003). All four groups concluded that the best approach involved the establishment of one or more paired treatment and control areas that were open and closed to fisheries, respectively. In all of the experiments, the sea lion response variable was the population trend based on counts of pups, juveniles, and adults during the breeding season. Spatial scales proposed were relatively "small" (20 nm radius zones; (NMFS 1999)), "medium" (20–50 nm zones around sets of paired rookeries; (NRC 2003)), and "large" (13 "open" and "closed" portions of critical habitat throughout the range of the western DPS in Alaska; (NMFS 2000)).

The proposed experimental durations were all quite long, ranging from 5 to 20 years depending on the model design and assumptions. This was because all of the experiments used population-level responses that could take a long time to manifest due to the long 10-year generation time of Steller sea lions, and their relatively "plastic" life history involving variable duration of maternal dependence of young (NMFS 2008). All of the panels stressed that the success of any experiment was dependent on how well the size, number, and location of treatment and control areas incorporated knowledge of Steller sea lion biology, seasonal movements, foraging ecology, and stock structure.

For this reason, NMFS recommended relatively large treatment and control areas across the entire Alaskan range of the western DPS in order to capture as much of the seasonal and ontogenetic movements as possible (NMFS 2000). One study ((Bowen et al. 2001), p. 20) cautioned that "It cannot be overemphasized how difficult it will be to conduct large-scale field experiments to test hypotheses about the effects of fishing on Steller sea lions. To our knowledge, experiments in the open ocean at this spatial scale [that proposed by NMFS 2000] have not been previously attempted." Indeed, none of the experiments was ever implemented, largely because of the high costs to NMFS and the groundfish fishing industry (see review of (Ferrero and Fritz 2002)).

Another approach to conducting a fisheries interaction experiment in the real world is to design one for the virtual world. This could be accomplished by developing a Steller Sea Lion Interactive Predator-Prey (SLIP) model. The SLIP model would provide a cost effective way to evaluate the implications of different management actions on the recovery rate of Steller sea lions. Components of the SLIP model would include an adaptation of a prey field dynamics model developed for the Bering Sea (Wiese, Wiseman, and Van Pelt 2012) to the Aleutian Islands, and linking it to a Steller sea lion foraging model. The SLIP model provides a framework for utilizing and interpreting results from small scale field experiments in an ecosystem context. As such, the SLIP model facilitates the integration of observed population dynamics and process studies to quantify the effects of fishing on groundfish and on sea lion feeding, growth, reproduction, and movement. Knowledge gaps identified through model development will guide the design of focused, small-scale field studies to fill them. Development of a SLIP model may improve fisheries management to identify ways to mitigate potential effects on Steller sea lions and provide for more efficient harvest of the target species.

11.1.2.4 Fisheries Interactions, Sea Lions and Local Ecology

Results of previous AFSC studies (by FIT and others) have shown that assessing the potential for commercial fishing to cause changes in prey fields (such as "localized depletion") requires an understanding not only of fishing removals, but of local fish abundance, fish movement, and oceanography (McDermott et al. 2005, McDermott and Haist, Conners & Munro 2008, Logerwell et al.

2007, Logerwell et al. 2010, Hollowed et al. 2007, Wilson et al. 2003, Walline et al. 2012, and Fritz & Brown 2005). Furthermore, in order to understand the spatial extent of Steller sea lions foraging pattern and behavior it is critical to understand the composition of the localized prey field at the time of Steller Sea lion foraging. It has been shown (Sigler et al. 2009) that Steller sea lions are generalist predators that tend to forage on available food sources. But Steller sea lions are also able to focus and travel to local high abundance aggregations of prey that are often associated with fish spawning events or local migration patterns commonly observed in herring, salmon, or pollock. It is therefore important to understand the small-scale seasonal and spatial changes in the prey field that the sea lions encounter and focus on when foraging.

To examine the prey field changes, researchers need to study the prey field at the same time and in the same place where sea lions are foraging (Logerwell et al. n.d.). To fill these knowledge gaps, researchers need to conduct focal studies of Steller sea lion foraging behavior, Steller sea lion diet, fish abundance, fish movement, oceanography, ocean productivity, and fisheries impacts in contrasting areas of Steller sea lion population trends in the Aleutian Islands (including the Commander Islands) and in areas where Steller sea lions forage. These studies should be conducted in summer and winter. Fish abundance estimates would come from trawling, acoustics, tagging, pots, and/or camera surveys depending on the species and habitat. Fish movement would be derived from tagging studies as described above. Oceanographic data such as temperature, salinity, water column structure, nutrient concentration, and productivity would be collected along with the fish studies. Steller sea lion diet and foraging would be assessed as described below. Results from these studies will shed light on prey selectivity patterns in space and time of different populations. These results combined with the underlying fish distributions provided by the groundfish surveys will help us understand if local differences in the abundance, species composition, and timing of the prey field influence sea lion population trends. Studies would be conducted in the Aleutian Islands and the Gulf of Alaska to help provide information on how the ecosystems differ in structure, function, and resiliency to fishing and thus provide insight into the drivers of these ecosystem differences.

11.1.2.5 Diet Information and Food Web Modeling

Small-scale groundfish and Steller sea lion food habits collections (diet information) and small-scale food web modeling (Ortiz & E A Logerwell n.d.) are needed to simulate potential direct and indirect impacts of changes in fishing removals on Steller sea lion foraging opportunities. In addition, an assessment of data gaps regarding food web interactions in the Aleutian Islands, as presented in the Aleutian Islands Fishery Ecosystem Plan (NPFMC 2007), includes the following research needs:

- Diet information from seasons other than summer is needed to assess seasonal changes in predator-prey interactions
- Diet information collected at appropriate spatial scales for key predators to determine whether and how spatial food webs are impacted by fishing, and other changes in the ecosystem
- Continue monitoring groundfish and Steller sea lion diets at both AI-wide and smaller local scales
- Expand or integrate existing databases to coordinate between marine mammal diet studies and lower trophic levels

It would also be of use to collect this information in the Gulf of Alaska to provide information into how the ecosystems differ in predator-prey interactions and thus provide insight into drivers of food web structure and dynamics. Disturbance of the animals for the studies would need to be addressed through research permitting, but the project would improve our knowledge of prey needs for Steller sea lions and could thus inform mitigation measures in future fisheries management.

Funding of FIT studies can come from a variety of sources, including NMFS, fishing industry cooperative agreements, and research boards and foundations. Several Atka mackerel studies have been funded by the North Pacific Research Board (NPRB). Congress created the NPRB in 1997 to recommend marine research initiatives to the U.S. Secretary of Commerce, who makes final funding decisions. These research initiatives include fisheries interaction studies (Table 11-8). The money provided by NPRB covered a portion of the total cost to conduct the research.

The FIT in collaboration with the North Pacific Fisheries Foundation (NPFF) will conduct a Steller sea lion prey study and Atka mackerel tagging study focusing on the Western Aleutian Island subarea in 2014–2015. The study will include one Atka mackerel tag release cruise in May/June of 2014 and two Atka mackerel recovery cruises in September 2014 and March 2015. Funding for this study was provided by NPRB ($499,589.00 starting February 2014 through March 2018), NPFF, and NMFS.

Table 11-8 Steller sea lion and fisheries interaction studies funded by NPRB

Project	Funding	Project Date
Atka mackerel tagging study	$499,589.00 (NPRB)	February 2014 – March 2018
Atka mackerel tagging study	$349,959.00 (NPRB)	February 2011 – May 2014
Atka mackerel reproductive biology study	$499,630.00 (NPRB)	May 2005 – December 2007
Atka mackerel reproductive ecology	$200,000.00 (NPRB)	May 2004 – October 2005

11.2 Steller Sea Lion Research

In contrast to fisheries-based studies described in this section, potential impacts of direct research on marine mammals are evaluated through a separate NEPA process, and are authorized by permits issued under the Marine Mammal Protection Act (MMPA) and ESA. The Steller sea lion and northern fur seal research programs were reviewed in a programmatic EIS (NMFS 2007), using an analysis that considered the benefits of studies relative to potential impacts from direct mortality and disturbance. New studies of Steller sea lions would be evaluated during the MMPA/ESA permitting process using the NMFS (2007) analytical methodology.

11.3 Lack of Commercial Fishing Leading to Less Data and More Need for Research?

The stock assessment for Atka mackerel relies on fishery independent data (e.g., biennial trawl surveys), and fishery dependent data (e.g., catch information, biological samples). Because the groundfish surveys are conducted on a biennial basis, are general groundfish surveys, and survey coverage is limited both temporally and spatially, information from the directed fishery on an annual basis over the course of the year is critical. The closure of the western Aleutians Islands to the fishery leaves a critical gap in information. Reliance will now be on the biennial surveys and other research efforts taking place in the closed areas until commercial fishing resumes. Because fishery catch information and biological samples will no longer be available from the western Aleutian Islands, we will need to use other platforms to collect information and may need to conduct survey efforts dedicated to collecting stock assessment information. Research catches for these surveys would be expected to be similar to those of the bottom trawl surveys described above.

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11.6 Index

adaptive management experiment, 11-10
bottom trawl surveys, 11-2, 11-12
Echo integration-trawl (EIT) surveys, 11-2
Fisheries Interactions, Sea Lions and Local Ecology, 11-10
Fisheries Surveys, 11-2
Food Web Modeling, 11-11
groundfish fisheries, 11-1, 11-10
Groundfish Fisheries, 11-2
groundfish surveys, 11-2, 11-7, 11-11, 11-12
Groundfish Surveys, 11-2
Lack of Commercial Fishing Leading to Less Data and More Need for Research?, 11-12
longline survey, 11-2
Pacific Cod Stock Assessment, 11-6
research permitting, 11-1
Steller Sea Lion Interactive Predator-Prey (SLIP) model, 11-10
Steller Sea Lion Research, 11-12
tag release-recovery studies of Atka mackerel, 11-7
Tagging Studies, 11-7
Winter groundfish surveys, 11-7
Winter Season Groundfish Surveys, 11-7

12.0 DISTRIBUTION LIST

NMFS sent the executive summary of the Final EIS to the following individuals and organizations. NMFS posted the Final EIS document for download on the NMFS Alaska Region web page at: http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/eis/default.htm

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Akiak Native Community
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Alakanuk Native Corporation
Alakanuk Tribal Council
Alaska Federation of Natives
Alaska Inter-Tribal Council
Alaska Rural Development Council
Alaska Sea Otter and Stellar Sea Lion Commission
Alaska Village Initiatives
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Assoc. of Village Council Presidents
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Atqasuk Tribal Council
Atqasuk Village
Atxam Corporation
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Azachorok Incorporated
Baan-O-Yeel Kon Corporation
Bean Ridge Corporation
Beaver Kwit'chin Corporation
Beaver Village
Becharof Corporation
Belkofski Corporation
Bering Sea Elders Advisory Group
Bering Sea Fishermen’s Association
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Calista Corporation
Canyon Village Traditional Council
Cape Fox Corporation
Caswell Native Association
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Chaluka Corporation
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Chefarnrmute Incorporated
Chenega Corporation
Chevak Company Corporation
Chevak Native Village
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Chignik Bay Tribal Council
Chignik Lagoon Native Corporation
Chignik Lake Village
Chignik River Limited
Chilkat Indian Village
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Chinik Eskimo Community
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Choggiung Limited
Chugach Alaska Corporation
Chugach Regional Resources
Chugachmiut
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City & Borough of Yakutat
City and Borough of Sitka
City of Adak
City of Akhiok
City of Akiak
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City of Ouzinkie
City of Palmer
City of Pelican
City of Petersburg
City of Pilot Point
City of Pilot Station
City of Platinum
City of Point Hope
City of Port Alexander
City of Port Heiden
City of Port Lions
City of Quinhagak
City of Ruby
City of Russian Mission
City of Saint George
City of Saint Mary’s
City of Saint Paul
City of Sand Point
City of Savoonga
City of Saxman
City of Scammon Bay
City of Selawik
City of Seldovia
City of Seward
City of Shageluk
City of Shaktoolik
City of Shishmaref
City of Shungnak
City of Skagway
City of Soldotna
City of St. Michael

City of Stebbins
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City of Tenakee Springs
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Dineega Corporation
Dinyea Corporation
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Egegik Village
Eklutna Incorporated
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King Island Native Community
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Native Village of Port Lions
Native Village of Quinhagak
Native Village of Ruby
Native Village of Savoonga
Native Village of Scammon Bay
Native Village of Selawik
Native Village of Shaktoolik
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Umkumiute Native Village
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Unga Corporation
Uyak Incorporated
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Village of Anaktuvuk Pass
Village of Aniak
Village of Atmautluak
Village of Bill Moore's Slough
Village of Chefornak
Village of Clark's Point
Village of Crooked Creek
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Village of Kotlik
Village of Lower Kalskag
Village of Ohogamiut
Village of Old Harbor
Village of Red Devil
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13.0 COMMENT ANALYSIS REPORT

13.1 Introduction

In May 2013, the National Marine Fisheries Service (NMFS) issued the Steller Sea Lion Protection Measures for Groundfish Fisheries in the Bering Sea and Aleutian Islands Management Area Draft EIS/RIR/IRFA. In conformance with National Environmental Policy Act (NEPA) requirements, NMFS solicited public comment on the draft EIS/RIR/IRFA. NMFS accepted public comments during a 60-day public comment period from May 17, 2013, to July 16, 2013. NMFS received 13 submissions of comment. Each submission contained multiple comments on the draft EIS.

This Comment Analysis report (CAR) provides summaries of the public comments received during the comment period and presents the agency's responses. Changes to the EIS and economic analysis from draft to final as a result of public comment are noted in this report.

A preliminary CAR was first prepared to provide information to the decision-makers and the public prior to the publication of the final EIS. The preliminary CAR served as an intermediate document that informed NMFS, the North Pacific Fishery Management Council (Council), and the public of the issues that need to be addressed in the final EIS. The preliminary CAR contained summaries of the public comments and the agency's draft responses. The preliminary CAR was a tool used by the EIS authors to revise the document and respond to each statement of concern. NMFS provided the preliminary CAR to the Council in October 2013 when it took final action to recommend Alternative 5 as the preferred alternative.

13.1.1 The Role of Public Comment

NEPA is a procedural law intended to facilitate better government decisions concerning the management of our lands and oceans. The law has an environmental emphasis. Drafters of the law believed that by requiring a process designed to provide decision-makers with the best information available about a proposed action and its various alternatives, fewer adverse impacts would occur. NEPA does not dictate protection of the environment, but instead assumes that common sense and good judgment, based on a thorough analysis of impacts of various alternatives, will result in the development of the Nation's resources in a way that minimizes adverse impacts to our environment. This is achieved by requiring an open public process whereby the responsible government agency, combined with the stakeholders

associated with a particular natural resource and development project, pull together and present relevant information for use in making decisions.

13.1.2 What is the Response to Public Comments?

NEPA requires government agencies to include in a final EIS all the substantive comments received on the draft EIS. The final EIS must include responses to the comments, and must describe any changes made to the draft EIS as a result of those comments.

According to the Council on Environmental Quality regulations for implementing NEPA (40 CFR 1503.4), an agency preparing a final EIS shall assess and consider comments both individually and collectively and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses include the following:

1. Modify alternatives including the proposed action.

2. Develop and evaluate alternatives not previously given serious consideration by the agency.

3. Supplement, improve, or modify its analysis.

4. Make factual corrections.

5. Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

NMFS staff has undertaken a careful and deliberate approach to ensure that all substantive public comments are reviewed, considered, and responded to. The draft CAR served as an intermediate document that informed NMFS, the Council, and the public of the issues that needed to be addressed in the final EIS.

13.1.3 Analysis of Public Comments

The analysis of public comment on the draft EIS was a multi-stage process that included reviewing and summarizing the comments within each submission, preparing responses, and reviewing the responses. The process is explained in detail below.

The NMFS Alaska Region staff compiled all incoming submissions of comment, maintaining a comprehensive list of all public comments. Staff assigned each submission a unique submission identification. The 13 submissions of comment, including any attachments, are accessible by a link through the Alaska Region website.[256] The submissions of comment and their attachments also are available directly at www.regulations.gov using the docket number NOAA-NMFS-2012-0013 in the search bar.

[256] http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/eis/default.htm under the section titled "Notice of Availability."

Each submission was reviewed by the preparers. The preparers divided each submission by its individual comments, each of which was assigned a comment ID number. The goal was to capture each sentence and paragraph in a comment letter containing substantive content pertinent to the draft EIS. Substantive content included assertions, suggested alternatives or actions, data, background information, or clarifications relating to the draft EIS document or its preparation. The substantive comments were summarized and organized by issue area. Within the 13 submissions received by NMFS, the preparers identified 227 specific substantive, summarized comments. The preparers then wrote the response for each summarized comment.

The comment summaries and draft responses are presented in this report by draft EIS chapter and then by subject area. During the process of identifying statements of concern, all comments were treated equally. The emphasis is on the content of the comments. They were not weighted by organizational affiliation or other status of commenters. No effort has been made to tabulate the number of people for or against a specific aspect of the draft EIS. In the interests of producing a final EIS that both meets the mission of NMFS and best serves all stakeholders, all comments have been considered equally on their merits.

13.1.4 Quality Control and Review

All comments and responses were reviewed by the preparers and NOAA General Counsel-Alaska Section. Additionally, various procedures were established in the analysis process to prevent a submission or comment from being inadvertently omitted. Communication and cross-checking between the submissions and the comments have ensured that all submissions received during the comment period are included in the report.

13.2 Chapter 1 Comments

These comments are on Chapter 1: the purpose and need, Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) national standards, NEPA issues, Endangered Species Act (ESA) issues, and general EIS issues. Most of the comments on Chapter 1 questioned NMFS's compliance with the Magnuson-Stevens Act, ESA, and NEPA in the implementation of the Steller sea lion protection measures and in the development of the draft EIS.

13.2.1 NEPA Compliance

CH1-1 Comment: This purpose and need statement appropriately recognizes the ESA's directive to insure that actions authorized by NMFS are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species. However, NMFS impermissibly qualifies this obligation with a single statement about minimizing costs, where practicable, which was apparently selected from among the Magnuson-Stevens Act's 10 National Standards. This qualification both impermissibly elevates economic concerns and ignores the agency's other statutory obligations.

Response: The purpose and need in the EIS is clear in that the agency needs to meet its obligations under the ESA and at the same time needs to minimize economic impacts, to the extent practicable, on those affected by the restrictions under the Steller sea lion protection measures. NMFS must meet both of the needs to avoid jeopardy under the ESA and minimize costs, where practicable, when managing fisheries under the Magnuson-Stevens Act.

CH1-2 Comment: An agency must look hard at the factors relevant to the definition of purpose, and should always consider the views of Congress expressed in the agency's statutory authorization to act, the relevant regulatory framework, and other congressional directives. The draft EIS violates this statutory obligation by (1) adopting an unreasonably narrow statement of purpose and need that is inconsistent with the statutory objectives of the proposed action, and (2) failing to consider feasible measures that would provide additional protections for endangered sea lions and the marine ecosystem.

The purpose and need statement does not comply with NEPA because it impermissibly elevates economic considerations and does not comport with the objectives of the ESA and Magnuson-Stevens Act. The goals to protect Steller sea lions and minimize economic costs may not be considered as coextensive, and the agency must meet all its management obligations under the Magnuson-Stevens Act and ESA when formulating and selecting NEPA alternatives. The purpose and need statement abandons the statutory directives for protection of marine resources, for avoiding irreversible and long-term adverse effects on the marine environment, and for rebuilding, restoring, or maintaining marine environment; and does not address any of the other Magnuson-Stevens Act national standards; nor the need to obtain optimum yield taking into account the protection of the marine ecosystem.

Response: All Federal actions must comply with all applicable Federal law. This does not mean that every proposed action must have as its purpose and need the full suite of applicable Federal law. NMFS has taken a hard look at the factors relevant to the proposed action in the definition of the purpose and need and has worked with the Council and the public during scoping to define the purpose and need and a reasonable range of alternatives. The statement of purpose and need briefly specifies the underlying purpose and need to which the agency is responding in proposing the alternatives, including the proposed action. As explained in the EIS, the need to comply with section 7(a) of the ESA is the primary driver for implementing Steller sea lion protection measures. However, in meeting ESA requirements, NMFS also needs to make sure that the measures that it implements minimize, to the extent practicable, adverse economic impacts to the groundfish fisheries. The range of alternatives is reasonable to meet the purpose and need statement. An agency may focus the scope of the action analyzed to ensure the range of alternatives and the analysis of the effects of the alternatives provide the decision makers with concise information for a selection of an alternative that will accomplish the purpose and need. NMFS considers and addresses its obligations under the Magnuson-Stevens Act in the analysis of the alternatives' effects on the human environment.

Alternative 1 would most likely provide sufficient protections to endangered Steller sea lions based on the 2010 biological opinion on the effects of the groundfish fisheries on ESA-listed species (2010 FMP biop) (NMFS 2010). However, in response to this and similar comments, NMFS added Alternative 6 to the final EIS in response to public comment on the draft EIS to include an alternative that provided more protection to Steller sea lion prey than Alternative 1. The new Alternative 6 would prohibit retention of Atka mackerel, Pacific cod and pollock in the Aleutian Islands. Alternative 6 is described in detail in Chapter 2.

CH1-3 Comment: The range of alternatives evaluated in the draft EIS may not be all of the possible reasonable alternatives. The Council and the public cannot compile the universe of reasonable alternatives when performance standards by which NMFS will determine unacceptable impacts are not disclosed and apparently still shifting. NMFS's process to identify and develop reasonable alternatives is incorrectly described in the draft EIS at Section 1.6. Revise Section 1.6 to reflect that NMFS asked for assistance from the Council through its Steller Sea Lion Mitigation Committee (SSLMC) to develop alternatives for the EIS, and that the SSLMC developed management measures without the benefit of requested fisheries interaction information or performance measures that would be used in an ESA consultation to understand how NMFS would evaluate the potential impacts of the proposed measures.

Response: Section 1.6 accurately describes the public process NMFS used to develop the EIS, including the range of alternatives. NMFS started the EIS process with a formal scoping period. In recognition of the Council's integral role in developing alternatives for fishery management actions under the Magnuson-Stevens Act, NMFS took many additional steps to seek input from the Council and the public before releasing the draft EIS. NMFS produced a scoping report that summarized the issues and alternatives from the formal scoping process. NMFS provided the SSLMC the performance standards used in the 2010 FMP biop, as modified based on the reviews of the 2010 FMP biop, for consideration while developing alternative fisheries management measures for the Council's consideration. These are the same performance standards used in the EIS analysis of the alternatives, as explained in Section 1.10.3.

CH1-4 Comment: By having the protection measures under the interim final rule as the status quo (Alternative 1), the analysis in the draft EIS is skewed and improper, does not provide the public and the decision makers with an objective evaluation of the impacts of the interim final rule, and facilitates the agency's evasion of the central and most controversial issues related to the potential interactions between commercial fisheries and Steller sea lions.

The draft EIS should assess the 2010 FMP biop reasonable and prudent alternative and interim final rule as the proposed action, and determine how moving forward with this action would impact the human and natural environment. The draft EIS must then consider the effects of, and alternatives to, that action to meet its NEPA mandate. The no-action alternative considered must be the 2010 environmental assessment (EA)-described "no action" alternative, which made no changes to pre-existing 2003 groundfish fisheries management regulations, as these were the last regulations that were enacted with proper NEPA compliance.

Response: This comment focuses on terminology without explaining how changing the terms would improve the analysis. The EIS rigorously explores and objectively evaluates each alternative in the same manner. This provides equal treatment to the analysis of all alternatives so that the public and decision makers have similar information for each alternative to ensure a fair comparison.

Alternative 1 is the protection measures as implemented by the interim final rule. NMFS labeled this alternative the "no action" alternative because it would remain in place if the agency took no action. In other words, if the agency were to take no action at the end of this NEPA process, the interim final rule would continue to be the management measures used for the Aleutian Islands Atka mackerel and Pacific cod fisheries. The EIS provides an objective evaluation of the impacts of Alternative 1 relative to the environmental baseline (see Section 1.10.1) and the other alternatives. This analysis shows how moving forward with Alternative 1 would impact the human and natural environment.

Alternative 4 is the Steller sea lion protection measures that were in place in 2010, essentially the 2010 EA's "no action" alternative. The EIS provides an objective evaluation of the impacts of Alternative 4 relative to the environmental baseline (see Section 1.10.1) and the other alternatives, including Alternative 1. NMFS did not label Alternative 4 the "no action" alternative because, in order to implement this alternative, NMFS would need to take action. Calling Alternative 4 the "no action" alternative would not change the analysis of Alternative 4.

CH1-5 Comment: NMFS violates NEPA by using the draft EIS analysis to justify a predetermined conclusion. NMFS bases its analysis on the assumption that only Alternative 1 is protective, despite the fact that NMFS has never done sufficient NEPA analysis to validate this conclusion. The draft EIS does not comply with the mandate for EISs to "serve as a means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made" (40 CFR 1502.2(g)). The draft EIS needs to have a fair and balanced approach to the analysis of the alternatives.

Response: The EIS does not justify a predetermined conclusion. As explained in Chapter 2, the alternatives were designed to accomplish the purpose and need for the action. The EIS analysis does not conclude that only Alternative 1 is sufficiently protective, and NMFS has not identified Alternative 1 as the preferred alternative. Based on the Council's recommendation, the EIS identified Alternative 5 as the preferred alternative. NMFS does assume that fisheries have the potential to impact Steller sea lions and that assumption is supported by the 2010 FMP biop, as explained in Chapter 5. The EIS also explains the uncertainties and controversies involved with understanding whether and how fisheries impact Steller sea lions, and notes that NMFS is continuing to evaluate the effects of fisheries on Steller sea lions in light of external reviews of the 2010 FMP biop and other new information. The results of this evaluation are provided in the 2014 biop (NMFS 2014), which in incorporated into the final EIS by reference. NMFS revised section 1.9 in the final EIS to include the 2014 biop.

Because NMFS assumes that fisheries have the potential to impact Steller sea lions, the EIS analyzes these potential impacts in detail to provide the information necessary for decision-making. At the time of the draft EIS, the decision had not been made for the selection of the preferred alternative. The process for determining the preferred alternative was informed by the draft EIS analysis, public comments on the draft EIS, NMFS's responses to public comments, and the Council's recommendations, as well as new information available up to the time the Secretary of Commerce makes a determination on the proposed action.

CH1-6 Comment: NMFS has not responded to comments by the public regarding the key scientific issues at the heart of the NEPA impacts analysis. Although the commenters provided lengthy scoping comments for the EIS, NMFS has incorrectly characterized many comments as related only to the 2010 FMP biop and did not respond to them in its scoping report. NMFS has similarly failed to adequately respond to repeated requests for more information by the Council. Most significantly, NMFS did not substantially revise the preliminary draft EIS before publishing the draft EIS, even though the Council passed a motion at its April 2013 meeting asking for substantial revisions. NMFS has had numerous occasions to respond to critiques, correct scientific flaws, and provide a meaningful role for the public, the Council, and its own scientific advisors since March 2012 when the court issued its order, but has repeatedly done just the opposite by conflating its roles as the action and consulting agency under the ESA, and hiding behind a future ESA consultation.

Although NMFS has solicited public comment on Steller sea lion mitigation measures in other processes, it has not provided specific written public responses to comments other than general statements that it "considered" such comments. For example, NMFS never published specific responses to public comments on the 2010 FMP biop. Similarly NMFS has yet to respond to public comments on the 2010 interim final rule—Alternative 1 in the draft EIS—even though the public comment period closed on February 28, 2011. See 76 FR 2027 (January 12, 2011). Specific written responses by NMFS to these previous comments would have informed this NEPA process and public comment during it.

Response: NMFS has followed the public process for developing the EIS as required by regulations and by the U.S. District Court for the District of Alaska. NMFS produced a scoping report that contained all of the public scoping comments received and NMFS's response to relevant scoping comments. Relevant scoping comments were then addressed through development and analysis in the draft EIS. Relevant scoping comments guided the scope of issues analyzed in the draft EIS. NMFS did make substantial changes based on the Scientific and Statistical Committee's and Council's comments on the preliminary draft EIS.

NMFS provided a 60-day comment period on the draft EIS. NMFS considered, summarized, and responded to comments received on the draft EIS. The response to the comments on the draft EIS are

contained in this CAR. Relevant public comments guided revisions from the draft EIS to the final EIS, as explained in the response to comments.

NMFS is not required to provide response to comments on issues not relevant to the development of the EIS and the process required by NEPA. NMFS has clearly explained the scope of the EIS analysis and the issues relevant to understanding the alternatives and their impacts on the human environment.

NMFS has not provided responses to comments that are not related to the EIS analysis to keep the EIS and NMFS's responses focused on the relevant considerations and key controversial issues. NMFS has provided responses in all circumstances that it is required to provide responses by law, including comments to the draft EIS.

CH1-7 Comment: The draft EIS does not disclose and respond to all major points of view on the environmental impacts of the alternatives as required by 40 CFR 1502.9(a). The final EIS should include an analysis of the potential impacts of fishing on sea lions, their prey, and critical habitat, and incorporate NMFS's responses to the findings and recommendations of the reviews of the 2010 FMP biop into this analysis, and apply that across all alternatives. This information must be included in order for the EIS to meet NEPA requirements to take a hard look at the environmental effects of each alternative. Without these analyses, the EIS will not be based on the best scientific information, nor will the resulting decisions that depend on the EIS. The draft EIS should have presented NMFS's response to those who contend that the measures in Alternative 4 provided adequate mitigation from any potential impacts from fishing.

Response: Whether an agency has taken a "hard look" at the environmental effects of the alternatives is determined by a "rule of reason" test applied by the reviewing court. The reviewing court looks to see if the EIS contains a "reasonably thorough discussion of the significant aspects of probable environmental consequences". *Neighbors of Cuddy Mountain v. U.S. Forrest Serv*., 137 F.3d 1372, 1376 (9th CIR 1998). Then the reviewing court looks to determine whether the agency took a "hard look" at those consequences. *Id*. The EIS takes a hard look at the probable environmental consequences of the alternatives. The analysis in the EIS is based on the best scientific information available. Environmental consequences are discussed and analyzed in Chapters 3 through 7. Examples include the Chapter 5 analysis of the potential impacts of fishing on sea lions, their prey, and critical habitat.

NMFS has considered the reviews of the 2010 FMP biop in the development of the EIS as explained in Chapters 1 and 5. Section 1.9.6 provides a brief summary of the reviews of the 2010 FMP biop to inform the reader that these were documents that informed the analysis in the EIS. NMFS considered the reviews of the 2010 FMP biop to identify issues that were applicable to the NEPA analysis and included that information in the EIS. In Section 5.2.2.1.9, NMFS discusses the conclusions of the reviewers of the 2010 FMP biop relative to the analysis of the effects of the alternatives on Steller sea lions and how NMFS used these reviews to inform the EIS analysis. NMFS therefore has not expanded the discussion in the final EIS of the findings of the 2010 FMP biop and the comments and critiques nor did NMFS include responses to the specific comments provided in the reviews of the 2010 FMP biop or responses to the public comments on the 2010 FMP biop in the final EIS. Note that NMFS does respond to the reviews of the 2010 FMP biop in the 2014 biop (NMFS 2014).

All of the alternatives were designed to minimize potential fishery impacts on Steller sea lions and each alternative greatly restricts fishing compared to no protection measures. The alternatives were designed to accomplish the stated purpose and need for the action. In developing the range of alternatives, NMFS, the Council, and the Council's SSLMC considered all available information, including the reviews of the 2010 FMP biop. Based on that information, the alternatives provide varied levels of protection to Steller sea lions. The Council recommended a preferred alternative in October 2013. It was premature at the time of the draft EIS to conclude which alternative best met the purpose and need for the action because

the Council had not recommended a preferred alternative and NMFS had yet to conduct an ESA consultation on that alternative. NMFS conducted a formal section 7 consultation on the preferred action that concluded in a biological opinion in April 2014 (NMFS 2014).

The EIS evaluates the effects of Alternative 4 along with the effects of the other alternatives, and concludes that Alternative 4 would provide less protection to Steller sea lions than the other alternatives.

CH1-8 Comment: The draft EIS does not give a concise, clear, and to the point statement of NMFS's thinking and resolution of the reasonably foreseeable significant adverse impacts expected from interaction between commercial fisheries and Steller sea lions. The draft EIS repeats the exact failing noted by the U.S. District Court for the District of Alaska and the very reason that the agency has been ordered to prepare this EIS. The court found that NMFS essentially provided some underlying environmental information for comment in the 2010 EA, but not its conclusions. Although it consists of hundreds of more pages than the 2010 EA, the same is true of the draft EIS.

Response: The EIS presents NMFS's conclusions on the reasonably foreseeable significant impacts in Section 5.2, including interactions between commercial fisheries and Steller sea lions that are expected from each alternative based on the analysis and information in Chapter 5.

CH1-9 Comment: The draft EIS sheds no meaningful light on the indicators that NMFS will use to assess impacts or the performance standards for mitigating potential adverse impacts. In Chapter 5, the comparison of alternatives is almost exclusively a comparison of how much geographic area is open or closed to fishing combined with an assumption that more open areas and more fishing means more adverse impacts on Steller sea lions. This simplistic analysis does not provide the reader with any meaningful basis on which to evaluate and choose between the alternatives. NMFS should have definitive conclusions about the respective effects of the different alternatives on the western distinct population segment (WDPS) of Steller sea lions and provide a transparent description of the methods and analyses used to evaluate the impacts across alternatives and present a clear summary of the results of its impact analysis showing, with detail, how each alternative may or may not have different impacts on the WDPS of Steller sea lions.

Response: Chapter 5 provides a clear explanation of the methods used for the analysis of the potential effects of the fisheries on Steller sea lions. The analysis examines the effects of the alternatives on incidental takes (Section 5.2.1), harvest of prey species (Section 5.2.2), and disturbance (Section 5.2.3). As explained in Chapter 5, the EIS uses the best scientific information available to understand the potential fisheries effects under each alternative. The EIS provides conclusions for each effect based on the results of the analysis. The assumptions that are used in the analysis are clearly stated for the public's understanding of the nature of the available information and how this information is used in the analysis.

CH1-10 Comment: The draft EIS fails to evaluate well-recognized and significant scientific issues, lacks key information to support decision making, and deviates from fundamental NEPA principles and requirements. Given the importance and magnitude of these deficiencies, NMFS must prepare a revised draft EIS that addresses the issues raised by the commenters and then issue the revised draft EIS (or the revised sections thereof) for public review and comment, as required by 40 CFR 1502.9(a). The comment period should be for 30 days and could be completed before the October 2013 Council meeting.

Response: The EIS fully evaluates well-recognized and significant scientific issues and contains key information to support decision making. NMFS has followed NEPA procedures to produce an EIS that uses the best scientific information available to analyze the alternatives. This analysis provides the decision makers with the ability to compare and contrast the effects of the alternatives on the human environment. In response to public comments, NMFS made many specific revisions in the final EIS, as

discussed in responses to specific public comments. NMFS disagrees that a new draft EIS is necessary for public review.

CH1-11 Comment: The draft EIS is yet another encyclopedic compilation of details related to the WDPS of Steller sea lions; but unfortunately, its analyses need substantial revisions in order to meet both NEPA's requirements and its goal of fostering excellent agency actions. The draft EIS does not provide straightforward and concise reviews that are proportional to potential impacts and effectively convey the relevant considerations on the key controversial issues to the public and decision makers in a timely manner while rigorously addressing the issues presented, as directed by the March 6, 2012, Memorandum from Nancy H. Sutley to Heads of Federal Departments and Agencies, Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Policy Act at 40 CFR 1500.1.

Response: The EIS does effectively convey the relevant considerations on key controversial issues. The Executive Summary provides a discussion of the area of controversy and Table ES-18 directs the reader to where the areas of controversy and uncertainty are further discussed in the analysis. In developing the EIS, NMFS carefully considered the public comments received during scoping on the issues that should be addressed in the EIS and provided information that would inform the EIS analysis and the ESA consultation on the proposed action. NMFS balanced meeting the requests of the public to address many issues identified during scoping with focusing the analysis and supporting information on the key issues that allows one to understand the potential impacts of the alternatives on the human environment.

Additionally, NMFS used the methods suggested in Council for Environmental Quality guidelines to avoid an encyclopedic analysis. In the EIS, NMFS incorporated by reference information and analysis from related documents described in Section 1.9, including the Alaska Groundfish Programmatic Supplemental EIS (NMFS 2004), Alaska Groundfish Harvest Specifications EIS (NMFS 2007), Essential Fish Habitat Identification and Conservation EIS (NMFS 2005), the 2008 Revised Recovery Plan for Steller sea lions (NMFS 2008), the 2010 FMP biop (NMFS 2010), the reviews of the 2010 FMP biop ((Stokes 2012), (Bowen 2012), and (Stewart 2012)), and the Aleutian Islands Fishery Ecosystem Plan (NPFMC 2007). Another important document referenced in Chapter 3 was the Stock Assessment and Fishery Evaluation Report for the Bering Sea and Aleutian Islands Groundfish Fisheries[257]. Referencing these documents allows for a more concise description of the status of the environment and a focused analysis of the effects of the alternatives on the human environment.

CH1-12 Comment: In the draft EIS, NMFS recognizes that the 2010 FMP biop is controversial and reflects differences in opinion on the interpretation of scientific information and on the application of law in fisheries management. However, these general statements do not accurately describe the precise controversy at issue. The relevant controversy specifically involves a difference of opinion as to (1) whether the Bering Sea and Aleutian Islands (BSAI) groundfish fisheries have any effects on the WDPS of Steller sea lions including nutritional stress, and, if so, (2) the scope, duration, and magnitude of any such effects.

Response: The Executive Summary provides a general overview of the controversial issues related to the proposed action. Included in this discussion is Table ES-18 that identifies the sections in the EIS where each controversial issue is further explored. The controversial issues include potential fisheries effects on Steller sea lions and additional issues, as listed in the table. The causes for controversy for these issues are differences in opinion on the interpretation of available scientific information and on the application of law in fisheries management.

[257] Available from http://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/.

CH1-13 Comment: NMFS's impact analysis must be carefully tailored to the specific controversy at issue, including those identified in the reviews of the 2010 FMP biop. NMFS may not simply assume that the fisheries impact Steller sea lions—it must first analyze whether such fishery impacts exist at all.

Response: NMFS disclosed the areas of controversy in the Executive Summary, including issues identified in the reviews of the 2010 FMP biop that are related to the EIS analysis. This discussion includes Table ES-18 identifying specific issues and where they are discussed in the EIS. The majority of the controversial issues are addressed in Chapter 5, in Sections 5.1.1 and 5.2.2. Each issue is discussed in the EIS to provide the reader an understanding of the differing views on the issue and the use of this information in understanding the status of Steller sea lions and in the analysis of potential effects. NMFS does not simply assume that fisheries impact endangered Steller sea lions. As explained in Chapter 5, NMFS identified fisheries as having the potential to impact Steller sea lions based on the best available information (including but not limited to the 2010 FMP biop) that indicates that fisheries may adversely affect Steller sea lions by the harvest of prey species, by incidental takes, and by disturbance.

CH1-14 Comment: NMFS has not adequately addressed incomplete or unavailable information as required by Section 1502.22 of the Council for Environmental Quality regulations. The single statement in the Executive Summary related to 40 CFR 1502.22 does not comply with this requirement. NMFS must make clear that such information is lacking. NMFS must obtain and include information relevant to reasonably foreseeable significant adverse impacts in the EIS if the information is (1) essential to a reasoned choice among alternatives, and (2) the overall cost of obtaining the information is not exorbitant. Reissue the draft EIS for public review and comment with this information; otherwise, the public will be deprived of the opportunity to provide specific and thoughtful comments on the required Section 1502.22 analysis.

Response: The Executive Summary provides a summary of the issues addressed in further detail in the EIS. In the Executive Summary, under Areas of Controversy, NMFS summarizes the types of information lacking to further understand the potential effects of the fisheries on Steller sea lions and to further understand Steller sea lion biology and refers the reader to Chapter 5 for a more complete discussion. Each chapter analyzing the potential effects of the alternatives on the human environment provides the best scientific information available regarding the environmental component and applies that information to the analysis of the effects. Each chapter provides the information necessary to comply with 40 CFR 1502.22. For instance, Chapter 5 includes the existing credible scientific evidence that is relevant to evaluating the reasonably foreseeable significant adverse impacts on Steller sea lions in Section 5.1.1 for the status of Steller sea lions and in Section 5.2.2 for the analysis of the effects of the alternatives on Steller sea lion prey availability. Section 5.2.2.1.9 includes a list of issues identified in the 2010 FMP biop where information is lacking to further understand the impact of fisheries on Steller sea lions. While this missing information may make a different analytical method possible that may provide a better understanding of potential fisheries effects, the methods in the EIS used to analyze the effects were not dependent on this missing information. Chapter 5 explains the methods used to analyze the effects of the alternatives on Steller sea lion prey availability, which was developed by a team of experts in stock assessments, Steller sea lion biology, and fisheries management from the Alaska Fisheries Science Center, National Marine Mammal Laboratory, Council, and NMFS Alaska Region Protected Resources Division and Sustainable Fisheries Division. The team examined the best scientific information available on fisheries harvests and Steller sea lion biology to determine how to analyze the effects of the alternatives in a way that would allow for the comparison of effects among alternatives.

CH1-15 Comment: NMFS must finalize its NEPA process with a Record of Decision.

Response: NMFS acknowledges the comment.

13.2.2 ESA and NEPA Compliance

CH1-16 Comment: NMFS is improperly deferring public presentation of its conclusions on the key issue of whether there are negative impacts on Steller sea lions to a forthcoming consultation under the ESA. NMFS's stated plan is to perform a new section 7 consultation after the EIS is finalized. Repeating this sequential approach, which is contrary to Federal policy and regulations calling for concurrent processes, effectively eliminates meaningful public comment on the agency's conclusions and makes it impossible for the Council to make an informed decision on new mitigation measures. The analyses NMFS will incorporate in a future biological opinion must also be included in the draft EIS to ensure consistency and guard against using one standard in the EIS for evaluating alternatives and their effect on Steller sea lions and to pick a preferred alternative, versus using a different standard in a future biological opinion to evaluate the same alternative and its effects. This is necessary to better inform the public in order to solicit meaningful comment and for informed decision making. NEPA demands that agencies provide the public and decision makers with the results of an agency's hard look at the most significant issues related to the impacts of a proposed action *in advance* of a decision on a proposed action, and we urge NMFS to correct this fundamental defect.

Response: NMFS prepared the EIS concurrently with and integrated with the ESA to the fullest extent possible. NMFS Sustainable Fisheries Division worked closely with NMFS Protected Resources Division and the Alaska Fisheries Science Center to analyze the impacts of the alternatives and to incorporate the best scientific information available necessary to understand and explain how fisheries impact Steller sea lions and the changes in impacts under the different alternatives. All of this information is presented in Chapter 5.

An agency prepares an EIS to disclose the potential impacts of a proposed action and to compare and contrast the impacts of each alternative. The EIS presents the agency's conclusions on the impacts of the alternatives on the human environment, including Steller sea lions. The EIS contains the information necessary for the Council to make an informed recommendation on a preferred alternative and for the public to provide meaningful comment.

NMFS reinitiated a Section 7 consultation on the preferred alternative (Alternative 5) as the proposed action in May 2013. Reinitiation of section 7 formal consultation is required if (1) the amount or extent of the incidental take is exceeded, (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in the FMP biop, or (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in the FMP biop (NMFS 2010a). Alternative 5 would change the action from what was analyzed in the FMP biop, and new information was available. NMFS revised Section 1.5.1 and 1.9 of the final EIS to reflect this new information. NMFS concluded the consultation by issuing the 2014 biop (NMFS 2014).

CH1-17 Comment: NEPA does not permit the action agency to defer analysis of undeniably significant impacts to later assessments to be performed by another agency division under the ESA, an entirely different statutory framework. NEPA requires NMFS to perform a full and fair analysis, in the first instance, of all relevant information—including all issues raised in the reviews of the 2010 FMP biop.

Response: NMFS prepared the EIS following the NEPA process. NEPA requires the evaluation of the potential effects of the alternatives on the human environment using the best scientific information available. The EIS does not defer to a later document for an analysis of significant impacts. The EIS includes the issues relevant to the analysis of the effects of the alternatives on the human environment identified during scoping, including issues identified by the reviews of the 2010 FMP biop. Chapter 5

includes the evaluation of the effects of the alternatives on Steller sea lion incidental takes, disturbance, and potential effects on prey based on the best available information.

CH1-18 Comment: NMFS does not need to make a jeopardy and adverse modification determination under section 7 of the ESA in a NEPA document. NMFS must disclose its thinking as to what are or are not the reasonably foreseeable significant impacts of commercial fishing on Steller sea lions, whether those impacts are beneficial or adverse, which alternatives are expected to adequately mitigate any adverse impacts, and how the agency arrived at those conclusions.

Response: NMFS agrees.

CH1-19 Comment: Given that NMFS is consulting with itself to execute the ESA, there is a particular need for conscientious attention to the statutes procedural rules. Strict adherence to the procedural mandates of the ESA is the best way to ensure that, should the current NEPA process ultimately result in adoption of different Steller sea lion protection measures, NMFS's subsequent ESA analysis will comply with the agency's obligation to prevent jeopardy and adverse modification and make decisions based on sound science.

Response: NMFS agrees that the process described in regulations (50 CFR 402, Subpart B) and in agency guidance for ESA consultations on Federal actions needs to be followed. NMFS did so for this action and will do so for all other actions under the agency's authority.

CH1-20 Comment: One overarching problem with the current EIS process is that NMFS has been conflating the distinct statutory obligations under NEPA and the ESA. Such an approach is unhelpful and unlawfully blurs the careful distinction between "action agency" and "expert agency" required by the ESA. NMFS appears to be improperly combining the court-ordered NEPA analysis and an ESA analysis. The Council has pushed for a premature ESA analysis of the NEPA alternatives before the alternatives are even finalized, and NMFS has complied by supplying early feedback from the agency's Protected Resources Division. Combining the agency's NEPA and ESA efforts in such a manner violates the ESA's requirement for stringent enforcement of its procedural requirements. The agency's current approach defies Congress's intent for ESA consultation, namely, that it provide an independent, objective, and fully-supported analysis of a proposed action.

Response: NMFS disagrees that it was inappropriate or illegal for the agency to provide feedback to the Council on Alternative 5, the preferred alternative. NMFS presented an initial analysis of the conformance of Alternative 5 to the performance standards for Steller sea lion protection measures in Section 1.10.3 of the EIS at the June 2013 Council meeting to provide early feedback to the Council on its preliminary preferred alternative. This early feedback was intended to assist the Council should it wish to consider a modified set of management measures with less potential impacts to Steller sea lions when it recommended a preferred alternative for the final EIS. In fact, this type of input is exactly what is envisioned for an informal consultation process (see the U.S. Fish and Wildlife and NMFS's Endangered Species Consultation Handbook (USFWS and NMFS 1998)). NMFS believes it would have been negligent not to provide initial feedback given the best available information. Providing this type of feedback does not conflate NMFS's obligations under NEPA and the ESA.

13.2.3 ESA Compliance

CH1-21 Comment: NMFS should take the following steps regarding Steller sea lion protection measures for the Alaska groundfish fisheries. Take appropriate regulatory action to vacate the management measures implemented by the interim final rule in time for the 2013 fishery and revert to

2001 measures except where no longer appropriate (e.g., Harvest Limit Area regulations). Adopt an expedited schedule for completion of the EIS so that it supports the completion of rulemaking for a final rule with new final management measures such that these measures can be fully in place for start of the 2014 fishery.

Concurrent with the expedited EIS process, immediately reinitiate ESA consultation with regard to Central and Western Aleutian Islands fisheries management, and prepare a biological opinion that incorporates the findings and recommendations of the Center for Independent Experts review and Bernard et al. (2011). These findings substantially change what is the best scientific information that is now currently available, and the new biological opinion should reflect this new information as it reconsiders the jeopardy and adverse modification determinations for groundfish fisheries in the Aleutian Islands.

Response: NMFS cannot take the recommended actions as these would not meet the U.S. District Court for the District of Alaska order for the preparation of the EIS. NMFS cannot vacate the interim final rule, but has begun the process to consider revised protection measures following the applicable analytic and regulatory process, including working with the Council. NMFS started that process by developing the draft EIS. Alternative 4 in the EIS is the 2001 measures with slight modifications. NMFS is following the schedule for completing the EIS established by the U.S. District Court for the District of Alaska. NMFS reinitiated ESA section 7 consultation on May 10, 2013 and concluded the consolation by issuing the 2014 biop in April 2014 (NMFS 2014). NMFS revised Section 1.5.1 and 1.9 of the final EIS to reflect the 2014 biop.

CH1-22 Comment: Include a discussion of the designation of significant portion of its range (SPOIR) for the U.S. WDPS of Steller sea lions. The term "endangered species" means any species that is in danger of extinction throughout all or a significant portion of its range. NMFS has proposed declaring SPOIR for the eastern distinct population of Steller sea lion in the *Federal Register* notice for delisting the eastern distinct population segment but has not done so for the WDPS. NMFS trend site analysis has long depicted the core of the WDPS as Kenai to Kiska. The Center for Independent Experts reviewers noted the absence of analysis in the 2010 FMP biop of the differential importance of core and fringe subareas to the total population.

Response: The EIS uses the best scientific information available regarding the range of Steller sea lions. The discussion of SPOIR is related to the listing or delisting of an ESA-listed species and does not provide additional information that would inform the analysis of the effects of the fisheries on Steller sea lions. To ensure the EIS is a concise, focused document, only issues relevant to the analysis of the effects of the alternatives on Steller sea lions are included. A general discussion of the SPOIR is available in the proposed rule to delist the eastern distinct population segment of Steller sea lions published in the *Federal Register* (75 FR 23209, April 18, 2012).

CH1-23 Comment: Although NMFS has committed to preparing a new biological opinion to be completed in time to coincide with completion of the final EIS, this commitment presently is unnecessary in light of the fact that the 2010 FMP biop has been upheld in Federal court. NMFS is under no obligation at this time to prepare a new biological opinion. It is possible that the current NEPA process eventually may require NMFS to revisit the agency's 2010 FMP biop and interim final rule; however, that is unknowable at this time and will remain so until, at the very least, a preferred alternative is definitively identified. Until then, NMFS must refrain from offering preliminary or incomplete ESA opinions. Significantly, the district court recognized that future NEPA and ESA analyses should be kept separate.

Response: On May 10, 2013, NMFS Sustainable Fisheries Division requested reinitiation of consultation on the Aleutian Islands Atka mackerel, Pacific cod, and pollock fisheries based on changes to the action that may result in effects not previously analyzed. On July 29, 2013, NMFS Protected Resources

Division (PRD) replied that the preliminary preferred alternative is similar to the proposed action analyzed in the 2010 FMP biop, but in response to external reviews NMFS is conducting several new analyses that could potentially lead NMFS to draw different conclusions about the effects of the fisheries on Steller sea lions. Thus, PRD concurred that reinitiation of formal consultation is advisable. NMFS used the Council's recommended preferred alternative as the proposed action for the ESA consultation process. NMFS conclude the consultation by issuing the 2014 biop (NMFS 2014). NMFS revised Section 1.5.1 and Section 1.9 of the final EIS to reflect this new information.

CH1-24 Comment: NMFS should reconsider its policy choice regarding its treatment of recovery plan criteria in the EIS and as the basis for jeopardy determinations in the upcoming biological opinion.

Response: NMFS expanded the discussion in Section 1.9.4 of the final EIS regarding the recovery criteria and the use of those criteria in biological opinions. The 2008 Recovery Plan for Steller sea lions (NMFS 2008) is the most recent recovery plan completed by NMFS for Steller sea lions and continues to be the best scientific information available to understand the measures needed for recovery of Steller sea lions, and is incorporated by reference in the EIS.

CH1-25 Comment: Reducing protections in the Aleutian Islands will not allow the agency to meet its obligation to insure that it is not causing jeopardy or adverse modification, including continuing to allow for recovery of the species. According to the Recovery Plan, and based on the best available science, Steller sea lion recovery depends on both (1) long-term, sustained growth in the overall western population and (2) avoidance of localized declines in the individual sub-regions comprising the larger stock. Widely distributed rookeries serve to maintain populations throughout the species' range, meaning that all parts of the range must remain occupied to ensure recovery. Widely distributed rookeries also provide an important source of genetic diversity that exists now but would be threatened by additional fragmentation of the population.

Response: NMFS agrees that sub-regions of the Steller sea lion population are important for the recovery of the entire WDPS of Steller sea lions. As stated by the commenter, this is consistent with the 2008 Recovery Plan (NMFS 2008). The potential effects on the Aleutian Islands subarea portion of the WDPS are analyzed in Chapter 5. The NEPA and ESA processes will allow NMFS to identify any appropriate changes that can be made to the Steller sea lion protection measures that insure the groundfish fisheries are not likely to cause jeopardy and that minimize, to the extent practicable, economic impacts on the fisheries.

13.2.4 Magnuson-Stevens Act Compliance

CH1-26 Comment: The draft EIS does not adequately address how and whether the proposed action complies or conflicts with applicable Federal, regional, or local plans and policies for the area concerned. At the Federal level, NMFS fails to adequately explain whether the proposed action is, or alternatives are, consistent with the Magnuson-Stevens Act National Standards. NMFS must address this point in the draft EIS, both because NMFS's underlying Magnuson-Stevens Act regulatory action is subject to NEPA, and because an EIS's environmental consequences section must address "[p]ossible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned" (40 CFR 1502.16(c)). NMFS explicitly addresses only National Standards 1, 2, and 8. It devotes more than cursory consideration only to Standards 8 and 10. This limited analysis is inadequate under NEPA and provides the public with no way of knowing whether NMFS has adequately addressed compliance with the Magnuson-Stevens Act. NMFS must comply with NEPA by addressing the possible conflicts that its proposed action has with National Standard 4. NMFS neither mentions National Standard 6 nor discusses whether its proposed

action is consistent with it, thereby violating its obligation to consider potential conflicts with the National Standards.

Response: At the time of the draft EIS, NMFS had not selected a preferred alternative; therefore, it was premature to make determinations about whether the proposed action complies with applicable Federal law. The EIS itself does not attempt to balance the National Standards. The Council considered and weighed all National Standards when it recommends its preferred alternative. Similarly, NMFS must ensure that any action it takes pursuant to the Magnuson-Stevens Act is consistent with the National Standards. The EIS explains how the preferred alternative best meets the purpose and need and complies with the Magnuson-Stevens Act. The EIS endeavors to analyze all impacts from the alternatives in order to disclose such information to the public and provide the decision-makers with the necessary information to balance the National Standards and render a final decision.

Section 1.5 of the EIS explains the relationship of this action to Federal law. Section 1.10.4 discusses the alternatives relative to regional or local plans and policies in the area concerned.

The EIS addresses the National Standards throughout the document in the analysis of the effects of the alternatives. NMFS addresses National Standards 1, 2, 5, 7, 8, 9, and 10 in response to the subsequent comments. The following provides examples of where information can be used to consider consistency with National Standards 3, 4, and 6.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination (16 U.S.C. 1851(a)(3)). The management of fish stocks is discussed in Chapter 3 of the EIS. None of the alternatives would change how NMFS manages individual fish stocks as units throughout their range.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different states (16 U.S.C. 1851(a)(4)). The effects on residents of different states from the conservation and management under the alternatives are discussed in Chapter 10 of the EIS. Though community impacts may occur more for some Aleutian Islands communities, fishery restrictions would apply to participants in the fisheries from Alaska, Washington, and Oregon with no discrimination between residents of different states.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches (16 USC 1851(a)(6)). The alternatives are designed to account and allow for variations among and contingencies in fisheries, fishery resources, and catches. These alternatives are described in detail in Chapter 2, including the considerations in the development of the alternatives to address fisheries, fishery resources, and catches.

CH1-27 Comment: If NMFS had adequately considered National Standard 1, it would have realized that its draft EIS is not consistent with the Magnuson-Stevens Act. The draft EIS concludes that the optimum yield limits on harvests in the BSAI and in the Gulf of Alaska contain overall harvest of groundfish, and that the 2 million metric ton optimum yield cap in the BSAI also contributes significantly to preventing overharvests. The controls on fishing mortality in setting harvest specifications ensure the stocks are able to produce maximum sustainable yield on a continuing basis. This conclusion is flawed because it presumes that the closures, harvest limitations, and additional restrictions on the Atka mackerel and Pacific cod fisheries are necessary to protect the prey of the WDPS of Steller sea lions.

Response: National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the U.S.

fishing industry (16 U.S.C. 1851(a)(1)). The 2010 FMP biop and the best scientific information available established the potential for Atka mackerel and Pacific cod fisheries to impact Steller sea lion prey and the need for measures to protect Steller sea lion prey. NMFS is complying with National Standard 1 in its management of the groundfish fisheries. Chapter 3 contains a discussion of the effects of the alternatives on target species and shows that none of the alternatives impact NMFS's ability to prevent overfishing. NMFS uses separate optimum yields for the combined groundfish fisheries in the Gulf of Alaska and in the BSAI.

The comment cites EIS text that refers to the management of the groundfish fisheries through the annual harvest specifications, not the alternatives under consideration in this EIS. The annual harvest specifications process includes adjustments of total allowable catch for individual fisheries in consideration of acceptable biological catch and fishery restrictions to provide for the overall groundfish fishery to achieve the BSAI optimal yield of 2 million metric tons on a continuing basis. As discussed in Chapter 3, none of the alternatives impact the ability of the fisheries in these two management areas to achieve the established optimum yields or change the setting of optimum yield. Additionally, Chapter 8 includes discussion of fleet redeployment that is used in consideration of achieving optimal yield from each fishery.

CH1-28 Comment: Contrary to NEPA's requirement that it address responsible opposing scientific views (see 40 CFR 1502.9(b)), the draft EIS postpones analysis of the scientific uncertainty surrounding the effects of fisheries on Steller sea lion prey resources to the section 7 consultation. This strategy violates the Magnuson-Stevens Act's National Standard 2 because NMFS cannot make a decision based on the best science available if it declines to consider relevant scientific information.

Response: National Standard 2 states that conservation and management measures shall be based on the best scientific information available (16 U.S.C. 1851(a)(2)). NMFS uses the best scientific information available in the EIS and highlights where information is lacking or where there is scientific uncertainty or controversy. Section 1.10.2 describes the best available information used in the EIS, including scientific information on which to base conservation and management measures. The EIS does directly address opposing scientific views that are relevant for the EIS analysis in Section 5.2.2. The EIS also explains how NMFS is addressing the opposing scientific views that are not relevant to the EIS analysis. NMFS has explained that it is conducting ongoing analyses to directly address the opposing scientific views that are relevant to the section 7 consultation. NMFS began the formal section 7 consultation on May 10, 2013. NMFS considered the Council's recommended preferred alternative in the section 7 consultation on the proposed action using the best available commercial and scientific information. NMFS concluded the consultation by issuing the 2014 biop (NMFS 2014). NMFS revised Section 1.5.1 and 1.9 of the final EIS to reflect this new information.

CH1-29 Comment: NEPA compliance mandates that the EIS consider any possible conflict that Alternative 5 has with National Standard 5.

Response: National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose (16 U.S.C. 1851(a)(5)). At the time of the draft EIS, NMFS had not selected a preferred alternative; therefore it was premature to make determinations about whether the proposed action is consistent with National Standard 5. The alternatives were designed to account for the efficient harvest of the target species while meeting other mandates under the ESA and Magnuson-Stevens Act. The EIS explains how the preferred alternative best meets the purpose and need and complies with the Magnuson-Stevens Act.

The EIS considers efficiency in the utilization of fishery resources in Chapter 8. Chapter 8 describes the sectors participating in the harvest of target species and the potential behavior of the fleets to redeploy to efficiently harvest the available quota. Chapter 8 addresses the E.O. 12866 Regulatory Impact Review requirement for a cost-benefit analysis and evaluates the alternatives and their options that are under consideration. Cost-benefit analysis is a standard tool for comparing the economic efficiency of alternative actions. Data limitations preclude a complete summarization of all costs and benefits, or the calculation of net benefit estimates for the different alternatives. The economic analysis in Chapter 8 provides qualitative analysis where it is not possible to provide a quantitative analysis. Alternative 5 is evaluated along with the other alternatives. This information was considered in the selection of a preferred alternative, ensuring National Standard 5 was considered in the decision making.

CH1-30 Comment: NMFS must address National Standard 7 in the EIS, and discuss whether any of the alternatives are consistent with it in order to ensure compliance with NEPA's requirement to address potential conflicts with Federal policies, plans, and controls. NMFS does not currently do so.

Response: National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication (16 U.S.C. 1851(a)(7)). The purpose and need for the action in Section 1.3 specifically states that the action should minimize costs to the extent practicable. Chapters 8 and 10 provide information on how to evaluate the costs under each alternative. The analysis in Chapter 8 identifies the costs of the alternatives to the extent that it is possible to do so, providing decision makers with a summary of the information that is available for choosing an alternative that addresses this, and the other, National Standards. The intent of these alternatives is to protect Steller sea lions by implementing reasonable and prudent alternatives. Each alternative, if chosen, would either confirm or replace the existing measures and would not duplicate existing measures.

CH1-31 Comment: National Standard 8 calls on agencies to account for the importance of fishery resources to fishing communities in a way that provides for the sustained participation of and minimizes adverse economic impacts to such communities. NMFS does not address how the proposed action or other alternatives conflict with the sustained participation of, and minimize adverse economic impacts on, communities. This discussion is especially lacking for Adak. In light of significant community harm, the EIS must comply with its NEPA obligation to explain how its proposed action is consistent with its responsibility under National Standard 8 to provide for the sustained participation of and minimize economic impacts to fishing communities. If it did so, NMFS would identify that the restrictions encompassed in the proposed alternative are inconsistent with National Standard 8 because the restrictions are unwarranted. NMFS cannot demonstrate that continued closures of and restrictions on fisheries will support the recovery of the Steller sea lion WDPS; therefore, it must address how this finding conflicts with its requirement to provide for the sustained participation of and minimize adverse economic impacts to fishing communities.

Response: NMFS evaluates six alternatives, one of which would return fishery management (with minor changes generally relaxing restrictions) to the 2010 management regime that preceded the interim final rule. The analysis evaluates, so far as possible with the information available, the impacts of these alternatives on geographical communities, such as Adak or Atka, or communities of interest, such as Aleut Corporation stockholders. Chapter 10 evaluates the importance of fishery resources to fishing communities using the concepts of engagement with and dependency on the fisheries. This analysis summarizes the information available to decision makers who must balance National Standard 8 with the other national standards. This balancing is done by decision makers rather than the EIS.

NMFS disagrees that there is a conflict with National Standard 8 on the grounds that the restrictions are unwarranted. National Standard 8 provides that "[c]onservation and management measures shall, consistent with conservation requirements of this Act (including the prevention of overfishing and

rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of Paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities" (16 U.S.C. 1851(a)(8)). Chapters 8 and 10 of the EIS use the best scientific information available to determine the economic and social impacts of the alternatives and to determine the importance of the fisheries for fishing communities. Chapter 10 provides detailed information on several fishing communities that may be particularly impacted by this action. This information supported the decision making to select a preferred alternative that considered sustainable participation by communities in the fisheries and to minimize to the extent practicable the economic impacts on these communities.

Management measures authorized by the Magnuson-Stevens Act must be consistent with *the national standards and other applicable laws* (emphasis added). NMFS appropriately applied the ESA in determining that the interim final rule was necessary to insure the groundfish fisheries were not likely to jeopardize the continued existence of the WDPS of Steller sea lions. Another important consideration in National Standard 8 is the phrase "to the extent practicable," which immediately precedes "minimize adverse economic impacts on such communities." The 2010 FMP biop and subsequent reviews provide important information for developing reasonable alternatives for the proposed action for analysis in the EIS.

CH1-32 Comment: While NMFS discusses bycatch in several places throughout the draft EIS, it does not specifically state whether its proposed action and other alternatives will actually minimize bycatch of implicated species to the extent practicable as required under National Standard 9. Rather, it concludes that the impacts of the proposed alternatives on fisheries bycatch are difficult to comprehensively assess (draft EIS at ES-45). This conclusory assertion is insufficient under NEPA. The EIS must address whether its proposed action conflicts with the goal of minimizing bycatch, as required by NEPA.

Response: The comment is incorrect. The EIS provides detailed conclusions regarding impacts of the alternatives on bycatch that are supported by the analysis. Section 3.5 analyzes the effects of the alternatives on other groundfish species, including the bycatch of these species under the alternatives. Section 4.7 explains the effects of the alternatives on the bycatch of prohibited species, non-specified species and forage species, comparing the action alternatives to the no action alternative. Section 5.2.1 addresses the incidental take of marine mammals and Section 6.3 addresses the incidental take of seabird species, providing analysis by each alternative and summarizing and comparing the bycatch effects of the alternatives. This information ensures that National Standard 9 is considered in the decision making. National Standard 9 states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch (16 U.S.C. 1851(a)(9)).

The comment's quote from the Executive Summary (draft EIS at ES-45) is referring to the difficulties in assessing ecosystem impacts and states "The lack of data as well as dynamic nature of the Aleutians Islands ecosystem suggest that the impacts of the proposed alternatives on bottom up change in ecosystem productivity, fishing and predation morality, top down changes in predation and fishing, total removals from the ecosystem, and fisheries bycatch are difficult to comprehensively assess and the impacts to the ecosystem in unknown under all of the alternatives." This statement does not indicate that assessing impacts on bycatch is difficult as much as comprehensively understanding all of the issues necessary to assess food web interactions under data limitations is difficult. Further, this sentence summarizes the in-depth analysis prepared for understanding ecosystem impacts presented in Chapter 7. Chapter 7 identifies where information is lacking, discusses the relevance of the unavailable information, identifies the existing credible scientific evidence, and provides an evaluation on ecosystem impacts based on scientific approaches.

CH1-33 Comment: To comply with National Standard 10, the EIS should contain a clearer conclusion about whether or not the proposed action would actually promote human safety.

Response: National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea (16 USC 1851(a)(10)). Safety issues are discussed in Section 8.18.1 of the EIS, and the analysis indicates the performance of the alternatives relative to safety using the best available information. The first paragraph explains the difficulties with preparing a quantitative evaluation of the net safety impact of each of the complex set of alternatives. These include data shortcomings and limited understanding of the relationship between fishery management and accident causality. In light of these difficulties, the discussion is necessarily limited to a qualitative discussion of five issues that are believed to be related to safety and how these may be related to the alternatives. This information ensures human safety and National Standard 10 are considered in the decision making.

CH1-34 Comment: Given the lack of data and information on which to assess population-level effects of increased fish harvests in and around the western and central Aleutian Islands, NMFS should adopt a precautionary approach in the development of the final EIS and any subsequent rulemaking.

Response: NMFS acknowledges the comment, and endeavors to use a level of precaution in its decision making that is commensurate with the level of confidence it has in the best scientific information available to make its decision and the specific requirements imposed by law.

13.3 Chapter 2 Comments

These comments are on Chapter 2, the description of the alternatives, and alternatives considered and not further analyzed. Details of the protection measures under each alternative analyzed in the EIS are in Chapter 2. The comments received on Chapter 2 focused primarily on information that may have been lacking to understand the alternatives, the reasonable range of alternatives, and the preferred alternative.

13.3.1 More information needed

CH2-1 Comment: Include a qualitative and quantitative description of the management actions that have resulted in closures in the Aleutian Islands since 1997, for example, closure of the directed pollock fishery, closures of habitat areas of particular concern, essential fish habitat (EFH) closures, 2001 biological opinion Steller sea lion management closures, and 2010 FMP biop measures. The EIS should include a description and chart of the areas that have been closed to fishing and include an analysis of the additive effects of those closures for Steller sea lions (prey resources and availability) and fishing fleets (re-distribution of fishing effort). The EIS also should provide a description of management measures taken that facilitate distribution of fishery catches over time and area and minimize the race for fish, such as Amendment 80, Amendment 85, parallel fisheries licensing requirements, and trawl recency. The discussion should include (1) potential changes in bycatch and prohibited species catch, (2) regulatory limitations and license limitations/requirements for vessels to move into new areas to fish for different species or with different gear types, (3) limitations of vessel configurations for converting to different fisheries or gear types, and (4) inability of fixed processing plants in the Aleutian Islands to shift locations and fisheries.

Response: To avoid being encyclopedic, the EIS presents the information that would provide an understanding of the alternatives and their effects on the human environment, incorporating by reference from the Programmatic Supplemental EIS for the Alaska Groundfish Fisheries (NMFS 2004) and from

the Alaska Groundfish Harvest Specifications EIS (NMFS 2007), which contain past fisheries management descriptions. The EIS incorporates by reference the discussion of the changes to fisheries management measures since 2003 in the EA for the interim final rule. The management measures applied in 2003 were those analyzed in the 2001 biological opinion on the Alaska groundfish fisheries.

A single figure of the Atka mackerel, Pacific cod, and pollock fisheries and their closures would be difficult to read due to the complications with types of closures, seasons, areas, and gear types; therefore, no such figure is included in the EIS. NMFS Alaska Region provides a mapviewer application that would allow one to create a map that shows all of the fishery management closures in a single view.[258] Chapter 2 includes figures showing by fisheries the overlay of the Steller sea lion protection measures and the Aleutian Islands Habitat Conservation Area closures for the nonpelagic trawl gear fisheries. The additive effects of the additional fisheries management measures are considered in the analysis of the impacts of the alternatives in Chapters 3 through 7. Section 5.2.2.2 incorporates the Aleutian Islands Habitat Conservation Area closures in the consideration of critical habitat closed under each alternative for Atka mackerel and Pacific cod trawl fisheries. The redistribution of fishing effort in consideration of license limitations is discussed in Chapter 3 under each of the target species and in greater detail in Sections 8.3.3, 8.4.3, and 8.5.3. Potential effects on bycatch and prohibited species catch are discussed in Sections 3.5 4.8, 8.3.3, 8.4.3, and 8.5.3. Limitations on vessels entering other fisheries, which may include changing configurations, are discussed in the redeployment sections of Chapter 8. Shore-based Aleutian Islands processing facilities are discussed in detail in Chapters 8 and 10.

CH2-2 Comment: Section 2.1 and Section 2.2 lack an analysis of each of the alternatives (and their varied management measures) in conjunction with other existing area and seasonal closures (such as EFH). The draft EIS should be revised to provide a cumulative impacts analysis of all of the closures to which the BSAI groundfish fisheries are currently subject, as well as any further closures under each of the alternatives. This would result in the documentation and evaluation in Section 2.1 of the actual amount of area closed and the cumulative impact of these closures on Steller sea lion habitat and prey field under each alternative. Section 2.2 should then include a comparison of these cumulative impacts between alternatives. Given that the only measure currently employed in this draft EIS to compare alternatives is the sheer amount of area closed to fishing, this metric at least should be applied consistently across all alternatives and this cumulative closure information should be made available to the public.

Response: Chapter 2 provides a description of the alternatives, not an analysis of cumulative effects. Section 2.1.1 provides a description of the State of Alaska fisheries and general Aleutian Islands groundfish fisheries management that applies under the status quo and all other alternatives, so the reader can understand the baseline for the fisheries management to which the alternatives would be applied. This description includes State of Alaska parallel fisheries management, Amendment 82 pollock fishery management, Amendment 80 non-American Fisheries Act trawl management, gear splits under Amendment 85 for Pacific cod, and EFH protection measures. The description of the alternatives in Chapter 2 includes the additional non-pelagic trawl gear closures that occur under the Aleutian Islands Habitat Conservation Area as shown in Figures 2-4 through 2-7, 2-15, and 2-26 through 2-28. In addition, in Section 5.2.2, the analysis of the harvest of prey species includes consideration of the portion of critical habitat that would be open when the Aleutian Islands Habitat Conservation Area is considered with each alternative's closures (Tables 5-20, 5-30, 5-31, 5-36, 5-46, 5-47, 5-55, 5-56, 5-57, 5-65, 5-70, 5-76, and 5-79). These tables in Chapter 5 allow the reader to compare the cumulative closures under the alternatives. Additional cumulative impacts, including fisheries management, are described in

[258] http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/

Section 1.10.4, and incorporated into the analysis of the effects of the alternatives as appropriate in each chapter on an environmental component, including Steller sea lions (Section 5.3).

CH2-3 Comment: Data exist regarding the biomass, acceptable biological catch, and harvest levels for all of the Steller sea lion prey species in the Aleutian Islands region. The locations of commercial harvest and critical habitat are also known. Estimates of the amount of prey left in important areas could be made for each alternative, and correlated with what is known about Steller sea lion foraging and nutritional requirements. But Chapter 2 does not include this kind of synthesis, and therefore the draft EIS does not provide any meaningful methods to compare and evaluate the efficacy of the alternatives.

Response: Chapter 2 is a description of the alternatives to be analyzed in the EIS. Information on the biomass and harvest of target species in the fisheries that are also Steller sea lion prey is in Chapter 3. Chapter 5 contains analysis of the harvests that would occur under each alternative and the potential impacts on Steller sea lions in Section 5.2.2. This analysis shows the different amounts and locations of harvests of prey species that may occur in the three statistical areas and within critical habitat and provides the contrasting potentials for effects on prey resources among the alternatives. Information is not available to estimate the amount of prey left in an area in relation to Steller sea lion foraging needs on the local scale as biomass for the target species is understood primarily on a statistical area or Aleutian Islands-wide scale.

CH2-4 Comment: The EIS should evaluate the impacts that multiple fishery restrictions have had on the consolidation of fishery catch into small geographic areas that remain open to fishing.

Response: The EIS explains in Section 2.1.1.2 that a large portion of the Aleutian Islands subarea is closed to nonpelagic trawling. Nonpelagic trawl gear is used for harvesting Atka mackerel and Pacific cod. The closures to nonpelagic trawling include the Aleutian Islands Habitat Conservation Area (AIHCA), the Aleutian Islands Coral Habitat Protection Areas, and the Bowers Ridge Habitat Conservation Zone, located in the northern portion of Area 542 and 543 (Figure 2-4). The EFH closures were implemented on July 28, 2006 (71 FR 36694, June 28, 2006), and revised March 20, 2008 (73 FR 9035, February 19, 2008). The AIHCA closed most of the Aleutian Islands subarea to nonpelagic trawling (279,114 nm^2), while most fishing areas that have been trawled repeatedly in the past remain open. The Bowers Ridge Habitat Conservation Zone is closed to mobile bottom contact gear, including nonpelagic trawling. The Aleutian Islands Coral Habitat Protection Areas are relatively small, discrete areas closed to bottom contact gear. Even though an area may be open to nonpelagic trawling, the area may be closed to Atka mackerel or Pacific cod trawling based on Steller sea lion protection measures, leaving discrete locations throughout the Aleutian Islands subarea that are open to nonpelagic trawl gear fishing, as shown in Figure 2-5. The AIHCA, which became effective on July 28, 2006 (71 FR 36694, June 28, 2006), applies to nonpelagic trawl gear, which is used to harvest Atka mackerel and Pacific cod. Even though portions of critical habitat would be open to trawl gear under an alternative, these areas would contain prohibitions on nonpelagic trawl gear that would further limit locations available to harvest Atka mackerel and Pacific cod by nonpelagic trawl gear. AIHCA is described in general terms in Section 2.1.1.2. Figures 2-5 and 2-6 in Chapter 2 show overlays of critical habitat and AIHCA. Figure 2-26 shows overlays of AIHCA, Aleutian Islands Coral Habitat Areas, and critical habitat. This topic is further discussed in Section 5.2.2.2.1. In Chapter 8, the analysis uses a baseline period from 2004 to 2010. Thus for the period from July 2006 through 2010, the analysis reflects the fishing patterns that developed in response to the introduction of EFH regulations. NMFS discusses regulatory changes during the baseline years in Section 8.3, and modified the discussion to list the introduction of habitat conservation and protection measures as one of the events taking place during this period, and provides a reference back to discussions in Chapters 2 and 5.

CH2-5 Comment: The comparison of alternatives at Section 2.2 rests largely on areas closed. Nowhere in Chapter 2 is there any information quantifying the effect of each alternative and its related fishery management measures relative to the amount of prey required by Steller sea lions, the area where the prey are needed, the amount of prey that would then be available to Steller sea lions under alternative scenarios, or any of the other direct effects of the alternatives or the management measures on Steller sea lions and their habitat. Without this information, the analysis leaves it to inference and speculation about whether or not any of the management measures would have any beneficial effect for Steller sea lions, or what a reasonable alternative set of management measures might be. Similarly, without this information, the reader has no ability to compare and contrast alternatives, which is required for informed decision making under NEPA.

Response: The reasonable range of alternatives is derived from the purpose and need for the action, which is described in Section 1.3. Section 2.2 provides a comparison among alternatives of the seasons, statistical area specific closures, catch limits, and other management measures that would be applied by fishery under each of the alternatives. These differences among alternatives are provided by fishery specific tables that compare the alternatives and by groups of maps by fishery to visually compare the closures that would be applied to the fishery under each alternative and option. Section 5.2.2 provides the analysis of the effects of the alternatives on Steller sea lion prey species, providing quantitative catch information inside and outside critical habitat and analysis of this information in the context of what is known about Steller sea lion behavior, diet needs, and prey behavior. Sections 5.2.2.12.1 through 5.2.2.12.5 summarize the results of the prey effects analysis by fishery so one can compare and contrast the impacts of the alternatives on Steller sea lions.

CH2-6 Comment: Chapter 2, along with Chapter 5, fails to include any of the metrics that might be used in the new biological opinion. These analyses should be integrated concurrently to the fullest extent possible. There is no clear linkage between the superficial analyses in Chapter 5 and the evaluation of Alternatives in Chapter 2. The substance that would help the reader evaluate alternatives and make reasoned comments or decisions is absent from the draft EIS.

Response: Section 1.10.3 provides the performance standards for Steller sea lion protection measures resulting from the analysis in the 2010 FMP biop and as modified in response to external reviews of the 2010 FMP biop. These standards were used to guide the development and analysis of the alternatives in the EIS to inform the decision maker on the potential effects of the alternatives on Steller sea lions given the best scientific information available to NMFS. In June 2013, NMFS presented to the Council the analytical approach that it intends to use to examine the effects of the proposed action under section 7 of the ESA. The ESA evaluation will include several qualitative and quantitative analyses to determine whether NMFS can insure that the proposed action does not jeopardize the continued existence of the WDPS of Steller sea lions or adversely modify designated critical habitat. If results of those analyses indicate that NMFS has not insured that jeopardy and adverse modification are not likely, then NMFS will provide a reasonable and prudent alternative to insure that jeopardy and adverse modification are not likely.

CH2-7 Comment: The draft EIS is so inadequate as to preclude meaningful analysis, requiring NMFS to prepare and circulate a revised draft of Chapter 2, particularly Sections 2.2 and 2.3, prior to preparation of the final EIS and in time for selection of a proposed action by the Council. Revisions of these key sections are needed in order to meet NEPA's requirements to provide a full and fair discussion of significant environmental impacts and inform decision makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

Response: Section 2.2 is a summary comparison of the features of the alternatives by fishery. This provides someone who is interested in a particular fishery an easy method to rapidly compare and contrast the alternatives in relation to a single fishery. Section 2.3 is the description of alternatives considered but not further analyzed. It is not clear from the comments what improvements are needed to these sections. Chapters 3 through 7 provide a full and fair discussion of significant environmental impacts and inform decision makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. NMFS does not agree that a supplemental EIS is necessary at this time. No new information has been identified that would indicate a revised draft EIS is required. NMFS made changes to the final EIS in response to specific public comments, as detailed in the specific responses.

13.3.2 Range of Alternatives

CH2-8 Comment: The Pribilof Islands and Round Island are geographically distinct from the Aleutian Islands, and should be included in the EIS but analyzed separately. Re-examine the rookery cluster area that encompasses the Pribilof Islands. The Pribilof Islands is a unique area in the Bering Sea and should not be grouped with another rookery cluster area. Examine the justification for lumping the Pribilof Islands with a portion of the Aleutian Islands.

Response: NMFS considered an alternative that included closures at Dalnoi Point on St. George Island of the Pribilof Islands and decided to not further analyze it, for reasons presented in Section 2.3.2 of the EIS. Pribilof Islands and Round Island are outside of the scope of the action, which is described in the purpose and need in Section 1.3 and is the basis for the reasonable range of alternatives. The rookery cluster areas are mentioned in Section 5.1.1 of the EIS, but are not used in the analysis of the effects of the alternatives and therefore are not further evaluated in the EIS.

CH2-9 Comment: Include the alternatives developed by the Council and its Steller Sea Lion Mitigation Committee.

Response: Section 2.3 details the alternatives considered and not further analyzed, including the measures recommended by the Council and Steller Sea Lion Mitigation Committee that NMFS did not include in Alternative 1 through 6. NMFS worked with the Council and its Steller Sea Lion Mitigation Committee to identify the reasonable range of alternatives for analysis in the EIS. Alternative 1 is the no action alternative, which are the protection measures under the 2010 interim final rule. Alternative 4 includes the management measures in place before the interim final rule, as adjusted to account for changes in fisheries management since 2003. Alternatives 2, 3, and 5 were developed through the Steller Sea Lion Mitigation Committee and Council process. NMFS added Alternative 6 to the final EIS in response to public comments.

CH2-10 Comment: Given the findings and conclusions of the reviewers of the 2010 FMP biop, it is not reasonable or appropriate to include an alternative that is more precautionary and more restrictive on fishing than the current protection measures (Alternative 1). Since the scientific premise for Alternative 1 has been found to be baseless, it is imperative that NMFS consider a number of other, less stringent, alternatives in its EIS.

Response: NMFS acknowledges the comment.

CH2-11 Comment: The range of alternatives is inadequate because it fails to consider alternatives that are more protective of Steller sea lions. Limiting the alternatives to those that reduce existing protections violates the agency's obligation under NEPA to consider all reasonable alternatives to the proposed

action, including those that are more protective of Steller sea lions. By refusing to consider more protective alternatives, NMFS has deprived itself of information on the environmental impacts of the unconsidered alternatives. The failure to consider viable alternatives that provide for additional protections is inconsistent with the purposes of the ESA and Magnuson-Stevens Act and prevents the agency from giving full and meaningful consideration to the trade-offs between protecting an endangered species and limiting the economic impacts of protective measures that are clearly contemplated in the proposal's statement of purpose. Without detailed consideration of more protective management measures, the agency lacks a valid baseline that will allow it to judge the feasibility of various suites of management measures.

Response: Based on this and similar comments, NMFS added an Alternative 6 to the final EIS. Alternative 6 would prohibit retention of the three principal Steller sea lion prey species harvested by the Alaska groundfish fisheries in the Aleutian Islands reporting areas (Statistical Areas 543, 542, and 541 and adjacent State of Alaska waters). Vessels would be prohibited from directed fishing for these species and prohibited from retaining any incidental catch of these species while directed fishing for other groundfish targets. Alternative 6 would provide the same protection of Steller sea lion prey resources as Alternative 1 in Area 543 and additional protection in Areas 542 and 541. The additional protection of prey resources from the retention prohibition provides effects that can be analyzed and compared with the less restrictive protection measures in these areas under the other alternatives.

CH2-12 Comment: NMFS failed to evaluate reasonable alternatives without sufficient justification. In addition to the more protective measures the agency considered during preparation of the 2010 FMP biop, feasible alternative management measures were presented to the agency during the scoping process and at other times. These proposed management changes include:

- Committing to managing Pacific cod in the Bering Sea and Aleutian Islands as two separate stocks;
- Establishing a maximum yield cap for the Aleutian Islands;
- For prey species in the Aleutian Islands, setting optimum yield so that biomass is predicted to increase to B_{60} over a 20-year time horizon;
- Modifying the global control rule for prey species so that α is 0.75 and fishing is stopped at B_{30} for fisheries in the Aleutian Islands;
- Committing to a formal implementation strategy for aspects of the Aleutian Islands Fishery Ecosystem Plan, such evaluating options to incorporate predator needs in the TAC-setting process; and
- Protecting critical habitat, such as areas surrounding rookeries and haulouts in the Pribilof Islands.

Other than the first one listed above (managing Pacific cod in the Bering Sea and Aleutian Islands as two separate stocks), the agency rejected these measures. The draft EIS justifies the exclusion of alternatives like those presented above on the grounds that they were not considered in the 2010 FMP biop, are inconsistent with the statement of purpose and need, and would "require extensive work." None of the reasons provide legal justification for failing to consider a viable alternative.

Response: Section 2.3 describes why these alternatives were not further analyzed. In response to this comment, NMFS expanded the discussion of why the commenter's proposed measures are not reasonable in section 2.3 of the final EIS. Of the reasons provided, the most compelling is that these measures are outside the purpose and need for this action. Further, no available information indicates that the commenter's proposed measures would be more protective for Steller sea lions than the suite of measures analyzed in this EIS.

Maximum yield cap: The comment did not define 'maximum yield cap', but NMFS assumes that it is a limit on the catch of each prey species. NMFS has established a 'maximum yield cap' for each of the prey species in the Aleutian Islands. Per the MSA, NMFS sets OFLs, ABCs, and TACs for Atka mackerel, Pacific cod, and pollock in the Aleutian Islands. NMFS manages the target fisheries on prey species to prevent exceeding the TAC and ABC and manages the groundfish fisheries to prevent exceeding an OFL. In addition, the alternatives considered in this EIS include additional catch limits for each management area for Atka mackerel, Pacific cod, and pollock (see Table 2-20, Table 2-21, Table 2-22, and Table 2-23). The impacts of the area specific catch limits on Steller sea lions are analyzed in Chapter 5. Therefore, NMFS considers this provision encompassed in the existing alternatives.

Aleutian Islands OY and new global control rule: In considering this comment, NMFS analyzed whether the proposed AI OY, the proposed global control rule, or both would result in less catch and more fish biomass than the catch restrictions under Alternative 1 (status quo). First, biomass targets are for presently unavailable for AI Pacific cod because it is managed at Tier 5. Pacific cod catch rate is lower in the Aleutian Islands due to area specific TACs (roughly half the previous average harvest rate in the AI prior to the split) than the catch rate proposed by the comment. Second, the AI pollock catch is already low and current fishing mortality rates would be lower than those proposed. As explained in section 3.4.2, the AI pollock catch is constrained by the 19,000 mt TAC. Thus, the proposed measures would not result in more restrictive harvests in the AI than status quo management for Pacific cod or pollock.

Atka mackerel is managed in Tier 3 and hence has biomass reference points that NMFS can use to evaluate the impacts of the proposed measures compared to status quo. NMFS concluded that applying the proposed AI OY and global control rule to Atka mackerel results in harvests that are similar to those currently in place under Alternative 1. The Alternative 1 harvest rate at $F_{59\%}$ is nearly identical to the proposed $F_{60\%}$. Applying the proposed global control rule would have a negligible difference relative to the projected harvest rates under Alternative 1. Therefore, NMFS concludes that the proposed measures would provide the same level of reductions in harvest rates (and concomitant biomass targets) when compared to Alternative 1. NMFS revised section 2.3.4 to include this analysis in the final EIS.

Aleutian Islands Fishery Ecosystem Plan (AI FEP): NMFS and the Council are committed to implementing the AI FEP. The Council's AI FEP is a strategic policy and planning document, to guide the Council in its management actions relating to the Aleutian Islands. The Aleutian Island ecosystem is complex, and is the least predictable of the ecosystems in which the Council manages. The FEP is intended to be an educational tool and resource that can provide the Council with both an 'early warning system,' and an ecosystem context for fishery management decisions affecting the Aleutian Islands area. Chapter 7 builds on the information and analysis in the AI FEP.

The needs of predators are incorporated in the harvest specifications process by applying natural mortality (including predation) for a target species stock assessment. The development of multispecies modeling that further incorporates predator/prey relationships is ongoing at the AFSC. In addition to this work, the current alternatives contain catch limits that are explicitly designed to reduce catch below the TAC in each management area specifically to incorporate predator needs (see Table 2-20, Table 2-21, Table 2-22, and Table 2-23). Therefore, NMFS considers this provision encompassed in the EIS alternatives.

Pribilof Islands critical habitat: See response to comment CH2-8.

CH2-13 Comment: The EIS reason for not considering rejected alternatives based on the fact that the FMP biop did not include the proposed measures is irrelevant to determining whether they are reasonable alternatives that NMFS must consider under NEPA. ESA-governed reasonable and prudent alternatives (RPAs) to proposals for resource exploitation are not coterminous with NEPA-governed reasonable

alternatives to proposed action. The underlying purpose of identifying potential RPAs during ESA consultation is thus narrower than that of discussing reasonable alternatives under NEPA, where the latter is intended to provide for informed decision-making and public participation by considering all viable alternatives to agency action.

Response: Based on this and similar comments, NMFS added an Alternative 6 to the final EIS. Alternative 6 would prohibit retention of the three principal Steller sea lion prey species harvested by the Alaska groundfish fisheries in the Aleutian Islands reporting areas (Statistical Areas 543, 542, and 541 and adjacent State of Alaska waters). Vessels would be prohibited from directed fishing for these species and prohibited from retaining any incidental catch of these species while directed fishing for other groundfish targets. Alternative 6 would provide the same protection of Steller sea lion prey resources as Alternative 1 in Area 543 and additional protection in Areas 542 and 541. The additional protection of prey resources from the retention prohibition provides effects that can be analyzed and compared with the less restrictive protection measures in these areas under the other alternatives.

CH2-14 Comment: The management measures adopted in 2010 only address the western and central Aleutian Islands and constitute the minimum protective action that NMFS could have undertaken. While it is true that the sharpest declines in the Steller sea lion population are occurring in the western Aleutian Islands, that fact does not permit the agency to limit the scope of its analysis. Rather, the breadth of the NMFS action ultimately at issue here—management of the groundfish fisheries—necessitates a similarly broad analysis of environmental impacts, addressing the multitude of groundfish fisheries issues, their interrelationships, and their direct, indirect, and cumulative environmental impacts. Based on a likely population-wide trend of low natality, NMFS should have adopted protection measures that extend beyond the western and central Aleutian Islands and address low natality and competition not just with the Atka mackerel and Pacific cod fisheries, but the pollock fishery as well.

Response: NMFS disagrees that the action is the general management of the groundfish fisheries. The scope of the action is limited by the purpose and need for the action in Section 1.3. As explained, the purpose of the action is to implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries. The action area is defined in Section 1.4. The 2010 FMP biop and the best scientific information available did not identify locations beyond the Aleutian Islands where additional protection measures are necessary to meet ESA obligations. Each alternative contains measures for pollock fishery management. Additionally, Chapter 5 considers the entire range of the WDPS of Steller sea lions in the impact analysis.

CH2-15 Comment: Examine measures in the draft EIS that would move toward better ecosystem-based management. NMFS provides no compelling reason for this failure and, instead, only evaluates alternatives that allow more fishing. The refusal to consider management changes that would benefit the marine ecosystem violates the law and contravenes NMFS's role as steward of our ocean resources. Moreover, the refusal even to consider viable changes in management or more protective measures risks prioritizing short-term economic benefit over long-term sustainability. It also undermines the efforts of those who have participated fully in this process and are committed to working to resolve the longstanding controversy surrounding fisheries management in the Aleutian Islands. For those reasons and others, NMFS should rescind the draft EIS and prepare a new draft.

Response: NMFS does not agree that a new EIS is necessary based on the lack of an ecosystem-based management alternative. All of the alternatives move toward better ecosystem-based management because they are all designed to manage the groundfish fisheries in a way that mitigates the potential impacts of the fisheries on Steller sea lions. Broader ecosystem-based management is outside of the purpose and need in Section 1.3, and the comment did not identify any specific alternatives that are more ecosystem-based and achieve the purpose and need. Section 2.3 of the EIS describes NMFS's

consideration of some suggested measures that have been labeled ecosystem-based management and the reasons they are not further analyzed. In response to this comment, NMFS expanded the discussion of why an additional ecosystem-based management alternative is not reasonable in section 2.3 of the final EIS. Further, Chapter 7 provides an analysis of the impacts of each alternative on the ecosystem.

Based on this and similar comments, NMFS added a new Alternative 6 to the final EIS. Alternative 6 would prohibit retention of the three principal Steller sea lion prey species harvested by the Alaska groundfish fisheries in the Aleutian Islands reporting areas (Statistical Areas 543, 542, and 541 and adjacent State of Alaska waters). Vessels would be prohibited from directed fishing for these species and prohibited from retaining any incidental catch of these species while directed fishing for other groundfish targets. Alternative 6 would provide the same protection of Steller sea lion prey resources as Alternative 1 in Area 543 and additional protection in Areas 542 and 541. The additional protection of prey resources from the retention prohibition provides effects that can be analyzed and compared with the less restrictive protection measures in these areas under the other alternatives.

CH2-16 Comment: The draft EIS arbitrarily suggests that more protective management measures are inconsistent with the purpose and need because such alternatives would increase costs to fisheries. The agency, however, has no basis on which to estimate the economic impact of more protective alternatives. There is no evidence that more protective management measures will have a greater impact on commercial fisheries, in part because the agency decided not to study these alternatives in any detail. An unsupported assumption of cost is an insufficient basis on which to avoid NEPA's requirement to consider all reasonable alternatives to the agency's proposal.

Response: Based on this and similar comments, NMFS added an Alternative 6 to the final EIS. Alternative 6 would prohibit retention of the three principal Steller sea lion prey species harvested by the Alaska groundfish fisheries in the Aleutian Islands reporting areas (Statistical Areas 543, 542, and 541 and adjacent State of Alaska waters). Vessels would be prohibited from directed fishing for these species and prohibited from retaining any incidental catch of these species while directed fishing for other groundfish targets. Alternative 6 would provide the same protection of Steller sea lion prey resources as Alternative 1 in Area 543 and additional protection in Areas 542 and 541. The additional protection of prey resources from the retention prohibition provides effects that can be analyzed and compared with the less restrictive protection measures in these areas under the other alternatives.

CH2-17 Comment: In rejecting ecosystem-based measures, the draft EIS misinterprets the harvest specification process. Contrary to the claim in the draft EIS that "[t]he needs of predators are incorporated in the harvest specifications process by applying natural mortality (including predation) for a target species stock assessment," (draft EIS at page 2-98) there is currently no explicit accounting of predation mortality in the stock assessments for Atka mackerel, Aleutian pollock, or Aleutian Pacific cod. The natural mortality parameter used in the stock assessments are intended to account for all forms of "natural" mortality—including not just predation, but also starvation, disease, stress, and other causes. Further, these parameters are constant, or change little from year to year. The parameters used have little relation to trends in predator populations or the actual level of predation. Even when natural mortality is estimated or derived within a model, the estimates are highly uncertain, derived or used inconsistently between assessments, and may be biased due to changes in populations of predators and the amount of predation.

Response: Insufficient data analysis and modeling are currently available to include time-varying mortality trends for groundfish interactions as the best available science for the Aleutian Islands stocks. The best available science is to estimate constant mortality rates based on long-term data (e.g., through single-species stock assessments).

Best practice in developing multispecies mortality estimates is to use the data (in particular, survey biomass and stomach contents) to estimate functional responses between predator and prey species, which then determine which direct and indirect effects (e.g., fish species eating each other's young) dominate and determine the direction of an interaction (positive or negative). The work of Kinzey and Punt (2009) found a range of uncertainty in functional responses that was not resolvable in terms of net effects between pollock, cod, and Atka mackerel with the data available at the time. The difficulties in mortality rate and functional estimation include lack of seasonal data (data on predation rates are available only in the summer) and limited coverage due to the infrequency of surveys.

While several more years of diet and survey biomass data have become available since this modeling work was conducted, the lack of Alaska Fisheries Science Center resources to re-perform this modeling means the single-species natural mortality estimates remain the best available science. Other sources of natural mortality (e.g., starvation, stress) are generally not directly measurable and are highly confounded with predation, as stressed animals may be more vulnerable to predation. They are best handled as residual mortality from a satisfactory application of a model such as the Kinzey and Punt model mentioned above.

CH2-18 Comment: Given the lack of data and information on which to assess population-level effects of increased fish harvests in and around the western and central Aleutian Islands, NMFS should apply the selected protection measures within the framework of an adaptive, experimental approach to managing Alaska groundfish fisheries.

Response: The 2008 Recovery Plan for Steller sea lions (NMFS 2008) concludes that an experimental framework of treatment and control areas in which fishing is permitted or prohibited will be required to distinguish between fishing and non-fishing effects on sea lion prey availability. However, the action analyzed in the EIS is not intended to be an experimental treatment for determining effects of fisheries on Steller sea lion prey availability. The purpose and need for the proposed action is described in Sections 1.2 and 1.3 of the EIS. While not experimental, NMFS applies an adaptive management strategy for the Alaska groundfish fisheries, including management measures designed to protect prey availability for Steller sea lions. Table 2-10 in the 2010 FMP biop shows a chronology of sea lion protection measures implemented in the Alaska groundfish fisheries since 1990 when Steller sea lions were listed as an endangered species under the ESA. Section 2.1.1 of the EIS describes the fishery management regime implemented in the central and western Aleutian Islands as a result of the conclusions of the 2010 FMP biop. Section 1.10.4 of the EIS describes NMFS's past and ongoing research aimed at understanding movement and abundance of Steller sea lion prey resources, noting that this information can be used to create more effective fisheries management measures to protect Steller sea lions and allow for harvest of prey species.

CH2-19 Comment: Protect every Steller sea lion, including a $2 million penalty for killing each animal. Put satellites on boats and watch what they do. Make fishermen stop carrying guns on board because they shoot Steller sea lions.

Response: The Marine Mammal Protection Act (MMPA, 16 U.S.C. 1361, *et. seq*.) prohibits the take of marine mammals, including the killing of Steller sea lions, except for subsistence harvests. The current maximum statutory penalty permitted under the MMPA is $11,000 per violation. All vessels that have Federal fisheries permits endorsed for pollock, Atka mackerel, or Pacific cod fishing (except by jig gear) are required to have a vessel monitoring system in operation when the fishery is open.

13.3.3 Preferred Alternative

CH2-20 Comment: NMFS identified Alternative 1 as being necessary to insure that any potential adverse population-level effects due to prey depletion by commercial fishing activities would not jeopardize the population's survival and recovery. It is unclear how NMFS can select a different suite of measures at this time, yet provide reasonable certainty that its preferred alternative will not result in jeopardy to the species or adverse modification of its critical habitat.

Response: The draft EIS provided the best available information to inform the Council's recommendation for a preferred alternative that meets the purpose and need. The final EIS, results of the ESA consultation, and the Council's recommendation informs NMFS's selection of a preferred alternative that would meet the purpose and need. The 2010 FMP biop concluded that Alternative 1 insured the groundfish fisheries were not likely to result in jeopardy of continued existence or adverse modification of critical habitat. However, Alternative 1 is not the only way to meet this requirement. NMFS completed an ESA section 7 consultation on the proposed action to insure the preferred alternative is not likely to result in jeopardy or adverse modification of critical habitat.

CH2-21 Comment: The draft EIS does not justify changing the existing protection measures to allow more fishing. There is no scientific information about the fisheries or Steller sea lions that could justify new measures simply allowing more fishing without a coincident increase in other protections. In fact, the latest information shows that sea lions continue to disappear from the western Aleutian Islands, tagged sea lions are ranging further to feed than previously expected, and populations of Atka mackerel, cod, and pollock are declining. All four models prepared for the 2012 draft assessment for the stock of Pacific cod in the Aleutian Islands indicate a declining biomass trend, and all four suggest that there is a significant probability that the stock is currently overfished and possibly even below the B_{20} threshold. Similarly, the Atka mackerel population in the Aleutian Islands is on a downward trend, and the recent stock assessment suggests that the acceptable biological catch amounts from the previous few years were overly optimistic.

Response: Section 5.1.1.2 describes the population trends of the WDPS of Steller sea lions and Section 5.1.1.6 describes the at-sea habits of Steller sea lions, including foraging behavior. NMFS agrees that the population of Steller sea lions in the western Aleutian Islands is declining and that adult female Steller sea lions have ranged far offshore and are likely foraging in these areas. The reason for the individual sea lions to range far offshore is not known, especially considering other tagged sea lions remain in inshore waters. NMFS does not agree that the populations of Atka mackerel, Pacific cod, and pollock are declining. The stock status for these species is discussed in Chapter 3. For Pacific cod in the Aleutian Islands the current biomass distribution is 93 percent eastern Bering Sea and 7 percent Aleutian Islands, replacing the previous proportions of 91 percent and 9 percent, respectively. Trawl survey biomass 2012 estimates for Pacific cod show a reduction in biomass in the western Aleutian Islands and an increase in biomass in the Central and Eastern Aleutian Islands compared to 2011, based on the 2012 Stock Assessment and Fishery Evaluation report (Table 2.2.2 in Appendix 2.2[259]), but trawl survey biomass estimates appear to vary widely among years.

The Alaska Fisheries Science Center is developing the Stock Assessment and Fishery Evaluation Report for Pacific cod that will provide an evaluation of several models for developing harvest limits for Pacific cod in the Aleutian Islands. The Aleutian Islands Pacific cod fishery will be managed to ensure overfishing does not occur based on the best available information considered in the harvest specifications process. NMFS agrees that the Atka mackerel abundance trend is down in the Aleutian Islands, but the setting of harvest specifications ensure sustainable management of this stock. Any changes to the Steller

[259] http://www.afsc.noaa.gov/REFM/Docs/2012/BSAIpcod.pdf

sea lion protection measures in the Aleutian Islands will consider the best available information on the effects of the protection measures on the target species stocks and on Steller sea lions, insuring that the fisheries are not likely to jeopardize the continued existence of Steller sea lions.

CH2-22 Comment: Please keep all current protections in place for the Steller sea lions. They are starting to come back from the brink of extinction and need to be protected from harmful fishing practices. It is important that all parts of the area's ecosystem are strong and healthy, and the sea lions are an important part of that balance.

Response: NMFS acknowledges the comment.

CH2-23 Comment: The reviewers of the 2010 FMP biop concluded that the measures in Alternative 1 are unjustified, irrelevant, and have little utility for recovery or effect on population. Remove Alternative 1 from consideration because it represents an alternative that is no longer viable and that is not consistent with the best available science.

Response: NMFS acknowledges the comment.

CH2-24 Comment: The scientific evidence, court decisions, and interim final rule reflect proper execution of NMFS's responsibilities under the ESA and support selection of Alternative 1. The other proposed alternatives are not consistent with the statutory requirements of NEPA or the ESA. The U.S. District Court for the District of Alaska found that the 2010 FMP biop and accompanying interim final rule were premised on application of the proper ESA standards. The 2010 FMP biop counsels in favor of Alternative 1 as the preferred alternative, as any lesser protection measures than those established by the interim final rule likely are unlawful under the ESA. The district court also found that sufficient evidence supported the 2010 FMP biop's conclusions that, without adoption of a reasonable and prudent alternative, the Alaska groundfish fisheries were likely to jeopardize the continued existence of the WDPS of Steller sea lions and adversely modify the species' critical habitat. Unless and until NMFS can determine that the threats that resulted in the past unforeseen and unexplained declines have abated, Alternative 1 represents the maximum spatial extent and amount of fishing that can be permitted by the commercial groundfish fisheries.

Response: NMFS acknowledges the comment.

CH2-25 Comment: The draft EIS concludes that there is no basis with any certainty that the alternatives will actually result in any increase in the Steller sea lion population, and that, even if there were such an increase, that this would actually benefit society at large. The "revenue-at-risk" methodology, at least, suggests that there will be a concrete adverse economic impact of the existing fishing restrictions. Given the acknowledgement that there is no determinate, concrete benefit related to the Steller sea lion measures, a sound cost-benefit analysis basis would suggest that Alternative 4, which essentially involves reverting to the fishing restrictions in place in 2010, be implemented.

Response: Section 8.2.10 summarizes the available scientific information on the value the U.S. public places on the health of the Steller sea lion population; the information in this section indicates that the public places a positive value on improvements in stock health. The analysis at Section 8.13 explains that, "While survey-based evidence suggests that an improvement in the stock population growth rate could have a large value, the reasonable and prudent alternative does not predict that the action will necessarily lead to an increase in the rate of population growth of Steller sea lion populations, nor does it make probabilistic statements about the range of potential outcomes." Thus, while the EIS does acknowledge the costs of the different restrictions on fishing in the Aleutian Islands, it does not preclude the possibility that these have positive benefits; it simply is not possible to make estimates of potential

impacts. The conclusion that Alternative 4 maximizes net benefits may be reached by a reader on the basis of the information contained in Chapter 8; however, other readers may reach other conclusions. In the absence of reasonably complete quantitative information on costs and on benefits, the analysis does not rank the alternatives with respect to net benefits.

CH2-26 Comment: If the draft EIS is finalized without substantial revision, NMFS must select Alternative 5 as the preferred alternative because no significant differences are shown between the alternatives, and Alternative 5 would result in the least economic impacts.

Response: NMFS acknowledges the comment.

CH2-27 Comment: Alternative 5 is a practical combination of some of the more beneficial aspects of other alternatives for the Atka mackerel, Pacific cod, and pollock fisheries, based in large part in response to stakeholder concerns identified during scoping.

Response: NMFS acknowledges the comment.

CH2-28 Comment: Relying on the general principles outlined in the 2010 FMP biop and NMFS's feedback letter dated May 28, 2013 (NMFS 2013), Alternative 5 should be selected as the preferred alternative for pollock. Alternative 5 should be selected for trawl cod, with the inclusion of a modified provision from Alternative 2 that would only open directed fishing for trawl cod in the area between 173° East longitude and 174.5° East longitude until April 30 and only outside 10 nm from rookeries and outside 3 nm from haulouts. It is more precautionary than the pre-2010 measures from a cod management perspective.

Response: NMFS acknowledges the comment.

13.4 Chapter 3 Comments

These comments are on Chapter 3, the analysis of the impacts of the alternatives on target species and species that may be taken incidentally in the Atka mackerel, Pacific cod, and pollock fisheries. The comments received on this chapter focused on the information used in the analysis of the effects of the alternatives on target and non-target species and multispecies modeling for groundfish stock assessments.

CH3-1 Comment: The appropriate baseline for Steller sea lion population data should be from 2000 (and not from 2004) forward. NMFS should also strive to capture that time period (2000 to 2012) in the fishery catch information to the extent practicable.

Response: Section 1.10.1 explains why the years 2004 to 2010 are used as the analytical baseline for fishery catch information. The period 2004 to 2010 is the most recent period reflective of current fishing patterns.

CH3-2 Comment: Overestimates in the 2010 FMP biop of 2008 Aleutian Islands Pacific cod longline catch resulted in requiring longline measures in the alternatives in the draft EIS.

Response: The overestimate of 2008 Aleutian Islands longline catch was acknowledged at the Steller Sea Lion Mitigation Committee meeting in 2010 and corrected prior to analysis in the EIS. The corrected estimates are reflected in various tables throughout the EIS. Furthermore, the overestimated 2008 Pacific cod longline catch was not the only information used in the 2010 FMP biop to analyze this fishery and is

not the reason certain alternatives are proposed. The alternatives represent a broad range of Steller sea lion protection measures and were developed with recommendations from the Council and its Steller Sea Lion Mitigation Committee.

CH3-3 Comment: For each of the alternatives, provide a full explanation of how that alternative will affect the Alaska groundfish stocks' biomass, density, age/size structure, and spatial/temporal distribution throughout the Aleutian Islands region.

Response: Effects on target stocks by the alternatives are described in Chapter 3. NMFS used the best scientific information available in describing any expected effects on target species. Biomass estimates are shown in tables for each of the target species in Chapter 3. No alternative would permit fishing in excess of the acceptable biological catch; therefore, there were no anticipated effects of the alternatives on the biomass. There were also no expected effects on age/size structure of target species by the alternatives. A discussion on age and size structure of target fisheries has been added to Chapter 3 in the final EIS. This additional information is not included in the analysis of the effects of the alternatives on target species, which is based on the management of the fisheries under the harvest specifications and is not changed by any of the alternatives. The harvest specifications are based on the information from the Stock Assessment and Fishery Evaluation reports, which already incorporate biomass, age, size structure, and distribution in the stock assessments for target species. Effects on target species density on either a spatial and temporal scale were described in Chapters 3 and 5.

CH3-4 Comment: The EIS should include a discussion on biomass estimates, harvest of prey species, prey field density, and Fishery Interaction Team studies on localized depletion.

Response: In Chapter 3, Atka mackerel, Pacific cod, and pollock sections include a table showing biomass estimates and harvest. A discussion on the Fishery Interaction Team studies on localized depletion is in Section 3.2.5 and in Chapter 11. Studies on prey field are discussed in Section 3.2.5, and Chapter 5 discusses potential fisheries effects on prey in Section 5.2.2.1 and analyzes the effects of the alternatives on prey availability for Steller sea lions in Sections 5.2.2.2 through 5.2.2.6.

CH3-5 Comment: The EIS should evaluate the stock status, population trends, and state and Federal fishery removals for salmon and herring.

Response: Salmon removals under the alternatives were addressed in Section 4.3. No stock status information on herring in the Aleutian Islands is available and very little catch of herring (60 mt from 2004 to 2012, primarily in the pollock trip target) occurred in the Aleutian Islands groundfish fisheries. Because of limited information and very small catches, no differences among alternatives are likely to be detected in the analysis of non-target catch of herring; therefore, no additional information on herring is included in Chapter 4.

CH3-6 Comment: The EIS should consider impacts of overfishing of Aleutian Islands pollock and Gulf of Alaska Atka mackerel.

Response: Consideration of impacts of overfishing of Aleutian Islands pollock and Gulf of Alaska Atka mackerel from the alternatives is not necessary because existing management structures are designed to prevent overfishing. Section 3.7 of the EIS states "The BSAI Groundfish FMP is designed to prevent any negative effects to groundfish stocks. Total harvest is managed to prevent exceeding the acceptable biological catch; therefore none of the alternatives are expected to impact stock status." Consideration of the impacts of overfishing can be found in the Alaska Groundfish Harvest Specifications EIS, which is incorporated by reference in Chapter 3.

CH3-7 Comment: The draft EIS describes predicted impacts of the alternatives to the groundfish stock biomass for each of the major fisheries in the aggregate, but offers little or no discussion of expected impacts at the local level. In terms of changes to groundfish stock biomass distribution, NMFS only provides a description of the stock's past, current, and future allocation of fishery effort to the three statistical areas in terms of acceptable biological catch. It does not characterize the local distributions, density, and movements of fish stock biomass within these statistical areas, or how the stock biomass could shift spatially or temporally in response to the proposed fishing activity.

Response: Fine scale spatial and temporal information on target species abundance is not available to make quantitative estimates of effects of the alternatives. Harvest specifications are used to manage the fisheries to the spatial level that information is available. Finer spatial information is not used in the analysis of the impacts of the alternatives on target species as that analysis depends on the management of the fisheries under the harvest specifications, which are not applied at the local level. Section 3.7 discusses the potential impacts of relocation of effort into remaining open areas, which may cause localized depletion in certain areas. However the intensity of the spatial relocation of fishing effort is unknown. Also in Section 3.7, temporal effects in target fisheries were discussed in relation to season changes. These changes are not expected to impact overall stock health.

CH3-8 Comment: NMFS must perform a more rigorous analysis of the effects of fishing using the multi-species model.

Response: Section 3.1 and Section 7.5.1 discuss the use of multispecies models for target species stock management and for modeling predator/prey interactions, respectively. The discussion in Section 7.5.1 includes the limitations of using such models. Section 7.7 discusses the modeling of Atka mackerel and Pacific cod interaction in the Aleutian Island. In particular, the uncertainty range in the current model estimates precludes using these models to draw reasonable inferences on the direction and strength of the interactions. Development of a broad multispecies model for the purposes of understanding effects on Steller sea lions from management of groundfish fisheries would take significant development of the information, skills, and dedication of resources that are not currently available to complete such a task. The EIS includes an analysis of the potential effects of fishing on the human environment using the best scientific information available, acknowledging that multispecies modeling would provide more information with potentially less certainty.

CH3-9 Comment: The District Court's Summary Judgment Order identified the use of single species versus multispecies modeling as an area of controversy requiring an EIS. The draft EIS also acknowledges the choice of modeling as an area of controversy. However, NMFS does not actually address the scientific differences of opinion surrounding the two models as ordered by the court. Instead, it uses multi-species models to analyze the interactions between groundfish, Steller sea lions, and fisheries. It does not discuss why other single species models are inappropriate for analysis as required by the District Court. The agency must do so to comply with the court's order.

Response: NMFS agrees that the U.S. District Court identified the use of single species versus multi-species modeling as an area of controversy, and that the Court required NMFS to prepare an EIS. Differences in single and multi-species models and how they are used by NMFS for the analysis of the effects of the alternatives are discussed in Section 3.1 of the EIS.

CH3-10 Comment: NMFS does not explicitly refer to National Standard 3, and makes only a cursory mention of managing Atka mackerel as a unit in Area 541. NMFS must analyze the proposed action, not only in Area 541, but also including its effects in Areas 543 and 542, to ensure consistency with NEPA's requirement to address possible conflicts with the Magnuson-Stevens Act.

Response: National Standard 3 states that an individual stock of fish shall be managed as a unit throughout its range to the extent practicable, and interrelated stocks shall be managed as a unit or in close coordination (16 U.S.C. 1851(a)(3)). Chapter 3 describes the management of BSAI Atka mackerel and indicates that Atka mackerel in Area 541 is managed with Atka mackerel in the Bering Sea subarea. The impacts of the alternatives on Atka mackerel are addressed in terms of Areas 541, 542, and 543 in Section 3.2.7 and are not limited to only Area 541.

CH3-11 Comment: The EIS should discuss how the protection measures under the interim final rule shifted Atka mackerel fishing to Petrel Bank in Area 542 where the fish are same size as Steller sea lion prey from scat data.

Response: This issue is addressed in Section 3.2.6. Further redeployment effects are discussed in Chapter 8.

CH3-12 Comment: Ormseth et al. (2008) was not cited or included in the 2010 FMP biop but should be included in the EIS.

Response: NMFS added a discussion on the differences between Aleutian Islands and Bering Sea Pacific cod stocks to Chapter 3 of the final EIS with references to Ormseth et al. (2008). Information from Ormseth et al. (2008) is applied to the harvest specifications process for Pacific cod. This revision will provide further information on the Pacific cod stocks, but does not change the method of analysis of the effects of the Pacific cod fisheries under the alternatives. This method applies fisheries management under each alternative with the harvest specifications process that establishes catch limits based on stock assessment science and the Council process, which would include the Pacific cod split between the subareas.

CH3-13 Comment: The Aleutian Islands directed pollock fishery has been closed since 1998; however, the biomass in 2011 is at the same level as in 1998 due to variability in recruitment.

Response: NMFS acknowledges this comment. This issue is addressed in Section 3.4.1 and Table 3-11.

CH3-14 Comment: Fishing depths for pollock are deeper than other Steller sea lion prey species in the Aleutian Islands and deeper in the Aleutian Islands than in other areas.

Response: NMFS acknowledges this comment. This issue is addressed in Section 3.4.3.

CH3-15 Comment: The EIS should include an examination of the fisheries and fishery closures in the Russia zone and the relationship (or lack thereof) with Steller sea lion population demographics. This should include information on fisheries and Steller sea lion population trends in areas such as the Sea of Okhotsk and the Commander Islands.

Response: Reliable catch information regarding the Russian fisheries is not available. Fishery closures in Russian waters include a 30 nm closures at the Commander Islands (30 nm) and no transit zones of 12 nm, established in late 1950s for northern fur seal and Steller sea lion conservation, before fisheries occurred. It is not clear if these closures are well enforced. Illegal fishing has been observed and the scale of illegal fishing is unknown. The information for the Russian fisheries is not sufficient to allow inferences as to the potential effects of the alternatives on Steller sea lion in the WDPS. The demographics of Steller sea lions in Russia is described in Section 5.1.1.2 and information on potential cumulative effects of Russian fisheries on Steller sea lions is in Section 5.3.8.

CH3-16 Comment: The EIS should include a summary (table or text) that clearly illustrates the timing of fishing activities throughout the year.

Response: Figure 3-4 and Figure 3-8 show the timing of fishing activities for Atka mackerel and Pacific cod throughout the year. This information is not provided for pollock as there is very limited catch information due to very limited harvest activity in the Aleutian Islands.

13.5 Chapter 5 Comments

These comments are on Chapter 5, the background information on the status of Steller sea lions, including natural and human caused threats, analysis of the effects of the alternatives on Steller sea lion, and uncertainty and information gaps on the potential effects of the fisheries on Steller sea lions. Comments received on Chapter 5 covered a wide range of issues related to Steller sea lion biology and understanding potential fisheries interaction. These topics include Steller sea lion foraging behavior and prey, population trends, natality, nutritional stress, overlap between fisheries and Steller sea lions, population level effects analysis, and uncertainty or lack of information regarding Steller sea lions and potential fisheries effects.

13.5.1 Forage Ratios

CH5-1 Comment: The commenter questions NMFS's decision to "abandon" the use of the forage ratio analysis (forage analysis) used in the draft 2010 FMP biop as an analytical tool in the draft EIS. The commenter questions whether this decision was because it did not support conclusions in the final 2010 FMP biop. The commenter suggests that NMFS should reconsider the use of a forage ratio analysis given comments made by Center for Independent Expert reviewers of the 2010 FMP biop, the fact that available information suggests that there is a high ratio of biomass to estimated dietary needs in the Aleutian Islands (Fadely et al. 2010), and that these ratios are higher in the Aleutian Islands than in the Gulf of Alaska and Bering Sea where Steller sea lions do not appear to be showing nutritional stress.

Response: NMFS did not "abandon" the forage ratio analysis in the 2010 FMP biop, and its use was explored in Section 5.1.7.4 in the 2010 FMP biop. The information provided from the forage ratio analysis has limitations as described in Section 5.2.2.1.9 of the EIS, which includes a discussion of forage ratios and summarizes the discussion of these issues from the 2010 FMP biop and the best scientific information available on this topic. NMFS agrees that the analysis of forage ratios on a large ecosystem scale shows lower forage available in areas where Steller sea lion populations are increasing, and higher forage ratios in some areas where populations are decreasing. However, the scale of the forage ratios was too coarse to determine whether the fisheries reduced prey availability on a spatial and temporal scale relevant for a foraging sea lion. There are additional limitations with the forage ratios including: the large amount of uncertainty in biomass estimates and the forage needs, the amount of prey required for efficient foraging is unknown, and the model assumption that all prey biomass is available to sea lions. The latter is highly unlikely as Steller sea lions do not consume all size classes equally, nor forage in all areas where the biomass may be present. Thus, when examining the results of forage ratio analyses, it is important to consider the scale of the available data and not draw conclusions on a finer spatial or temporal scale than the data allow. The EIS and the 2010 FMP biop address this issue in the context of informing the analysis, providing the public with the best scientific information available to consider.

CH5-2 Comment: The forage ratios in critical habitat, the 2010 trawl survey, and the Atka mackerel tagging studies do not support a finding of adverse modification of critical habitat for the entire WDPS of Steller sea lions.

Response: NMFS received this comment during the EIS scoping period and assumes that it refers to the ongoing action analyzed in the 2010 FMP biop. NMFS did not have data on the biomass of Steller sea lion prey species inside critical habitat for the 2010 FMP biop (required to calculate a forage ratio in critical habitat). NMFS does not have that information now, nor does NMFS expect to have that information in the near term. The trawl surveys provide a broader scale of species abundance that does not necessarily provide the information needed to determine prey availability at finer scales that may be necessary for Steller sea lions within critical habitat. The analysis of the effects of the alternatives on Steller sea lions is based on the methods used in Section 5.2.2, which use fishery catch information and Steller sea lion critical habitat. NMFS considered the results of the Atka mackerel tagging studies in the 2010 FMP biop when it determined that it could not insure that the groundfish fisheries were not likely to adversely modify designated critical habitat. In the EIS, NMFS reviewed the available information on forage ratios, trawl survey results (including the 2010 survey), and the Atka mackerel tagging studies along with other information, as discussed in Sections 3.2 and 5.2.2.1.9.

CH5-3 Comment: In the draft EIS, NMFS criticized the forage ratios (page 5-105), stating that: "the scale of the forage ratios was too coarse" where the forage ratios were calculated by management area in the Aleutian Islands (541, 542, and 543) and critical habitat in the Aleutian Islands, eastern Bering Sea, and Gulf of Alaska (GOA). The forage ratios were proposed by NMFS in the draft 2010 FMP biop as a rationale for restrictive management measures as the ratios suggested insufficient forage in the Aleutian Islands. However, the ratios were miscalculated in the draft 2010 FMP biop, and the revised ratios in the final 2010 FMP biop found the forage ratio in critical habitat in the Aleutian Islands was the highest of all areas (eastern Bering Sea critical habitat and GOA critical habitat) and higher than all other areas of critical habitat combined. The highest forage ratio in the Aleutian Islands is found in the western Aleutian Islands. With the revision of the forage ratios, the ratios no longer supported the "belief" by NMFS that the Aleutian Islands was a low production area. Since the revised forage ratios no longer supported increased management measures, NMFS in the draft EIS now disparages the forage ratios (and NMFS's own methodology). In contrast, NMFS cites Zeppelin et al.(2004), whose scale for fishery lengths and prey size is the combined eastern Bering Sea and GOA, which is considerably far coarser than the scale used in the forage ratios. Apparently, NMFS's views on appropriateness of scale are not consistent and "may" depend on the study providing the desired outcome to support the NMFS theory.

Response: In Section 5.2.2.1.9 of the EIS, NMFS discusses the limitations with the forage ratio analysis, providing the public with an understanding of how the results of this analysis should and should not be used. The scale of an analysis will depend on the data available for the analysis and is not designed for a particular outcome as much as to address a particular question. The question to be answered will dictate the scale of the study.

13.5.2 Foraging

CH5-4 Comment: For each alternative, provide an explanation of how changes in foraging efficiency could affect overall Steller sea lion vital rates at the rookery cluster area and statistical area levels.

Response: The data available for analysis of effects of the alternatives does not allow determining foraging efficiency at a rookery cluster area level or statistical area level. Foraging efficiency would depend on where, when, what, and how much prey is available to Steller sea lions and their potential competition with fisheries for these prey resources in space and time. Limited information regarding Steller sea lion prey biomass is available. For instance, statistical areas 541, 542, and 543 are used in the analysis for Atka mackerel in Section 3.2 due to the management of this target species at the statistical area level. Pacific cod and pollock are not managed at the statistical area level and therefore biomass information for these species discussed in Sections 3.3 and 3.4, respectively, is not available at the

statistical area spatial scale. Foraging efficiency analysis would require a good understanding of the foraging needs of Steller sea lions in relation to the forage available on the spatial scale in question. Currently, information is not available to understand foraging efficiency at either the rookery cluster or statistical area level for Atka mackerel, Pacific cod, or pollock. This information was not used in the methods to analyze the effects of the alternatives on Steller sea lion prey as described in Section 5.2.2 which used critical habitat and fishery catch information. It is not possible to predict Steller sea lion vital rates based on foraging efficiency under the alternatives at these spatial scales.

CH5-5 Comment: Understanding Steller sea lion preferred foraging habitat is one of the key questions in evaluating the potential effectiveness of proposed Steller sea lion protection measures. To date there have been few studies using satellite telemetry for Steller sea lions in the western and central Aleutian Islands. The draft EIS includes limited juvenile and adult female foraging data. It is currently unknown whether adult females in the Aleutian Islands portion of the sea lion's range are nutritionally stressed and exhibiting lower than expected fecundity or natality. Further satellite linked time depth recorder studies on adult females at these breeding sites could help determine whether proposed protection measures are consistent with foraging habitat preferences.

Response: NMFS agrees that available telemetry data do not show conclusively whether adult females are nutritionally stressed. However, the best scientific information available to NMFS is provided in this EIS to inform the decision makers on an alternative that meets the purpose and need. Telemetry data are discussed in Section 5.1.1.4.3 of the EIS. NMFS agrees that there are limited telemetry data for Steller sea lions and was scheduled to tag more adult females in Fall 2013 in the western and western portion of the central Aleutian Islands to collect additional information. Unfortunately, this work was cancelled in large part due to the government shutdown.

CH5-6 Comment: The EIS should address new and emerging technologies for Steller sea lion surveys throughout the WDPS range (e.g., unmanned aerial survey technologies), and facilitate the permitting process for these emerging technologies.

Response: Section 5.1.1.6 provides a description of the best scientific information available on determining at-sea habitat used by Steller sea lions, including the latest technologies used to gather information on animal behavior. Permitting for research on Steller sea lions is addressed in Section 11.2.

CH5-7 Comment: Provide an expanded discussion of the limitations of datasets of platform of opportunity (POP) observations used in Himes Boor and Small (2012) including a list of areas with few to no POP sightings (holes in the data) and areas with few POP sightings since 2000 or largely dated observations (pre 1990). The EIS should include latitude and longitude of the POP sightings in the Aleutian Islands to determine depth and identification of type of vessel reporting the sightings (within the confines of confidentiality).

Response: Section 5.1.1.6 of the EIS contains a discussion of Steller sea lion habitat use and POP data related to Steller sea lions, including the limitations of POP data to understand the areas used by Steller sea lions. The POP data provides limited information on the locations of marine mammals during observed fishing activities. The analytical method in Section 5.2.2.2 uses designated critical habitat as a measure of locations important to Steller sea lion foraging and where fisheries overlap may occur, rather than depending on observed occurrences of Steller sea lions during fishing as provided by the POP data. For these reasons the POP data is not used in the method to analyze the effects of the alternatives in Section 5.2.2.2.

CH5-8 Comment: Opening the "Seguam smile" would only open 3 percent of Area 541 critical habitat to the Atka mackerel fishery. In discussing the impacts, the draft EIS states on page 5-121: "Opening this

portion of critical habitat from 12–20 nm southeast of Seguam Island, increases the potential for prey availability effects compared to Alternative 1. This portion of critical habitat is near two rookeries and 5 haulouts. Areas of relatively high Steller sea lion encounter rates (based on sightings data from the Platform of Opportunities Database) occur during breeding and non-breeding seasons (Himes Boor and Small 2012) within the area that is proposed to be opened to Atka mackerel fishing. Therefore, increased potential for prey availability effects from this fishery occurs throughout the year."

This quote from Himes Boor and Small (2012) mis-characterizes the data from the POP database. A figure provided in public comment with POP data shows sightings on the northeast edge of the Amlia flat, but none in the "Seguam smile."

Response: NMFS disagrees. NMFS reviewed the POP data in response to this comment and verified that there are several confirmed sightings of Steller sea lions in the 12 nm to 20 nm portion of critical habitat around Seguam Island that would be open to Atka mackerel fishing under Alternatives 2, 3, and 5. Figures 7 and 8 in Himes Boor and Small (2012), show high use of critical habitat inside the area 12 nm to 20 nm from Seguam Island by Steller sea lions.

CH5-9 Comment: The recent telemetry data from the five adult females needs to be analyzed in detail to compare locations with the underlying bathymetry, as well as compare dive depths with that bathymetry, including limited portion of Area 543 proposed as open to the Pacific cod trawl fishery under Alternative 2. The commenter attached several figures showing the overlap between bathymetry, Pacific cod trawl fishing, fishery closures, POP data sightings, and telemetry results for Steller sea lions. (The commenter excerpted data from the draft EIS Figure 5-16 and used recent adult female telemetry results from the Alaska Fisheries Science Center to create figures that show there is no use of the Pacific cod trawl grounds by the telemetered Steller sea lions and no use of dense Pacific cod aggregations by these female Steller sea lions in the Pacific cod A season.) While the sample size of tagged adult female Steller sea lions is small, the results are consistent with other data showing very little reliance on the mid-shelf as a foraging area for Steller sea lions, particularly in the Aleutian Islands.

Response: Section 5.1.1.6 of the EIS includes a discussion of data from the five female adult Steller sea lions tagged in the fall of 2012 (Figure 5-16). This section also includes a discussion of the limitations of the data and cautions drawing conclusions due to limited information for different age-sex groups. The final EIS is updated in Section 5.1.1.6 to include the results of the analysis of the at-sea distribution of Steller sea lions in the western and central Aleutian Islands based on telemetry information collected from 2000 to 2013 (Lander et al.). This analysis found seasonal and age differences inside and outside critical habitat, including many locations greater than 10 nm (inside and outside of critical habitat) from terrestrial sites used by adult females in winter. All winter locations of sea lions less than 1 year old (not representative of all juveniles) occurred within critical habitat. Overall the analysis does not change NMFS's understanding of movement of Steller sea lions. Section 5.2.2.2 of the EIS describes the method and assumptions used in the EIS to analyze the effects of the alternative on Steller sea lion prey availability and allows an analysis of the alternatives that permits the comparison of effects, using critical habitat as the location of likely importance to Steller sea lion foraging rather than trying to use very limited telemetry data to characterize the potential overlap of fisheries in time and space with Steller sea lions.

13.5.3 Harvest of prey

CH5-10 Comment: The discussion in the EIS should include: a) the available prey field (and seasonality) in the Commander Islands with a comparison to the prey field found in the Aleutian Islands;

b) overall comparison of the Steller sea lion demographics in the Commander Islands to the Aleutian Islands; c) comparison of killer whale populations in each area and observed predation on Steller sea lions; and d) comparison of Steller sea lion movement information in the two areas. The EIS should include a discussion to determine if the Steller sea lions in the western Aleutian Islands are migrating and dispersing to the same extent as Steller sea lions at Medny Island and if the western Aleutian Islands rookeries are experiencing the same lack of immigrants from other rookeries as is occurring at Medny Island (and if so, the potential causation).

Response: The EIS included the best scientific information available on the Commander Islands that would inform the analysis of the effects of the alternatives on Steller sea lions. Information on prey fields and seasonality of prey fields in the Commanders Islands is not available. The demographics of Steller sea lions in the Commander Islands are described in Section 5.1.1.2 along with the U.S. Steller sea lion demographics. Killer whale predation in the United States and Russia is discussed in Section 5.1.1.9. Movements of Steller sea lions between Russia and the United States are discussed in Section 5.1.1.4.3.

CH5-11 Comment: The area with some of the highest Steller sea lion population increases in Russian waters includes the Sea of Okhotsk, which also happens to have one of the world's largest commercial fisheries including a large pollock fishery (second only to the U.S. Bering Sea pollock fishery). Section 5.3.8 should include information about the fisheries of the Sea of Okhotsk and what restrictions are in place in those waters to protect Steller sea lions and provide foraging areas around rookeries and haul-outs.

Response: See response to Comment CH3-15 and Section 5.3.8 regarding the potential cumulative effects of Russian fisheries on Steller sea lions. Fisheries and Steller sea lion information from the Sea of Okhotsk is not included in the discussion in Section 5.3.8 for two reasons. The first reason is that the Russian fisheries information is not reliable and, therefore, cannot be compared to U.S. fisheries information. The second reason is that the Sea of Okhotsk is a very different marine environment from the Aleutian Islands. The Sea of Okhotsk is surrounded by islands and continental land mass and has broad shelves. The Aleutian Islands is characterized by an island chain with a very narrow shelf edge compared to the Sea of Okhotsk. For these reasons, information on fisheries and Steller sea lions in the Sea of Okhotsk does not provide a good comparison to the fisheries and Steller sea lions in the Aleutian Islands and is not within the scope of the analysis.

CH5-12 Comment: Competition should be evaluated on a local basis, including harvest rates by sub-area.

Response: In Chapter 5 the harvests of Atka mackerel and Pacific cod described in Chapter 3 were used to understand the potential effects on Steller sea lion prey resources near haulouts and rookeries to the finest scale possible given the data available to NMFS. NMFS does not have data on local harvest rates in relation to available local biomass. NMFS does not have biomass data at local levels because that data are not used in the methods used to determine biomass for groundfish stock assessments and has not been collected. Limited local area biomass has been determined for Atka mackerel and Pacific cod tagging studies and pollock cooperative acoustic survey studies, respectively, as described in Sections 3.2.5, 3.4.3, and 11.1.2. These studies provided biomass estimates at the location and time when the studies were conducted but are limited by resources available to continue such studies so that updated answers on available biomass at the local level and harvest rates in relation to available local biomass are not available.

CH5-13 Comment: Harvest rates of Atka mackerel are too low and the fraction of Pacific cod in these areas too small for a fishery on these species to result in nutritional stress.

Response: Section 5.2.2.1 discusses the factors that may lead to competition between fisheries and Steller sea lions for Atka mackerel and Pacific cod. These factors include more than just harvest rates and fraction of prey abundance in an area. Nutritional stress may occur if fisheries and Steller sea lions are dependent on the same prey resources in time and/or space on statistical area and local scales.

CH5-14 Comment: The 2010 FMP biop gives little consideration to studies that examined the relationship between fishing and Steller sea lions, such as Calkins (2008) and Trites et al. (2010). Bernard et al. (2011) found that since 2000 the results of the studies are unequivocal as none of these studies found statistically significant associations consistent with harm by fisheries. Moreover, studies conducted by the Fisheries Interaction Team (FIT) do not support persistent localized depletion due to fishing.

NMFS may not ignore the reputable scientific opinion of Dr. Calkins (Calkins (2008)), which was submitted to NMFS on April 6, 2008. NMFS acknowledges that this document is relevant and scientific uncertainty of the effects of fisheries on Steller sea lion prey resources exists. However, instead of analyzing the study, NMFS defers analysis of it to the forthcoming section 7 consultation. Dr. Calkins concluded that there are no ecological reasons why low effort or efficient fishing should have any effect on sea lion population growth trends within the near future. His report supported the hypothesis that longline fishing and Steller sea lion population trends are largely independent of each other. The draft EIS mentions this study only once, when discussing its consideration of the Bernard et al. (2011) review in preparation for future section 7 consultation. NMFS acknowledges that Dr. Calkins's study reaches a contrary conclusion on the impact of fisheries on Steller sea lions, but provides no further description of Dr. Calkins's conclusions or their implications on its analysis. This lack of analysis contravenes NEPA, both by ignoring reputable scientific opinion, and by failing to weigh scientific considerations before taking a Federal action.

Response: Chapter 5 includes consideration of differing opinions on the potential effects of the fisheries on Steller sea lions. These studies are discussed in Sections 3.2.5 and 5.2.2.1.9 in the EIS. NMFS is analyzing the methodology used in Bernard et al. (2011) for the statistical analysis of fisheries effects studies related to Steller sea lions. NMFS does not agree with the commenter's conclusion that FIT studies do not support persistent localized depletion due to fishing. Results of the available FIT studies suggest that some areas studied are more susceptible to localized depletion from fishing than other areas studied. For example, research conducted by the FIT and discussed in the EIS concluded that fishing on Atka mackerel aggregations near Amchitka Island from 2002 through 2010 at fishery exploitation rates were likely to result in localized depletion of Atka mackerel though they were not likely to result in localized depletion at Seguam Pass, Tanaga Island, or Kiska Island.

NMFS considered Calkins (2008), as well as other scientific opinions on interactions between fisheries and endangered Steller sea lions (see Section 5.2.2.1.9). Furthermore, NMFS provides the background information on the differing views on the factors that may inform the potential effects of fisheries on Steller sea lions in Section 5.2.2.1, including Steller sea lion diet, prey size, depth, time, and space of foraging and fisheries, predator behavior, and how these factors may contribute to nutritional stress. Also, an explanation of the analytical method used to analyze the effects of the alternatives on endangered Steller sea lion prey availability is found in Section 5.2.2.2.

CH5-15 Comment: Steller sea lions "out-compete" fisheries for prey by feeding mostly on recruit and pre-recruit Atka mackerel and Pacific cod while fisheries largely catch older fish.

Response: Prey size is discussed in Section 5.2.2.1.2 in the EIS. Considerable overlap exists in the size of Atka mackerel and Pacific cod eaten by Steller sea lions and the size of Atka mackerel and Pacific cod

taken in the fisheries, as well as other factors that may lead to competition between Steller sea lions and fisheries (See Section 5.2.2.1).

CH5-16 Comment: Fisheries effects on Steller sea lion prey, including overlap, was identified as an area of controversy in the draft EIS. However, Section 5.2 of the draft EIS provides little information or a balanced examination of this issue. By failing to meaningfully incorporate the reviews of the 2010 FMP biop in the draft EIS, the draft EIS does not inform and provide the reader with an understanding of the controversy. Merely stating a controversy exists does not address NEPA's requirements nor the court's direction to take a "hard look" at the significant issues related to the impacts of a proposed action *in advance* of a decision on a proposed action.

Response: Conflicting points of views on fisheries interaction with Steller sea lions are discussed in Section 5.2.2.1 (including reviews of the 2010 FMP biop). The action analyzed in the EIS is a suite of measures designed to protect Steller sea lions from effects of fishery removals of important sea lion prey species. Thus, NMFS incorporated information from the 2010 FMP biop into the EIS to evaluate how the alternatives may protect Steller sea lions from potential adverse impacts of prey removal. NMFS outlined the areas of controversy in the EIS to inform decision makers about the controversy of the findings of the 2010 FMP biop. NMFS incorporated the best scientific information available into the EIS and will continue to evaluate new information as it becomes available, to determine if the information affects the analysis in the EIS. NMFS included the best scientific information available in the final EIS, including information on the controversial topics identified in the draft EIS, prior to issuing a decision on the proposed action.

CH5-17 Comment: Section 5.2.2.1.4 "Rate of Fisheries in Time and Space" states that trawl fisheries had the highest proportion of their catch in cells with high catch rates. However, a comparison of weekly A season catch amounts between trawl and non-trawl gear, shows similar total removals per week by both gear types. As the section concludes "we cannot determine the relationship between these catch rates and the impacts on prey except that higher catch rates in relation to low prey abundance would be more likely to result in localized depletions." As long as "higher catch rates" by trawl gear are occurring where there is "high prey abundance" that concern should be mitigated, especially if those areas used by the trawl fishery are partitioned from the areas used extensively by Steller sea lions.

Response: Section 5.2.2.1.4 refers to Figure 4.31 in the 2010 FMP biop, which is based on fisheries data from 2000. Since 2000, the management of the hook-and-line fisheries has shifted the concentration of fishing from the early part of the year to spread out through the year as shown in Figure 3-8 of Section 3.3.3. The text in Section 5.2.2.1.4 has been updated in the final EIS to refer to more recent information on fishing practices by Pacific cod trawl and non-trawl vessels as described in Section 3.3.3. Trawl fisheries continue to be concentrated in the early part of the year, while non-trawl harvests are distributed between the A and B seasons (hook-and-line and pot gears) reducing potential concentration of harvest in time by non-trawl gear. NMFS agrees that high prey abundance and fishing in areas not used by Steller sea lions reduces the potential for localized depletion by trawl fisheries.

CH5-18 Comment: For each of the proposed management alternatives, provide a full account of how the changes to groundfish stocks could potentially compromise or otherwise alter the quality of the Steller sea lion prey field and affect individual foraging efficiency of Steller sea lions, particularly for juveniles and adult females.

Response: The alternatives' effects on target groundfish species stocks are discussed in Chapter 3 of the EIS. The effects of the alternatives on groundfish stock are very similar so that the effects on the stocks do not provide information that could show changes to the Steller sea lion prey field or effects on individual foraging efficiency for different life stages. The analysis of the harvest management of the

groundfish on the target stocks under all of the alternatives is on a scale at the statistical area or at the Aleutian Islands subarea level. The analysis in Chapter 5, based on the catch data in Chapter 3, provides a better description of the effects of the alternatives on Steller sea lions prey resources, including smaller spatial scale analysis of catch in relation to Steller sea lion critical habitat.

CH5-19 Comment: Section 5.2.2.1.2, "Prey Size," lacks any quantitative evaluation of the sizes of prey taken by the fishery in the Aleutian Islands. There is detailed data on sizes of Pacific cod, Atka mackerel, and pollock taken in Aleutian Islands fisheries available from the NMFS observer database that could be used to evaluate partitioning based on size. This is particularly relevant to the Aleutian Islands trawl fishery for Pacific cod, which takes significantly larger sizes of Pacific cod than the sizes taken by Steller sea lions.

Response: Prey size is discussed in Section 5.2.2.1.2 to the extent that it informs the analysis of the effects of the alternatives on Steller sea lions. Issues with using available data to determine size of prey are discussed in this section. Because of the issues with prey size data and how representative it is or is not to Steller sea lion prey needs, NMFS has not done a quantitative analysis of prey size data to inform the analysis of the effects of the alternatives on Steller sea lion prey.

CH5-20 Comment: The EIS should reevaluate the rationale for seasonality of fishing restrictions, and reevaluate whether changes to existing fishing seasons may be warranted.

Response: The EIS discusses seasonality of several issues related to Steller sea lions, including frequency of occurrence for prey (Section 5.2.2.1.1), prey size (Section 5.2.2.1.2), foraging behavior (Section 5.2.2.1.3), fishing rates in time (Section 5.2.2.1.4), and effects of the alternatives on prey availability (Section 5.2.2.2). This analysis focused on the effects of the alternatives taking into consideration seasonality of Steller sea lion behavior and fishery management rather than evaluating whether current fishing seasons should be changed. Only a small seasonal adjustment was considered in the alternatives for Atka mackerel and Pacific cod, with Alternatives 2, 3, 4, and 5 changing the end date for the year from November 1 to December 31 for trawl and Alternative 2 shortening the Pacific cod non-trawl fishery season from December 31 to November 1. That change in seasonal apportionment of catch is addressed in Section 5.2.2. NMFS did not undertake an analysis that would consider changes in seasonal catch outside of the alternatives presented.

CH5-21 Comment: Section 7.7 acknowledges that not only are the Pacific cod in the Aleutian Islands larger than the eastern Bering Sea, the largest Pacific cod are found in the western and Central Aleutian Islands (page 7-23): "As shown in Figure 7-13, larger Pacific cod (fork lengths greater than or equal to 80 cm) tend to be more numerous in the western Aleutian Islands (Areas 542 through 543), while smaller Pacific cod are more numerous in the east (Area 541)." (Aydin 2010).

However, this reference is found in the draft EIS only in Chapter 7 (Ecosystem) and is not included in Chapter 5 in the section on potential competition with fisheries. The draft EIS (page 7-23) also notes that: "Decreasing fishing on Pacific cod would have little or no, or even potentially deleterious, impacts on increasing prey supply to Steller sea lions." This conclusion (from multi-species ecosystem modeling in Chapter 7) should also be considered in the discussion of the potential competition between fisheries and Steller sea lions in Chapter 5.

Response: NMFS did consider the conclusion from the multi-species ecosystem modeling in Chapter 7. Pacific cod predation on Atka mackerel and how this is considered in the analysis of the alternatives on prey availability for Steller sea lions are in Section 5.2.2.2. Because Pacific cod predation on Atka mackerel is part of the natural mortality incorporated into the Atka mackerel stock assessment, the changes in harvest of Pacific cod and any change in predation on Atka mackerel is not further considered

in the analysis of the effects of the fisheries on prey availability for Steller sea lions (see response to comment CH2-17 for more information on natural mortality). Section 5.1.1.10 has been revised to refer to Aydin (2010) in Chapter 7 regarding the potential competition between Steller sea lions and large Pacific cod for Atka mackerel prey.

CH5-22 Comment: The draft EIS does not give a "hard look" at the effects, if any, of Pacific cod hook-and-line fishing, missing the objective to spatially and temporally disperse fishing. The 2010 FMP biop reasonable and prudent alternative, and, subsequently, the draft EIS, incorrectly makes the unsupported assumption that there is a negative association between Pacific cod hook-and-line fishing and Steller sea lion population trends. However, the conclusions of Calkins (2008) for hook-and-line gear and Loughlin and Merrick (1989), Ferrero and Fritz (1994), Sampson (1995), Dillingham, Skalski, and Ryding (2006), and Hennen (2006) for fishing by all gear types and species contradict this assumption. Such analyses were dismissed in Section 5.2.2.1.4 in the draft EIS and in the 2010 FMP biop. The hook-and-line fishery is less likely than trawl gear to result in adverse modification to critical habitat compared to other gear types as described in the 2001 biological opinion and Calkins (2008). The draft EIS should analyze the different effects of fishing by gear type on the prey field and WDPS of Steller sea lions similar to the 2001 biological opinion and informed by Calkins (2008).

Response: Section 5.2.2.1.4 acknowledges that Pacific cod hook-and-line fishing has less potential for localized depletion than trawl fishing. Rates of fishing in time and space are discussed in Section 5.2.2.1.4 and include the recognition that hook-and-line gear has the lowest catch rates compared to other gear types. Section 5.2.2.1.9 discusses the conflicting information related to fisheries effects on Steller sea lions and the 2010 FMP biop findings, including the references cited in the comment. The EIS analyzes the effects of fishing on Steller sea lions by looking at the harvest of Pacific cod by trawl and non-trawl gear, including hook-and-line gear. The analysis of the alternatives allows the decision makers to understand the effects of the non-trawl fisheries on Steller sea lions and to tell the difference between effects from trawl and non-trawl fisheries.

CH5-23 Comment: NMFS fails to articulate a rational reason for its inclusion of Pacific cod restrictions in its alternatives. The case for Pacific cod as an important prey species for Steller sea lions is tenuous at best. The inclusion of Pacific cod in the alternatives is based on the presence of this species in the Steller sea lion diet using evidence from scat samples. NMFS' most recent study detailing the frequency of occurrence (FO) of various prey in the Steller sea lion diet shows that Atka mackerel is the highest ranking prey, with a 93% FO in the summer in the Western and Central Aleutian Islands. This finding makes NMFS's decision to continue restricting Pacific cod fisheries in this area, especially in the summer months, inconsistent with the record evidence before the agency. For example, in summer in the central and western Aleutian Islands, Pacific cod occurs at only 16% FO. Further, NMFS does not have data establishing that the Pacific cod fisheries compete with the Steller sea lions for prey. It is therefore not rational to conclude that restricting Pacific cod fisheries in the summer months would benefit the Steller sea lion.

Response: The best available information on Steller sea lion diet in the western and central Aleutian Islands is provided in EIS Table 5-19. Based on the exposure analysis in the 2010 FMP biop, NMFS uses a threshold of 10% FO at any time during the year to determine important Steller sea lion prey species. Pacific cod meet this threshold in winter (FO = 26.8%) in the western and central Aleutian Islands but not in summer (FO = 7.72%). Benefits to Steller sea lions from any restrictions to fishing for Pacific cod in summer months are assumed to accrue as a result of greater overall biomass of Pacific cod through reduced fishing mortality. Fishing restrictions for Pacific cod in winter in the western and central Aleutian Islands are likely to have the greatest benefit in terms of reducing the potential for localized competition between sea lions and fisheries and conserving the value of critical habitat for foraging Steller sea lions.

CH5-24 Comment: The EIS should include the latest information on movement of Atka mackerel in and out of trawl exclusion zones including the magnitude of movement (amount) and the proportion. The EIS should include the likelihood of localized depletion given the movement information and local exploitation rates.

Response: The results of the Atka mackerel tagging studies are discussed in Section 3.2.5 of the EIS and are the latest information available regarding Atka mackerel occurrence and movement in the tagging study areas of the Aleutian Islands. These studies looked at the efficacy of trawl exclusion zones by determining aggregations and movement of tagged Atka mackerel across the trawl exclusion zone boundaries. Based on the results, it appears that the Amchitka Island study area may be more likely to be affected by localized depletion than the other study areas. This information was used to inform the analysis of the effects of the alternatives on Steller sea lion Atka mackerel prey in Section 5.2.2.2.

13.5.4 Natality

CH5-25 Comment: The EIS should provide greater detail in the use of pup/non pup or pup/adult female ratios as a proxy for natality, and should review other methods to estimate natality in the WDPS of Steller sea lions. The issue of natality is central to understanding factors affecting Steller sea lion population trends and the effect of fishing, which in turn is central to understanding the effects of each of the alternatives presented in the draft EIS. Chapter 5 needs to be revised to include this information to inform the analyses of alternatives. The EIS should evaluate whether the assumptions in the Holmes et al. (2007) natality model are credible, and should reevaluate natality estimates with current Steller sea lion population dynamics data and should consider alternative estimates of natality since 2004 (e.g., Maniscalco, Springer, and Parker (2010)), and other alternatives to reduced natality (e.g., Horning and Mellish (2012)). Provide factors that may affect pup to non-pup ratios such as length of forage trips and use of non-pups or breeding females in denominator. In light of Center for Independent Expert (CIE) review of the 2010 FMP biop, re-examine efficacy of using pup to non-pup ratios as a proxy for natality, including potential for inaccuracies and bias. Contrast and compare the more recent information to Holmes et al. (2007). Evaluate the validity of conclusions by Holmes in light of more recent studies, CIE and other peer reviews, and studies on pup surveys in the Central Gulf of Alaska.

Response: The EIS included a discussion of pup and non-pup trends and natality in Section 5.1.1.4 based on the best scientific information available. A review of methods to estimate natality is beyond the scope of this EIS, but NMFS is continuing to look at the issues regarding the appropriate methods to estimate natality. The analysis of the effects of the alternatives in the EIS focuses on potential effects on prey availability (Section 5.2.2.2) and does not further apply those effects to natality. (See response to Comment CH5-26). The information in the population dynamics section provided status information on Steller sea lions to understand the context for the potential effects of the alternatives.

CH5-26 Comment: Chapter 5 makes no reference to pup to non-pup ratios so one might infer that NMFS took the reviews of the 2010 FMP biop to heart. Use of non-pup to pup ratios in the 2010 FMP biop is a primary weakness for an assessment of population change and is problematic as a measure of reproductive output. It is not known if ratios are a reliable proxy for natality. However, while the draft EIS does not include pup to non-pup ratios, NMFS has stated that the 2014 biological opinion will include an analysis of the "Evaluation of the reliability of pup: non-pup ratios as indices of sea lion reproductive rate" (Demaster 2013). This analysis will be a simulation where NMFS is going to artificially hold all variables (other than natality) static to measure reproductive rate (page 3)—an artificial construct that does not occur in nature.

Given the reviews of the 2010 FMP biop, this exercise appears to be unjustified. Nonetheless, if NMFS is going to use pup to non-pup ratios in the 2014 biological opinion as a yardstick or measure of the potential effects of the proposed action, then this analysis needs to be integrated into the draft EIS. Given the number of analyses that are not included in the draft EIS but will be in the future biological opinion, it is as if NMFS is preparing one analysis and metric for the public and Council to evaluate the alternatives (the EIS), while using a completely different analysis and metric for the 2014 biological opinion. This dual standard is not consistent with NEPA or the direction of the court.

Response: The 2010 FMP biop used ratios of sea lion pup counts to sea lion non-pup counts as a proxy for WDPS natality. Several of the external reviewers of the 2010 FMP biop questioned the validity of this ratio as a proxy for natality in the WDPS. NMFS agrees that the use of pup to non-pup ratios as a proxy for natality warrants investigation. NMFS plans to further investigate the use of pup to non-pup ratios as a proxy for natality. Chapter 5 of the EIS presents the best scientific information available for WDPS reproductive rates and notes that few empirical data exist to directly infer birth rate in wild Steller sea lions, and no empirical data exist for the western and central Aleutian Islands. Section 5.1.1.4.2 discusses reproduction and Section 5.2.2.1.8 discusses nutritional stress and reduced natality as an indicator. Section 5.1.1.4.2 discusses that the extent to which reproductive rates are influencing the continued decline of western Aleutian Islands Steller sea lions is unknown.

CH5-27 Comment: Reduced natality during high juvenile survival seems unexpected. This implies inexperienced juveniles are foraging more successfully than adult females.

Response: Population dynamics of Steller sea lions are discussed in Section 5.1.1.4 of the EIS. NMFS disagrees that the sole explanation for low natality and high juvenile survival, should it exist, is due to a difference in foraging success of adult females and juveniles. Section 5.1.1.4.2 of the EIS describes factors that may affect natality in Steller sea lions and Section 5.1.1.4.1 describes factors that may affect survival.

13.5.5 Nutritional stress

CH5-28 Comment: The EIS should consider a different metric for performance standards other than modeled biomass projections that were contained in the 2010 FMP biop. NMFS must take into account that there is no scientific evidence to support nutritional stress from fishing. NMFS should incorporate the input of the Steller Sea Lion Mitigation Committee (SSLMC), which is the Council's committee that is currently working on development of protection measures for consideration by the Council.

Response: NMFS did not use modeled biomass projections for the analysis of effects of the alternatives on Steller sea lion prey in Chapter 5. Based on the 2010 FMP biop, which based its conclusions on more than just modeled biomass projections, NMFS maintains that the scientific evidence indicates that there is a potential for nutritional stress from fishing activities. In Section 5.2 of the EIS, NMFS explains the controversy and uncertainty in understanding the potential for nutritional stress. NMFS worked closely with the Council and its SSLMC to consider the Council's recommendations on the EIS development, including development of the alternatives.

CH5-29 Comment: The EIS should discard the weight of evidence approach that resulted in the conclusion there was nutritional stress (and nutritional stress due to fishing) where the only purported evidence was reduced natality. Weight of evidence rests on speculation of what is possible rather than what is supported by scientific evidence. The EIS should re-examine the underlying basis of the hypothesized nutritional stress and reduced natality that was based on the modeling work in Holmes et al. (2007) in light of more recent information (e.g., Horning and Mellish (2012);

Maniscalco, Springer, and Parker (2010); Central GOA pup counts since 2005). There needs to be a critical and unbiased evaluation of the evidence. It was difficult to determine the weight-of-evidence method.

Response: The EIS examines the best scientific information available regarding nutritional stress for Steller sea lions in Section 5.2.2.1.8. The EIS presents the type of information available to discern potential effects of the alternatives on Steller sea lions and makes reasonable conclusions based on the available information. NMFS used information that informed the analysis of the effects of the alternatives, including Horning and Mellish (2012) on juvenile mortality and Maniscalco, Springer, and Parker (2010) on natality rates (see Chapter 5). Evidence consistent with the nutritional stress hypothesis included continued declines in pup and non-pup counts discussed in Section 5.1.1.2 along with fishing for important Steller sea lion prey species in designated critical habitat discussed in Section 5.2.2, and an indicator that natality may be lower in the western and central Aleutian Islands than in other sub-regions. As well, Chapter 2 shows markedly less restrictive fishing measures before 2011 for Atka mackerel and Pacific cod in designated critical habitat west of 178º West longitude relative to measures to the east. This indicates that fisheries cannot be conclusively excluded as contributing to the continued declines of Steller sea lions in the western and central Aleutian Islands.

CH5-30 Comment: NMFS's cursory overview of the studies it intends to review for its section 7 consultation invalidates the theory that fisheries cause nutritional stress to the WDPS of Steller sea lions. For example, the statistical tests included in the studies analyzed by Bernard et al. (2011) include 20 tests with negative effects, 26 tests with positive effects, and 373 non-significant results. NMFS acknowledges in Section 5.2.2.1.9 that "the overwhelming number of non-significant relationships calls into question the appropriateness of the underlying models, and also whether findings of significant effects (positive or negative) are spurious." If fisheries adversely affect sea lion numbers, statistically significant negative associations should be detectable between measures of fishing and measures of sea lion numbers. Studies after 2000 cited in the 2010 FMP biop and two studies cited in Bernard et al. (2011) did not have statistically significant associations consistent with harm by fisheries. The food driven nutritional stress hypothesis as an explanation for central and western Aleutian Islands Steller sea lion decline should be scientifically rejected.

Response: NMFS disagrees that the nutritional stress hypothesis should be rejected. As described in Section 5.2.2.1.9 of the EIS, the nutritional stress hypothesis remains a working hypothesis for the continued decline of Steller sea lions in the western and central Aleutian Islands and the lack of robust recovery in the remainder of the WDPS as identified in the 2008 Steller Sea Lion Recovery Plan. The extent to which Steller sea lions in the western and central Aleutian Islands are experiencing nutritional stress as a result of environmental or fishery-related causes is unknown. NMFS is not as confident as Bernard et al. (2011) that a relationship between fishery removals of prey and Steller sea lion population trends can be determined with statistical precision with available data. The results of the CIE reviews of the 2010 FMP biop do not support the conclusions of Bernard et al. (2011) about the influence of the existing fishery correlation analyses in resolving the nutritional stress hypothesis, although (Bowen 2012) and (Stokes 2012) criticize NMFS for not giving the fishery correlation analyses more thorough treatment in the 2010 FMP biop. However, at this time NMFS does not have information that conclusively invalidates the nutritional stress hypothesis.

CH5-31 Comment: Dr. Bowen found that the harvest rates for Atka mackerel are too low and the fraction of the Pacific cod stock in the Steller sea lion areas are too small for a fishery of these species to result in nutritional stress. Bernard et al. (2011) also determined that the nutritional stress hypothesis should be scientifically rejected. They found that forage ratios of groundfish to sea lions were higher in the western and central Aleutian Islands than in regions where sea lions are indisputably recovering. This indicates that the quantity of groundfish area-wide is sufficient to prevent sea lions from encountering

nutritional stress. The report also analyzed the signs of fishery-driven nutritional stress included in the 2010 FMP biop. Of the eight general conditions consistent with fishery-driven nutritional stress, three—emaciation, reduced body size, and reduced survival—were not indicated. Four of the remaining conditions have not been analyzed since 2000, and the final condition—reduced reproduction—was contradictory. Failure to analyze these independent expert findings in the EIS violates NMFS's NEPA obligation to respond to credible and reputable scientific opinions.

Response: Section 5.2.2.1.9 describes the findings of the 2010 FMP biop on potential fisheries impacts and includes a discussion of the reviews of the 2010 FMP biop (including Bowen (2012) and Bernard et al. (2011)) as these reviews relate to the analysis in the EIS. Issues discussed include further evaluation of the methods used to determine fisheries effects on Steller sea lion populations and a discussion on forage ratios. Section 5.1.1.4.2 provides the best scientific information available regarding reproduction.

CH5-32 Comment: In the discussion in Section 5.2.2.1.8, NMFS acknowledges that of 14 indicators used in the 2010 FMP biop to evaluate potential biological manifestations of nutritional stress in Steller sea lions only one, reduced natality, was positively correlated to suggest an effect from nutritional stress. NMFS states that the lack of data that support any other indicators of nutritional stress has caused some stakeholders to believe that nutritional stress is not caused by the (then) highly regulated fisheries of the Aleutian Islands. It was exactly the conclusions that NMFS drew from the analysis of the 2010 FMP biop that led to the sharp criticisms leveled by the reviewers of the 2010 FMP biop that the science does not support the proposition that fishing at the 2010 levels caused nutritional stress and lower natality. This viewpoint, not just a bulleted list of performance standards, should have been disclosed and discussed in the alternatives analysis in the draft EIS.

Response: See response to Comments CH5-29 and CH5-30. Section 5.2.2.1.9 includes the findings of the 2010 FMP biop and the concerns raised by the reviewers and other stakeholders. This information provides the context for the analysis of the effects of the alternatives in Section 5.2.2.

CH5-33 Comment: Chapter 5 provides little discussion of the nutritional stress theory and does not disclose concerns with this theory from the 2010 FMP biop reviews. Section 5.2.2.1.8 presents the nutritional stress theory as probable and likely without scientific evidence that addresses the concerns with this theory expressed in the reviews of the 2010 FMP biop. Without any new supporting scientific evidence, the draft EIS maintains that fishery induced nutritional stress "may" occur based on the 2010 FMP biop. Nutritional stress is an unproven theory that has been related to potential effects on Steller sea lion populations. There is little evidence that nutritional stress occurred in the past and virtually no evidence that Steller sea lions are currently experiencing nutritional stress from multiple studies. The evidence for fishery-induced nutritional stress is weak and effectively remains conjecture. The evidence suggests there is no more than a possibility of this occurring; therefore, this interpretation of likely is out of sync with that applied elsewhere for resource standards. The draft EIS identifies nutritional stress and particularly "fishery induced nutritional stress" as an area of controversy. However, the draft EIS provides little information on the nature of the controversy but does identify (page 1-17) that Bernard et al. (2011) found "that the NMFS theory of nutritional stress from competition with fisheries was not well supported" and should be rejected, and the CIE also criticized the theory. The reviews of the 2010 FMP biop further found significant evidence to undercut the nutritional stress hypothesis. For example, Drs. Bowen, Stewart, and Stokes each concluded that the 2010 FMP biop unjustifiably relied heavily on pup/non-pup ratios as a proxy for natality, despite the fact that no evidence shows these ratios provide a reliable proxy. Dr. Stokes also found that the comparison of inferred natality rates in the western and eastern distinct population segments to support a theory of nutritional stress in the WDPS indicated no link between nutritional stress and natality because the inferred natality rates in the WDPS varied widely.

NMFS has failed to provide scientific support for its nutritional stress theory and has ignored or misinterpreted studies to the contrary.

Response: Nutritional stress is addressed in Section 5.2.2.1.8. The EIS presents various and conflicting views on nutritional stress and the potential responses of Steller sea lions to nutritional stress, including decreased natality. The EIS acknowledges that the extent to which the WDPS is susceptible to nutritional stress today is unknown. The EIS provides the public with the best scientific information available to inform the analysis of the alternatives and does not require the resolution of controversy regarding the information used, only the identification of controversy.

CH5-34 Comment: The draft EIS assumes that fisheries compete with Steller sea lions in a manner that causes chronic nutritional stress and other adverse impacts and that more fishing, and more areas open to fishing, result in greater negative effects on Steller sea lions. The draft EIS fails to addressing the merits of this assumption in consideration of the strong criticisms levied in the reviews of the 2010 FMP biop. Whether such a significant, negative impact exists is relevant under NEPA. The reviewers of the 2010 FMP biop concluded that the case made for prey competition with fisheries resulting in nutritional stress was weak, and that it was not likely that fisheries were causing nutritional stress in Steller sea lions. By assuming that fishing is adversely competing with sea lions rather than objectively evaluating all available information, including new information that does not support the agency's previous ESA conclusion, the EIS does not meet the standard of rigorous and accurate scientific analysis.

Response: The 2010 FMP biop and subsequent information provide the best scientific information available, and NMFS used that information in developing the analysis in the EIS in Chapter 5. The EIS meets the requirements of NEPA by describing the type of information available to understand the effects of fisheries on Steller sea lions and considering this information in the analysis of the effects of the alternatives. The EIS discloses the potential impacts on Steller sea lions and their critical habitat, including nutritional stress in Section 5.2.2.1. Critical habitat is identified as an area important to Steller sea lions; therefore, an analysis of the amount of area open to harvests of prey species under the alternatives would allow the decision makers to understand the potential effects of the alternatives on Steller sea lions as described in Section 5.2.2.2. The EIS also discloses the scientific uncertainty associated with understanding the impacts of fisheries on Steller sea lions and competition for prey in Section 5.2.2.1.

CH5-35 Comment: NMFS relies on the 2010 FMP biop to conclude that fisheries cause jeopardy to Steller sea lions, but it does not provide a rational explanation of how this data supports the interim final rule. The 2010 FMP biop identified reduced natality as the sole indicator to support its theory that chronic nutritional stress causes sea lion declines in the western Aleutian Islands subarea. It did so despite the fact that NMFS had no actual natality data from the region, and that 13 other indicators suggested that the WDPS of Steller sea lions are not nutritionally stressed. Indeed, the independent experts found that the 2010 FMP biop lacked evidence of nutritional stress and routinely "overstates conclusions based on weak evidence," and "transforms suggestion and possibility into fact."

Response: NMFS used information from the 2010 FMP biop to inform its analysis of the environmental consequences of the alternatives. However the information from the 2010 FMP biop is not the only information NMFS used to analyze the environmental consequences of the alternatives. Including the references cited throughout the EIS, NMFS also used scientific information from journals, stock assessments, NMFS Catch Accounting System fishery catch data, AFSC Steller sea lion surveys and other biological information, and reviews of the 2010 FMP biop to inform the analysis in the EIS. NMFS provided the basis, based on the best scientific information available, whereby decision makers compared the environmental consequences of the alternatives and selected a preferred alternative (see Section 5.2 for the environmental consequences of the alternatives for Steller sea lions).

13.5.6 Other factors affecting Steller sea lions

CH5-36 Comment: The EIS should re-evaluate the threat assessment of killer whales to Steller sea lions in the Aleutian Islands, including Bigg's killer whales (transient killer whales). It should provide a greater synthesis of Bigg's killer whale population estimates and predation in the Aleutian Islands and the Commander Islands, and its potential contribution to Steller sea lion population declines and lack of robust recovery. Population estimates of killer whales should include both historic and current estimates for the Aleutian areas and the Commander Islands. The EIS should include the total population estimate of transient killer whales in Alaska (Eastern North Pacific stock: BSAI and GOA) and the proportion of that stock that is found in the Aleutian Islands. The EIS should provide an estimate of what portion of transient killer whale diet is composed of Steller sea lions as well as an estimate of the energetic resting discount. The EIS should also include estimates of the amount of predation (and number of killer whales) that could potentially trigger proportional changes in Steller sea lion population in the Aleutian Islands. NMFS must also address the reviews of the 2010 FMP biop finding of killer whales being a significant source of mortality for the Steller sea lion. Failure to address these credible scientific opinions violates NEPA. The relevant data includes documentation of two transient killer whales from the central Aleutian Islands that had nitrogen values high enough to indicate that they fed on Steller sea lions regularly and that Steller sea lions may be the primary part of their diet. Also relevant are observations showing that Steller sea lions represented up to 14 percent of killer whale diets in the Aleutian Islands. Based on review of these and other data, the reviewers of the 2010 FMP biop found that killer whales are likely a major source of Steller sea lion mortality, and others found that killer whale predation could not be scientifically rejected as a cause of decline with the available data.

Response: Section 5.1.1.9 includes a description of killer whale predation on the entire WDPS of Steller sea lions using the best scientific information available. Table 5-11 includes abundance estimates of killer whales throughout the range of the WDPS of Steller sea lions. This section also describes killer whale predation in the Aleutian Islands and the Commander Islands and other locations in the range of the western and eastern distinct population segments. NMFS identifies killer whales as a cause of mortality for Steller sea lions in the 2008 Revised Recovery Plan, the 2010 FMP biop, and in the EIS. The information provided in the EIS gives background information on natural threats to Steller sea lions to understand the context for the proposed action. The predation of killer whales on Steller sea lions is not included in the methods to analyze the effects of the alternatives in Chapter 5. These methods use fisheries harvest and Steller sea lion biology to analyze effects of fishing on Steller sea lion incidental takes, disturbance, and prey availability. NMFS revised Chapter 5 for the final EIS to address reduced prey availability potentially leading Steller sea lions to increase foraging effort, which may make them more susceptible to killer whale predation.

CH5-37 Comment: Depending on the numbers of transients, only a small portion of killer whale diet needs to be sea lions to create a "predator pit" effect. Just 10 killer whales could consume the entire Western Aleutian Islands annual Steller sea lion pup production. Twenty-five killer whales could shift the central Aleutian Islands Steller sea lion population growth rate by 3 percent. It only takes 12 percent of the minimum count of transient killer whales counted west from the Shumagin Islands to fully explain the population trend of Steller sea lions in the central and western Aleutian Islands, even after applying the discount factors caveats identified in the 2010 FMP biop. Taken together with the new information in the 2010 FMP biop on Aleutian Islands productivity and forage ratios, as well as harvest exploitation rates, NMFS should have substantially revised its final reasonable and prudent alternative in the 2010 FMP biop.

Response: Killer whale predation was considered in the environmental baseline in the 2010 FMP biop and is recognized as an important source of mortality for Steller sea lions. Killer whale predation is discussed in Section 5.1.1.9 of the EIS. The Revised Steller Sea Lion Recovery Plan (NMFS 2008) lists

predation by killer whales as a potentially high threat to the recovery of the WDPS. In an ESA section 7 consultation, NMFS adds the effects of the proposed action to the natural and anthropogenic effects described in the environmental baseline to determine whether the action agency has insured that the proposed action is not likely to jeopardize the continued existence of a listed species or adversely modify or destroy designated critical habitat. The Revised Steller Sea Lion Recovery Plan also lists competition with fisheries as a potentially high threat to the recovery of Steller sea lions. In the 2010 FMP biop, NMFS concluded that it could not insure that the fisheries for Pacific cod and Atka mackerel in the western and central Aleutian Islands were not likely to jeopardize the existence of the WDPS or destroy or modify designated critical habitat for the WDPS when the effects of the action were added to the environmental baseline, which included effects of predation by killer whales.

CH5-38 Comment: The EIS should incorporate the discussion and findings of the 2010 northern sea otter recovery plan where the weight of evidence for the sea otter decline is predation by killer whales. The recovery plan rates this predation as "very likely" with a high degree of confidence over the entire western population geographic range. The EIS should incorporate known predation by killer whales on other marine mammals in the Aleutian Islands such as grey whales and northern fur seals.

Response: Section 5.1.1.9 includes descriptions of killer whale predation on other marine mammals including sea otters, gray whales, and northern fur seals. Section 5.1.2 also included information from the northern sea otter recovery plan that informs the analysis of the alternatives, limiting the discussion to the effects of the groundfish fisheries on sea otters rather than naturally occurring mortality.

CH5-39 Comment: The draft EIS acknowledges that "although transient killer whale predation on Steller sea lions in the North Pacific has received substantial attention and study in recent years, major limitations in the available data result in substantial uncertainty, especially when trying to determine the historic impacts of killer whale predation" (draft EIS at 5-56 to 5-57). The EIS must discuss whether this information is too costly to obtain and what the relevance of the missing data is.

Response: NMFS will continue to gather information on killer whale predation in Alaska waters as resources and priorities allow. Killer whales are identified as a threat to Steller sea lion recovery in the 2008 Steller sea lion recovery plan. The information in Section 5.1.1.9 provides the context for analysis of the effects of the alternatives including consideration of natural conditions for Steller sea lions. Section 5.1.1.9 contains the best scientific information available to NMFS. The lack of more detailed information on killer whale predation does not prevent the analysis of the effects of the alternatives in the EIS using the methods described in Chapter 5, which apply fisheries harvest and Steller sea lion biology.

CH5-40 Comment: The EIS should incorporate the study and findings of Horning and Mellish (2012) regarding life history transmitter (LHX) tags and the proportion of sudden mortality predation events attributed to killer whales and sleeper sharks, including recent mortality events since the report was published, such as was included in the CIE briefing.

Response: Section 5.1.1.4.1 includes a discussion of the findings of Horning and Mellish (2012) regarding juvenile survival from the LHX tag study. Section 5.1.1.9 includes a discussion of killer whale predation on Steller sea lions in the GOA and includes Horning and Mellish (2012) findings regarding juvenile Steller sea lion mortality in the GOA potentially from killer whale and sleeper shark predation. The August 2012 presentation to the CIE review panel by members of the fishing industry stated that recent information from the Horning and Mellish LHX tagging study indicated 14 of 16 deaths of tagged Steller sea lions were likely due to predation. NMFS contacted the author of this information because it is not published yet, and NMFS did not receive a response. Therefore, NMFS is unable to use this unpublished information in the final EIS.

CH5-41 Comment: Top-down hypotheses lack support and remain hypothetical (e.g., killer whale predation), as well bottom-up hypotheses (fishery competition) lacks evidentiary support and remains hypothetical.

Response: The top-down and bottom-up hypotheses for impacts on Steller sea lions are discussed in Section 5.1.1 of the EIS. The types of information supporting these hypotheses and associated scientific uncertainty are included in the discussion.

CH5-42 Comment: The draft EIS contains no evidence regarding whether disease was a predominant factor in the decline of the WDPS, and NMFS therefore concludes that disease played no role. However, NMFS bases this conclusion on population data from 1997 to 2000, despite the fact that the remainder of the draft EIS analysis uses the baseline of 2004 to 2010. The EIS must explain how NMFS reached the conclusion that fisheries are the primary cause of a decline in the WDPS population if it has no data determining whether infectious disease also affected the population during this time. It must further explain the relevance of this missing information and why it was unable to obtain it.

Response: NMFS has not reached the conclusion that fisheries are the primary cause of a decline in the WDPS of Steller sea lions. However, NMFS determined in the 2010 FMP biop that it could not insure that the Federal groundfish fisheries in the Bering Sea and Aleutian Islands management area (and fisheries conducted on the Federal total allowable catch) were not likely to jeopardize the existence of the WDPS or destroy or adversely modify the WDPS' designated critical habitat. The baseline of 2004 to 2010 was related to fisheries data that was used to analyze the effects of the alternatives. Status information on environmental components included historical data that informed the analysis and may include information before 2004 or after 2010. Information on disease in Section 5.1.1.8 provides the best scientific information available on potential naturally-occurring effects on the WDPS of Steller sea lions. This information provides background on the status of Steller sea lions, but is not used in the methods to analyze the effects of the alternatives on Steller sea lions as explained in Section 5.2.

CH5-43 Comment: The EIS should expand the discussion of the presence and effects of contaminants (including organochlorines, heavy metals, and emerging contaminants) on Steller sea lions in the WDPS.

Response: Section 5.1.1.7 describes the best scientific information available on the effects of contaminants on the WDPS of Steller sea lions, including organochlorines and heavy metals. This discussion includes new information since the 2010 FMP biop was completed.

CH5-44 Comment: NMFS cannot rule out contaminants as the cause of the WDPS decline because no toxicological studies have been performed to determine the effects of organochlorines (OCs) on Steller sea lions. This potential for Steller sea lion exposure to contaminants is a significant gap in the understanding of the impacts of pollutants on Steller sea lions. Studies on other marine mammals have associated OC exposure with reproductive failures. If OCs are also causing reproductive failure in the Steller sea lion, this could be the cause of any population decline in the WDPS of Steller sea lions. NMFS must explain the relevance of this incomplete information and whether obtaining this information is infeasible or too costly. Exposure to OCs in other marine mammals has been associated with reproductive failures, population declines, carcinomas, and immune suppression. There is currently not enough information to determine what role exposure to contaminants plays in the health, survival, and recovery of Steller sea lions.

Response: NMFS agrees that more information on the potential effects of organochlorine (and other) contaminants on Steller sea lions would be helpful to understand the potential impacts on the population. In 2013, NOAA awarded a grant ($1,385,410) to the Alaska Department of Fish and Game to study

mercury contaminants in the WDPS of Steller sea lions. Section 5.1.1.7 of the EIS contains the best scientific information available on contaminants effects on Steller sea lions.

CH5-45 Comment: NMFS also lacks information related to the harmful effects of mercury on Steller sea lions. While the agency has identified that "further study is necessary," it has not contemplated the relevance of this missing data or the cost of obtaining it. Available data show that adult females and pups are likely the age classes most vulnerable to other toxic substances, and Steller sea lion pups from the WDPS had statistically higher mercury levels in kidney and liver tissues and lead in liver tissues than animals from the eastern distinct population segment (EDPS). Steller sea lion pups in the western portion of the range also appear to have higher mercury and PCB levels than those in the eastern portion of the range. It remains unknown whether sea lions have internal mechanisms that allow them to minimize the harmful effects of the contaminant by processing it. Data also show that the EDPS has recovered sufficiently, but NMFS believes that the WDPS is still susceptible to population declines. The EDPS has statistically lower mercury levels than the WDPS. If Steller sea lions cannot process mercury, it may be a cause of population decline in the WDPS. This is highly relevant to the question of whether fishing pressure or other factors like contaminants are responsible for population effects, and NMFS must address the relevance.

Response: In Section 5.1.1.7, the best scientific information available is used to address the potential effects of mercury contamination on Steller sea lions. NMFS discusses the occurrence of mercury in different life stages of Steller sea lions and concludes that based on the studies discussed, the animals may have mechanisms that allow them to process or sequester the mercury, mitigating harmful effects. NMFS explains that further study should be done to understand this interaction and in particular fetal exposure. However, the methods for analyzing the effects of the alternatives on Steller sea lions in Chapter 5 use fisheries harvest and Steller sea lion biology, and do not determine the population level effects of mercury contamination of Steller sea lions, which would not be affected by the alternatives.

CH5-46 Comment: The most relevant study available to NMFS addresses organochlorines (OCs) in pollock, and NMFS uses this study to conclude that OCs are likely not the primary cause of population declines and reduced natality in the WDPS. It bases this conclusion on the study's finding that OCs in pollock are ubiquitous throughout the study's sampling area. NMFS then posits that the OCs are not likely the primary factor for population declines in the WDPS because the EDPS population has been increasing. This explanation has no rational basis, as it does not account for Steller sea lion's consumption of other fish, primarily Atka mackerel, which contain unknown levels of OCs.

Response: Section 5.1.1.7 is revised in the final EIS. The conclusion that the EDPS is increasing while consuming prey with higher OC contamination based on pollock OC concentrations across the WDPS is too broad of a conclusion and does not take into account the different diets between the eastern and western distinct population segments.

CH5-47 Comment: The EIS should consider whether conditions in the North Pacific have reduced carrying capacity for Steller sea lions such that recovery to pre-decline population levels may not be based on the best available science or simply not possible under current environmental conditions.

Response: Sections 5.2.2.1.8 and 7.3 discuss carrying capacity and the potential impacts on Steller sea lions and the Aleutian Islands marine environment using the best scientific information available, including the 2010 FMP biop, the Ecosystem Considerations report for the 2012 Stock Assessment and Fishery Evaluation report for groundfish of the Bering Sea and Aleutian Islands Management Area (Zador 2012), and the Aleutian Islands Fishery Ecosystem Plan (NPFMC 2007). The EIS did not examine carrying capacity in relation to recovery of Steller sea lions as this information was not used in the

methods in Chapter 5 to analyze the effects of the alternatives on Steller sea lions and is outside of the scope of the analysis.

CH5-48 Comment: One cannot interpret response of Steller sea lion population in areas of increased fishing protection measures without controlling for other stressors (e.g., predation).

Response: NMFS agrees it is difficult to differentiate the response of Steller sea lions to fisheries effects and non-fisheries effects. Section 5.1 reviews the best scientific information available on natural and human-caused effects on Steller sea lions so all the factors that potentially affect Steller sea lions are provided in the EIS. The EIS identifies potential fisheries effects under the alternatives in the context of the status of Steller sea lions and other potential stressors on the population.

CH5-49 Comment: CIE reviewers of the 2010 FMP biop agree that disease, parasites, and contaminants are unlikely to have played a role in the Steller sea lion decline.

Response: These issues are addressed in the EIS in Sections 5.1.1.7 and 5.1.1.8, providing the best scientific information available on these topics. Recent information on mercury contamination in the Western Aleutian Islands (Castellini et al. 2012) indicates that there is more potential for effects on Steller sea lions than indicated by information available for the 2010 FMP biop. This recent information is addressed in Section 5.1.1.7.

CH5-50 Comment: The CIE reviewers of the 2010 FMP biop find that fishery-induced and natural nutritional stress and killer whale predation on Steller sea lions are possible. The reality is that the reasons for Steller sea lion lack of recovery in some sub-regions are complicated and may never be unraveled.

Response: NMFS agrees that Steller sea lions may be affected by a number of stressors and the natural and human caused stresses on Steller sea lions are difficult to separate. These topics are discussed in Section 5.1.1 of the EIS.

13.5.7 Overlap between fisheries and Steller sea lions

CH5-51 Comment: The draft EIS does not take a "hard look" at the exposure analysis, provides no meaningful quantification of the degree of potential overlap with fisheries and Steller sea lions, and provides no scientific evidence that fisheries overlap results in competition that has a negative effects on Steller sea lion populations. Chapter 5 continues to assert without scientific evidence that competition may occur if there is overlap between fisheries and Steller sea lions in terms of size of fish, depth, temporal, and spatial overlap. However the draft EIS provides no meaningful quantification of the individual and cumulative extent of any potential overlap between fisheries and Steller sea lions.

Quantitatively evaluate the extent of overlap between fisheries and Steller sea lions for each species (pollock, Pacific cod, and Atka mackerel) for size of prey, predominant and proportions of Steller sea lions dive depth and fishing depth, and spatial use by season (from telemetry). Section 5.2 needs a quantitative reference to the size of Pacific cod found in Steller sea lion prey (see O.A. Ormseth et al. (2008); Bernard et al. (2011); and the BSAI Pacific cod SAFE[260]). The EIS should also include the shift in the size of the Atka mackerel in Area 542 as a result of fishing under the interim final rule. Providing the extreme end of the range of the size of prey estimated from scat samples in Section 5.2 is a selective

[260] http://www.afsc.noaa.gov/REFM/stocks/assessments.htm

presentation of the information and does not inform the reader as to the distribution of the sizes of pollock found in scats.

Quantitatively examine the potential depth overlap between fisheries and Steller sea lions in terms of proportions of dives in depth strata, and proportions of the fishery in depth strata. The draft EIS presents only the maximum dive depths of Steller sea lions compared to mean fishing depths.

Examine telemetry data for spatial and temporal overlap with fisheries, and clearly explain the relevance and significance of any overlap found. What the draft EIS does provide is non-comparable metrics (e.g., maximum dive depths compared to average fishery depths).

Response: NMFS disagrees with the comment that it did not take a "hard look" at the exposure analysis, that it did not provide meaningful quantification of the degree of potential overlap with fisheries and Steller sea lions, and that it did not provide scientific evidence that fisheries overlap could result in competition that has a negative effects on Steller sea lion populations. Quantitative information is used in Sections 5.2.2.2 through 5.2.2.6 when available and appropriate to inform the analysis and also is provided in Section 5.2.2.1 when available to describe potential fisheries overlap with Steller sea lions. Section 5.2.2.1.2 describes information related to the size of prey, and the final EIS provides lengths of the three prey species. Section 5.1.1.6 has details on Steller sea lions at-sea habitat use, including quantitative information on diving depth and location. Section 5.2.2.1.3 describes depth of foraging and fisheries, including reference to Tables 5-8 and 5-10 for diving depths and estimated fishing depths from Chapter 3. Section 5.1.1.6 also describes the spatial use of habitat by Steller sea lions, which was considered with fisheries location information in Chapter 3 for the analysis of the effects of the alternatives in Sections 5.2.2.2 through 5.2.2.6. Section 5.2.2.1.9 identifies the discussions in the 2010 FMP biop of the factors that may be considered in analyzing the effects of fishing on Steller sea lions and the additional information that could provide better understanding of potential fisheries overlap of prey size, depth of foraging and fishing, and location of foraging and fishing, The method used in Sections 5.2.2.2 through 5.2.2.6 for the analysis of effects of the alternatives was based on the best scientific information available and provides the ability to determine the effects of the alternatives on Steller sea lion prey availability. See response to Comment CH1-14 for a description of the development of this method.

CH5-52 Comment: It is questionable whether any amount of a Baysian statistical manipulation of the Platform of Opportunity (POP) data set in Himes Boor and Small (2012) without clear measures of the various types of sighting effort can provide any meaningful identification of Steller sea lion "high use" areas. Further analysis of the POP data is needed to determine the merits of the Himes Boor and Small (2012) approach and whether it supports the actions taken based on the 2010 FMP biop. It is necessary to analyze the positive sightings in the POP data (including location, target, bycatch rate data without vessel name or target quantity and foreign vessels) in the context of the "null" observations from the same platforms.

Response: Himes Boor and Small (2012) describe in great detail their rigorous approach to derive effort-corrected data from the POP dataset, and discuss effects of sparse or missing data, how encounter rate values should be interpreted, and potential biases associated with their model assumptions. The conclusions of Himes Boor and Small (2012) are supported by their study methodology and results.

CH5-53 Comment: Steller sea lion sightings and telemetry locations outside of critical habitat do not appear to align with fishing locations for groundfish.

Response: Fishing locations for groundfish are shown in Chapter 3 figures and Steller sea lion telemetry and other location data are discussed in Section 5.1.1.6. Overlap occurs between Steller sea lion locations and fishing locations outside of critical habitat.

CH5-54 Comment: There is not considerable overlap between the size of Atka mackerel eaten by Steller sea lions and those harvested in the Atka mackerel fishery. The information provided to the CIE reviewers of the 2010 FMP biop and the 1998 biological opinion are better sources of this type of information than Zeppelin et al. (2004). Zeppelin et al. (2004) is based on scat samples from 1998 to 2000 (with no winter samples from the western Aleutian Islands) and the comparisons are over a very coarse scale (entire range of WDPS aggregated for scat; Eastern Bering Sea and Gulf of Alaska aggregated for fishery length information). Steller sea lions eat Atka mackerel of a mean size smaller than fishery size. The more recent information indicates that the extent of size overlap for Atka mackerel is considerably less than stated in Zeppelin et al. (2004).

Response: The EIS used the best scientific information available regarding the size of Atka mackerel used as Steller sea lion prey and the size of Atka mackerel taken in the Atka mackerel fisheries. Section 5.2.2.1.2 discusses prey size and includes reference to more recent analysis of prey size than the 1998 biological opinion on the effects of the Atka mackerel and pollock fisheries. Section 5.2.2.1.2 also includes Atka mackerel prey size information from Zeppelin et al. (2004), which was presented to the CIE reviewers. NMFS has no additional information that would lead to a conclusion that Atka mackerel prey size overlap with the fisheries is considerably less than stated in Zeppelin et al. (2004). As described in Section 5.2.2.1.2, the evaluation of the overlap of the size of prey eaten by Steller sea lions and the size of fish harvested in the fisheries is confounded by a number of factors, including the biases of estimating prey size based on otoliths from scat samples and scientists being able to measure only what was consumed, not what was preferred by the animals.

13.5.8 Population Effects Analysis

CH5-55 Comment: NMFS overlooks the work of Dr. Maschner (Maschner et al. (n.d.) and Trites et. al. (2010), which were included in commenter's submissions. Dr. Maschner's work was mentioned in the 2010 FMP biop, but it is not analyzed in the draft EIS. The draft EIS does not adequately explain NMFS's consideration of the conclusions from Trites et al. (2010) in its decision to continue to restrict Atka mackerel fishing. By failing to do so, the agency ignores reputable scientific opinion that is relevant to the key question of whether fishery restrictions correlate to a WDPS population decline.

Response: Maschner et al. (n.d.) examines the indigenous, ethnohistoric, and archaeological information on the decline of Steller sea lions in Alaska and is cited as (Maschner et al. 2013) in Section 5.1.1.2 of the final EIS. They found that these data indicate that Steller sea lion numbers have declined and recovered repeatedly over the past 4,500 years and were last at critically low numbers during the 1870s to1920s. The Maschner et al. (n.d.) paper focused on evidence collected from midden sites in the GOA and Eastern Aleutians; areas where the Steller sea lion population is increasing currently. As such, they offer no explanation as to how the population fluctuations that they hypothesized could explain declines in abundance occurring in diverging directions like currently observed among subareas. This paper is included in the discussion in Section 5.1.1.2 to provide historical information related to the proposed action. Trites et al. (2010) analyze the Aleutian Islands Atka mackerel fishery and Steller sea lion decline. Trites et al. (2010) apply generalized estimating equation models to Atka mackerel harvest and sea lion numbers to test whether numbers of sea lions or changes in numbers of sea lions were related to the frequency of trawling (number of hauls) and amounts of fish caught within 10, 20, or 40 nautical miles of sea lion rookeries and haulouts. They found that the models failed to find a relationship between

average catch as a proxy for Atka mackerel abundance and sea lion numbers. This paper is included in the discussion in Section 5.2.2.1.9. Both of these papers provide additional information to consider for the description of the population trends and for potential fisheries effects on Steller sea lions.

CH5-56 Comment: Chapter 5 is deficient because NMFS selectively relied on incomplete analyses and omitted relevant information from the analysis. Information can be gleaned from documents that were presented to the Council, but not incorporated into the draft EIS. These papers include the draft agTrend paper (Johnson and Fritz, paper in prep), the May 24, 2013, DeMaster memorandum, the May 2013 analytic approach memo[261] and the June 4, 2013, DeMaster Powerpoint presentation for the Council.[262] Several questions exist about the methods in Johnson and Fritz (in prep). The DeMaster memorandum does not provide a quasi-extinction probability for the U.S. WDPS as a whole population, and asserted that any population projection or population viability analysis (PVA) needs to be based on the total population for the U.S. WDPS in the same manner as the Goodman PVA analysis in the 2008 Revised Recovery Plan for Steller sea lions.

Response: NMFS disagrees that Chapter 5 is deficient or that relevant, available information was omitted from the EIS. The analysis cited as Johnson and Fritz (in prep) in the draft EIS is now in review for publication in the journal *Methods in Ecology and Evolution*. Also, the results of that analysis have been included in the technical memorandum (Fritz et al. 2013), which was cited as Fritz et al. draft in the draft EIS in section 5.1.1.2. The citations for these references have been updated in the final EIS. The agTrend analysis (Johnson and Fritz, in review) presents a novel method for calculating aggregated Steller sea lion abundance and trends by augmenting missing survey observations and was prepared in response to external reviews of the 2010 FMP biop that were critical of NMFS's method for estimating abundance based only on direct and interpolated counts from trend sites. The trend information in Johnson and Fritz (in review) represents the best scientific information available and has been reviewed in compliance with the Information Quality Act and by the Council's Scientific and Statistical Committee (SSC). At the June 2013 Council meeting, NMFS presented results of completed studies and methods for planned studies to the Council's SSC. The results of the completed studies are included in Chapter 5 of the EIS. NMFS presented the methods for the population projection, including estimates of quasi-extinction over various future time frames to the Council's SSC for its review and comment. The SSC did not identify deficiencies with the population projections based on the methods in Johnson and Fritz (in review). NMFS agrees however that it is useful to look at the probability of quasi-extinction by sub-region as well as the WDPS as a whole, and NMFS included this information in Section 5.1.1.2.

CH5-57 Comment: The draft EIS does not include a meaningful discussion of direct statistical testing or a comprehensive review or analysis of studies that examine the relationship between fishing effort and Steller sea lion population trends as in Bernard et al. 2011 and recommended by the CIE review of the 2010 FMP biop. Instead of encouraging these studies, the draft EIS disparages Bernard et al. (2011) (primarily regarding the power analysis) while providing no direct quantitative statistical analysis to support its criticisms. The draft EIS does not include an informative synthesis of the description and results of the ten statistical studies. The draft EIS only includes a list of studies that examined the relationship between fisheries and Steller sea lions, but without any comprehensive review. The draft EIS includes a discussion of data issues, but fails to provide any quantitative statistical analysis. The lack of comprehensive review and consideration of these ten studies in the draft EIS is inconsistent with NEPA's standards for rigorous scientific analysis, especially considering that all but one of these studies was available prior to the 2010 FMP biop, and all the studies have been available to NMFS for the draft EIS for at least two years. Other studies were commissioned by NMFS and still received scant review in the

[261] http://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/SSL/NMMLmemo513.pdf
[262] http://www.npfmc.org/council-meeting-archive/

draft EIS (e.g., Calkins (2008)). NMFS improperly proposes to analyze the statistical studies in a future simulation, but these studies needs to be included in the draft EIS in order to determine the effects of the proposed action.

Response: This issue is addressed in Chapter 5. The draft EIS included a discussion about the issue raised in Bernard et al. (2011) regarding studies conducted to quantify the relationship between explanatory variables such as fishery catch, effort, or catch per unit of effort and Steller sea lion counts. Section 5.2.2.1.9 describes the analysis that NMFS will undertake to test whether external drivers of sea lion survival can be detected with the types of regression analyses used in the studies cited in Bernard et al. (2011). The methods for this analysis were provided to the Council's SSC in April 2013 with additional detail presented to the SSC in June. The objective of this analysis is to understand if the methods in the studies cited by Bernard et al. (2011) have sufficient statistical power for determining whether presence or absence of fishing has an effect on Steller sea lion population size. If the methods are found to be acceptable, they could then be used for correlative studies of sea lion population trends and fisheries effects. The resources to complete the review of the fishery correlation study methods and to develop a subsequent correlative study, should it be warranted, are limited so that the results of this work are not available for the EIS on its current timeline, but may be available to inform future analyses.

CH5-58 Comment: The States' sponsored review of the 2010 FMP biop directly contradicts the conclusion in the draft EIS on page 5-69 that "at this point it is not possible to determine the population level effects to Steller sea lions from the indirect effects of fishing on prey availability through this NEPA analysis…Insufficient information exists to quantify Steller sea lion population effects with various levels of fishing." No statistical relationships of negative effects on Steller sea lion populations were found by Bernard et al. (2011) from the indirect effects of fishing since 2000. The statement on page 5-69 in the draft EIS is simply wrong and should be corrected. With the addition of the meta-analysis and conclusions of Bernard et al. (2011), there is sufficient evidence and information that fisheries do not affect Steller sea lions. The question of appropriate level of statistical power depends on what level of effect is to be detected. If the question under NEPA is to determine if the indirect effect of fisheries on Steller sea lion populations is "significant," then the appropriate level of power is to detect a significant or appreciable effect. Why is NMFS trying to detect an extremely small or insignificant effect of fisheries on the WDPS of Steller sea lions that may require more statistical power?

Response: Based on the best available information, the description of the analytical approach and the information available to analyze the effects of the alternatives on Steller sea lions on page 5-69 of the draft EIS is accurate. NMFS is further evaluating Bernard et al. (2011) to determine if the studies cited therein provide the statistical power to correlate the effect of fishing on Steller sea lion populations. This is discussed in the final EIS in section 5.2.2.1.9. When developing the draft EIS, NMFS reviewed the information available to inform the analysis and determined that population level analysis was not possible with the available information and is not necessary to determine the potential effects of the alternatives on Steller sea lions and their critical habitat. Section 5.2.2 describes the method used to analyze the effects of the alternatives with the best scientific information available and the assumption applied to the analysis. Best scientific information available includes quantitative fisheries catch information in time and space and critical habitat locations in relation to fishing activity. This information is used to compare and contrast the effects of the alternatives.

NMFS prepared an EIS for this action because the alternatives have the potential to cause significant impacts. In general, an EIS provides a full and fair discussion of significant environmental impacts and informs decision makes and the public of reasonable alternatives that would avoid or minimize adverse impacts.

CH5-59 Comment: The EIS does not analyze the effects of fishing on the WDPS of Steller sea lions as a whole. No unit smaller than a distinct population segment is relevant when considering actions that arise from claims under the provisions of the ESA. Analyzing effects on the entire WDPS is required to take a hard look at the proposed action and to address the controversy that required an EIS. The EIS should analyze the extent, if any, if the effects of fishing on prey availability have any detectable impact on the WDPS as a whole, including on the health, size and status of the WDPS and the duration of any effect.

Response: The purpose and need of the action focuses the alternatives and the analysis of the effects on the action area, which is a portion of the WDPS of Steller sea lions. Section 5.1.1.2 describes the population trend for subareas and the entire U.S. WDPS of Steller sea lions to put the population trend in the action area in context for the entire population. The analysis focuses on the effects on Steller sea lions that occur in the action area (Aleutian Islands subarea). Further explanation can be found at Section 5.1.1 and Section 5.2.

CH5-60 Comment: The expectation that Steller sea lion numbers in the Aleutian Islands would increase under Alternative 1 based on experiences with fisheries management and Steller sea lions in the GOA is not based on science. There is insufficient evidence that Steller sea lion numbers increased in the GOA due to fisheries management to protect sea lions. The multispecies model in the 2010 FMP biop showed that increases in sea lion numbers in the last decade were a coincidence.

Response: The EIS describes the best scientific information available on Steller sea lion population trends in Section 5.1.1.2, and Sections 3.1 and 7.5.1 describe multispecies modeling. Alternative 1, the reasonable and prudent alternative in the 2010 FMP biop, is intended to insure the groundfish fisheries are not likely to jeopardize the continued existence of Steller sea lions or adversely modify or destroy their critical habitat. The EIS presents both natural and anthropogenic effects on Steller sea lions. These effects on Steller sea lion populations are difficult to separate, and information is not currently available to conclusively establish linkages between Steller sea lion population trends and fishery management measures.

CH5-61 Comment: The EIS should evaluate the effect of the Aleutian Islands pollock closure on the population trends of pollock and Steller sea lions in the Aleutian Islands, and whether that closure remains necessary to protect Steller sea lions in the Aleutian Islands.

Response: The effects of the alternatives on pollock and Steller sea lions are analyzed in Chapters 3 and 5 of the EIS. The alternatives analyzed include the closure of directed fishing for pollock in critical habitat of the Aleutian Islands under Alternative 1 and additional pollock fishing that would be allowed under Alternatives 2 through 5. Impacts on pollock stocks from the alternatives are described in Section 3.4.4. Impacts on Steller sea lions from the pollock fishery management under the alternatives are described Section 5.2.

CH5-62 Comment: Despite overall positive population trends for the WDPS of Steller sea lions, the draft EIS looks to effects within sub-regions of the WDPS to determine effects on the population as a whole. It is unclear how NMFS has attempted to impute the declines from these regions onto the WDPS as a whole. The EIS must identify and clarify the relationship between the sub-regional declines and the overall health of the WDPS, and explain how its conclusions stand up to the criticisms in the reviews of the 2010 FMP biop.

Response: Section 1.1 of the EIS identifies the relationship between the sub-region declines and the overall status of the WDPS relative to listing under the ESA. The 2008 Recovery Plan provides the connection between the viability of the sub-regions and the WDPS as a whole (NMFS 2008). NMFS's

examination of sub-regions in the 2010 FMP biop was upheld by the U.S. Court of Appeals for the Ninth Circuit in State of Alaska v. Lubchenco, No. 12-35201 (2013).

CH5-63 Comment: The draft EIS continues to provide considerable discussion of sub-regional and rookery cluster area population trends within the U.S. WDPS, but omits the big picture of the total population growth and trend of the U.S. WDPS as a whole for 2000 to 2012. Chapter 5 of the draft EIS continues to focus on sub-regional populations and treats all sub-regions as equally important, whether they are core of the range or not. In contrast, the June 4, 2013, Powerpoint presentation by NMFS to the Council based on agTrend analysis states that probability of the U.S. WDPS of reaching the quasi-extinction level in fifty years (2062) is zero. This conclusion should be in the draft EIS in the population trends discussion.

Response: See response to CH5-56. Section 5.1.1.2 and Figures 5-3 and 5-8 show the WDPS of Steller sea lion trends for non-pups and pups, respectively, for the time period 1990 through 2012. In addition this section also shows sub-region trends as these are important to consider in the analysis of the potential effects of the fisheries at a sub-regional level. This is based on the proposed action being focused in two of the sub regions and the choice to consider effects on the sub-regions as identified in the 2008 Recovery Plan (NMFS 2008). The June 2013 powerpoint presentation was not in contrast to the text in the EIS on sub-regions. This presentation provided additional information from modeling population trends at both sub-region and DPS levels in relation to quasi-extinction levels from the population viability analysis in the 2008 Recovery Plan.

CH5-64 Comment: NMFS proposes to use a sub-region viability analysis to predict the future condition of the sea lion population. The analysis uses a statistical method to estimate an aggregated abundance trend (via the 'agTrend' statistical package for the open-source statistics program 'R'). This method, however, makes the assumption that whatever conditions that resulted in the trend for the last few years of data will persist into the future. This is an unreasonable assumption to make when attempting to forecast the status of the Steller sea lion population. The resultant forecast favors the overall positive trends of the last 20 years but does not account for any unpredictable, random events that may occur in the future. The new method also ignores the past documented sea lion population trends, including the sudden and dramatic drop of the population in the 1980s. Considering that there have been regime shifts, management changes, and at least one unpredicted and unexplained change in the Steller sea lion population trend in the last 30 years, the potential for such events to occur again must be included in any analysis. The sub-region viability analysis using agTrend should incorporate stochasticity and the observed sea lion population trends of the past. Even so, in contrast to the optimistic forecast for the overall western population trend, the current agTrend sub-region viability analysis results in a high proportion of projection scenarios culminating with a loss of the rookeries in the western Aleutian Islands.

Response: NMFS has revised Section 5.1.1.2 in response to this comment. Section 5.1.1.2 discusses the results of the agTrend forecast and an additional viability analysis conducted by NMFS for comparison and an assessment of qualitative inference with the results of the agTrend forecast method presented in Johnson and Fritz (in review).

CH5-65 Comment: Several issues were identified with the trend analysis (Johnson and Fritz (in prep)) and the forecasted persistence analysis that should be addressed in Chapter 5. Johnson and Fritz (in prep) examines regional trends in population abundance for the U.S. WDPS and needs to include a 2000 to 2012 trend for the U.S. WDPS as a whole. Is the referenced population only the non-pup population, or is it the total population (pups and non-pups)? If the paper is only using non-pup data then this does not represent the whole or total population and may not accurately reflect population status and trends. The trend for the Central Gulf of Alaska (CGOA) appears to be inaccurate and does not reflect the growth in pups and non-pups in the CGOA and brings into question the augmentation methodology. From the

results sections of the draft paper it appears that either the 2011 non-pup count was not "augmented" or omitted or the "augmentation" method is suspect and biased low. With its apparent reliance on non-pups in Johnson and Fritz (in prep), the augmentation method appears to not accurately represent the total population growth in CGOA. Of interest in the CGOA is the decline in pups and non-pups from 2000 to 2004 followed by steady increases from 2004 to 2011.

Response: Johnson and Fritz (in review) is referenced as Johnson and Fritz (in prep) in the draft EIS. Figure 5-3 shows the U.S. WDPS total non-pup population trend from 1990 to 2012, and Figure 5-8 shows the total pup population trends from 1990 to 2012. Section 5.1.1.2 discusses and Figures 5-8 through 5-10 include trends in pup counts, which are similar to non-pup trends. The non-pup trends are used in the recovery plan criteria for sub-regions identified in the recovery plan, and are an appropriate reference population for this analysis of trends in different sub-regions. The best scientific information available was used in the analysis of the CGOA pup and non-pup trends, and the results reflect these data.

CH5-66 Comment: Provide a quantitative scientific explanation on how the entire WDPS of Steller sea lions is in jeopardy. Include discussion of Boyd (2010) on projected Steller sea lion populations and potential risk of extinction.

Response: NMFS uses the best scientific and commercial data available to insure that its actions are not likely to jeopardize the continued existence of an endangered species. If that best scientific and commercial data available is quantitative, then NMFS will use it in its determination. The quantitative and qualitative discussion of NMFS's jeopardy determination is incorporated by reference in the EIS from the 2010 FMP biop (Section 5.2.2.1.9), and Boyd (2010) is discussed in Section 5.1.1.4.3. A discussion on quasi-extinction risk is included in Section 5.1.1.2.

CH5-67 Comment: The EIS should evaluate the WDPS of Steller sea lions in the context of trends of pinnipeds globally (including ESA listed and unlisted populations) and the potential impacts of fishing activities on those populations. Include a discussion and comparison of pinniped populations in the world whose populations are stable or increasing in the proximity of groundfish fisheries. The discussion should include Parrish et al. (2011) and the importance of including environmental variability and changes in carrying capacity in recovery.

Response: A comparative study of other pinniped populations and other groundfish fisheries was not included in the EIS. These types of reviews have been performed in the 2000 biological opinion on the groundfish fisheries, and are incorporated by reference in Section 5.2.2.1. NMFS cannot find the reference Parrish et al. (2011), and therefore, cannot consider it for the final EIS. Any comparison of global pinniped status to Steller sea lions in the Aleutian Islands would need to consider the Aleutian Islands ecosystem, Steller sea lions in particular, or how groundfish fisheries are managed in the Aleutian Islands. Environmental variability is addressed in Chapter 7 and in Section 5.1.1.

13.5.9 Population Trends

CH5-68 Comment: The EIS should clearly describe the best estimate of the total population of Steller sea lions in the WDPS, rather than only estimates from trend sites, and population trends. The revisions should include methodology and recent and historical time periods that include fluctuations in populations. Provide a discussion on the methods to improve the accuracy of Steller sea lion surveys including the use of drones; compensating for stage of tide; adding sites of known Steller sea lion use; dropping sites with no recent Steller sea lion use. Include the total population estimates and trend of Steller sea lions in the Alaskan and Russian portions of the WDPS from 2000 to 2012.

- Provide the total pup counts (not trend rookeries) from surveys from 2002 to 2011 (and resulting total population estimates for the U.S. WDPS (from the 3.5 pup multiplier). Provide total pup counts by subarea 2002 to 2011 (not trend rookeries).
- Provide the total unadjusted non-pup counts (in addition to trend sites). Compare to the total unadjusted non-pup counts from the 2008 survey. Compare 2011 survey to 2008 survey for only sites surveyed in both years (as was done in the NMFS comparison of the 2007 to 2004 survey) and provide non-pup population trend from 2008 to 2011.
- Compare population trend analysis from total population estimates for the U.S. WDPS to trend analysis from the trend sites. The EIS should provide a comparison of the total WDPS population trend 2000 to 2012 as calculated from total population estimates (from pup surveys and multipliers) and as calculated from non-pup trend site analysis.
- Provide a clear explanation of the methodology in non-pup trend site counts and analysis including a list of all the inherent adjustments (e.g., camera angle, adjustments for Steller sea lion movements). Provide what counts are included and what is excluded from the counts or not considered in the counts (e.g., animals at sea, Steller sea lions at Round Island and other locations at the time of survey with known Steller sea lion presence).
- Include Steller sea lion counts from Round Island. Provide explanation why these counts are not used in the non-pup population estimate or in the Steller sea lion minimum population estimate.
- Provide information regarding numbers, timing of Steller sea lion aggregations in the WDPS (e.g., St. Lawrence Island) and the EDPS (e.g., Akwe, Sitka) including branding information.
- Provide information on the extent and timing of movement from the WDPS to the EDPS and from the EDPS to the WDPS). Provide the proportion of sampled pups at EDPS rookeries that are from WDPS females.

Response: Sections 5.1.1.1 and 5.1.1.2 of the EIS describe the population abundance and trends for the entire WDPS of Steller sea lions pups and non-pups based on the best scientific information available, including the period 2000 to 2012. Section 5.1.1 has been revised to refer the reader to Johnson and Fritz (in review) and Fritz et al. (2013) for details of survey methodology and history. These references are included in the draft EIS as Johnson and Fritz (in prep) and Fritz et al. (draft). The final EIS has been revised to update these references. Counts and trend estimates make no adjustment for movement between DPS or between sub-regions. See Johnson and Fritz (in review) for what site counts are used (all with >2 non-zero counts since 1975) and how counts are adjusted with the change in methodology from oblique to vertical camera angles. Animals at sea (if they are not hauled out or in the immediate nearshore area) are not included. For breeding season index counts (June through early July) no counts at haulouts or rookeries in the Bering Sea north of Amak Island are included (e.g., Pribilof Islands, Round Island, Cape Newenham, St Matthew, St. Lawrence). See Fritz et al. (2013) for all other methods and details on site by site counts from 2008–2012.[263] Considering the 10-year generation of Steller sea lions, it is not clear what the purpose of doing a 2008 to 2011 comparison would be.

As explained in Section 5.1.1.1, the pup multiplier used is 4.5, but this section further explains the assumptions behind using the value of a multiplier. The number of pups used to estimate the WDPS population was from all sites. In Section 5.1.1.2, the AFSC provided analysis of non-pup count data using all sites, (not just trend sites) to estimate regional and overall population trends for the U.S. WDPS of Steller sea lions between 2000 and 2012. Steller sea lion counts at Round Island have not been collected in the same manner as other aerial survey counts and are therefore not included in the count data used to estimate the population. Bristol Bay has not been included in aerial survey routes because it would require additional survey days that are not funded. Recent Round Island summer counts from the

[263] See www.afsc.noaa.gov/nmml/alaska/sslhome/databases/adult.php for counts from previous years.

U.S. Fish and Wildlife Service would add several hundred animals to minimum estimate (less than 1 percent of the estimated population). Question 7 does not explain the utility of providing counts of ephemeral concentrations of sea lions at seasonal feeding areas like the Akwe River mouth. There has not been any branding at those sites. The U.S. Forest Service has provided annual reports to the Alaska Department of Fish and Game (ADF&G) that include the annual counts of Steller sea lions around the Akwe and Alsek Rivers. Likewise, ADF&G has some counts at St. Lawrence Island Steller sea lion sites in past years. However, these are not summer counts so they do not occur at the same time as the Steller sea lion aerial survey and are not used in the population estimates.

Section 5.1.1.4.3 describes the movements of Steller sea lions, including branding resight information and movement timing based on animal age and sex. Cross boundary movement between the eastern and western distinct population segments and pups on eastern sites from WDPS females also are described in Section 5.1.1.4.3. Genetic samples from EDPS pups have not been collected since 2005. Therefore, there are no new, published data available to inform the EIS background information beyond what has already been provided. Likewise, NMFS has not collected genetic samples from pups in the eastern portion of the WDPS to determine what proportion of these pups might have mtDNA haplotypes unique to the EDPS. This additional genetics information from pups would be helpful to understand movement across the DPS boundary between the east and west.

CH5-69 Comment: The EIS should evaluate in greater detail the movements of Steller sea lions between and among subareas in the Aleutian Islands, and describe dispersal of Steller sea lions from their natal rookeries.

- Provide brand/resight movement and dispersal information between rookeries within Russia and outside Russia to the U.S. WDPS. Include, for example, breakouts by male/female and adult/ juvenile as in the Burkanov presentation.
- Provide brand/resight movement between rookeries, between subareas, between eastern and western distinct population segments, and between Russia/U.S. WDPS. Breakout as in Burkanov presentation.
- Provide brand re-sight information and timing from known Steller sea lion aggregations such as St. Lawrence Island, Akwe River, Sitka, Berners' Bay, Round Island and breakout as Burkanov presentation.
- Include results and comparison of previous movement studies such as Raum-Suryan et al. (2002) and other relevant studies.
- Provide potential reasons on why a) Medny Island is the only Russian rookery that has no immigrants (among branded animals) in all categories (e.g., adults, juveniles, male/female), b) why Medny has the longest dispersal distance of branded animals of all Russian rookeries, and c) the extent and direction of that dispersal from Medny Island to locations in Russia and Alaska.

Response: Section 5.1.1.4.3 provides a discussion of movement of Steller sea lions using the best scientific information available. This section includes a discussion of the movement of Steller sea lions among Russian and U.S. sites, including by age and sex (Tables 5-5 through 5-7) and to locations in the Bering Sea and Gulf of Alaska. Figure 5-12 show reproductive females movement between the western and eastern distinct population segments and the text summarizes what is known about Steller sea lion aggregations at different times of the year depending on reproduction and cites (Raum-Suryan et al. (2002)). Table 5-6 shows 17 sightings of Steller sea lions branded in the U.S. of different ages and sexes occurring on Medny/Yugo-Vostochny rookery. The discussion of the dispersal to and from Russia was focused on the movement to and from the action area to inform the status of Steller sea lions within the location where the effects of the alternatives are analyzed. The discussion does not include movements

from Russian sites to other Russian locations as this would not inform the analysis of the effects of the alternatives in the action area.

CH5-70 Comment: The draft EIS gives only cursory treatment to the work of Dr. Boyd (Boyd 2010), whose study found that decreased Steller sea lion abundance in some regions can be attributed to internal re-distribution of juveniles and that the risk of extinction of Steller sea lions has declined to a level that they should no longer be listed. The draft EIS mentions this study only once, and without explanation concludes that "the above brief synthesis of sea lion movement does not support his assumption of such unconstrained movement" (draft EIS at page 5-31). While NMFS cites Dr. Boyd's research, it provides no explanation of how it reached this conclusion or whether it factors into the agency's analysis.

Response: Section 5.1.1.4.3 discusses movements of Steller sea lions and cites Boyd (2010). Section 5.1.1.4.3 discusses movements of Steller sea lions and cites Boyd (2010). This section has been revised in the final EIS to highlight how several studies of sea lion population dynamics incorporate assumptions about movements, but without directly addressing how the assumptions may affect model results, which is beyond the scope of this section.

CH5-71 Comment: The probability of extinction analysis in the May 24, 2013, DeMaster memorandum uses the quasi-extinction threshold of 4,743 individuals—the threshold population size from the Goodman PVA. The Goodman PVA was based on a total population (pups and non-pups) of the U.S. WDPS. The quasi-extinction projection in the May 24, 2013, DeMaster memorandum appears to be based on trend analysis for non-pups only in 2000 to 2012 (from agTrend). The use of a total population threshold to evaluate non-pup projections seems to represent dissimilar datasets.

Response: The May 24, 2013, DeMaster memorandum discusses how the quasi-extinction threshold in Goodman's analysis in the Steller Sea Lion Recovery Plan (NMFS 2008) was applied in the updated quasi-extinction forecast. The quasi-extinction threshold in the Goodman analysis is based on a minimum viable breeding population of 1,000 and takes into account the juvenile portion of the total population and the sex ratio of reproductively active animals in the U.S. WDPS to arrive at a non-pup population size of 4,743 individuals.

CH5-72 Comment: Re-examine the efficacy and relevancy of rookery cluster areas (RCAs) and sub-areas in context of Steller sea lion movement information. The CIE reviewers raised a number of concerns regarding the basis of the RCAs. The relevancy of the RCAs should be re-examined given these concerns as well as in light of information regarding Steller sea lion movement.

Response: The EIS includes Figure 5-1, 5-6, and 5-10 in Section 5.1.1 that shows the relationship of the RCAs to fisheries management areas and Steller sea lion sub-regions identified in the 2008 Recovery Plan for Steller sea lions (NMFS 2008) and provides population trend information at the RCA and sub-region scales. The EIS does not further evaluate or use the concept of RCAs in the analysis of the effects of the alternatives on Steller sea lions. Steller sea lion movement is discussed in Section 5.1.1.4.3. The concept of RCAs is included in the EIS only in the context of information that informs the analysis in the EIS, such as Steller sea lion population information that is specific at this level in relation to fishing activities.

13.5.10 Prey

CH5-73 Comment: The EIS should include the estimation of the proportion of Pacific cod in the entire Aleutian Islands prey field. The EIS should incorporate Table 4.6 of Bernard et al. (2011) that shows the relative contribution of Pacific cod to the groundfish prey field biomass is also minimal.

Response: Table 4.6 of Bernard et al. (2011) shows predicted and observed changes in vital rates and body condition of Steller sea lions under different prey conditions. Table 4.5 in Bernard et al. (2011) shows forage ratios based on combined pollock, Atka mackerel, and Pacific cod biomasses. Limitations with foraging ratios including those presented in Bernard et al. (2011) are discussed in Section 5.2.2.1.9. NMFS will not incorporate Table 4.6 of Bernard et al. (2011) due to the limitations with this kind of information as discussed in this section. Information is not available to determine the entire biomass of the Steller sea lion prey field or the portion that includes Pacific cod. Section 3.3.1 of the EIS describes the stock status of Pacific cod, including the Aleutian Islands biomass.

CH5-74 Comment: The draft EIS at page 5-104 provides a list of problems NMFS believes are inherent with foraging ratios. However, the draft EIS does not describe the methods the agency will use in the 2014 biological opinion to evaluate effects of fisheries on prey availability for Steller sea lions. The methods that will be used for the biological opinion need to be included as part of the methods used to assess each of the alternatives in the EIS to allow public comment on the methods and to make a reasoned decision when selecting a preferred alternative. The commenter raised concerns with specific aspects of the analytical approach for the 2014 biological opinion that was presented to the Council in June 2013 and asserted they should be addressed in the EIS.

Response: NMFS disagrees that the EIS needs to include the methods that may be used in a future analysis. The analysis in Chapter 5 of the EIS includes the best scientific information available for the analysis of the effects of the alternatives to inform the selection of a preferred alternative. If the analysis in a subsequent ESA biological opinion on the proposed action changes the agency's conclusions about the effects of the fisheries on prey availability for Steller sea lions relative to the information in the EIS that is necessary for NMFS to make its final determination, then NMFS may include that information in the final EIS or may supplement the final EIS.

CH5-75 Comment: Provide assessment of the abundance, distribution, energy contribution, and seasonality of all Steller sea lion prey species in the Aleutians such as salmon, herring, sculpins, sand lance. Include changes in abundance and distribution of the prey field species over time. Include the presence or absence of Steller sea lion feeding aggregations in the Aleutians and prey species involved. Determine the proportion of pollock, Pacific cod, and Atka mackerel in the entire prey field in the Aleutian Islands. Include the contribution of prey species that are not harvested by commercial fisheries in the Aleutian Islands (e.g., Irish lords, sand lance, myctophids, cephalopods, and flatfish) to the Steller sea lion nutritional and energetic needs. If the data is available for the Commander Islands, a similar analysis of the available prey field would be useful.

Response: The status of the prey potentially harvested by the Atka mackerel, Pacific cod, and pollock fisheries is described in Chapters 3 and 4. The status of the prey species is considered in the analysis of the effects of the fisheries on Steller sea lions in Chapter 5. Information about Steller sea lion prey, including species harvested by the fisheries and other prey species, is in Sections 5.1.1.5 and 5.2.2.1.1 Information is not available or obtainable with limited agency resources to understand the entire Steller sea lion prey field and to apply this information to the analysis of fishery effects in United States or Russian waters. Chapter 11 includes a description of studies recommended to understand the Atka mackerel and Pacific cod prey that may be available to Steller sea lions (e.g., Atka mackerel and Pacific cod tagging study). NMFS will implement these studies as resources allow and apply any new information to future analyses of fisheries effects on Steller sea lion.

CH5-76 Comment: Current fishery management may compromise the prey field and thus influence Steller sea lion foraging efficiency by shifting of the age/size distribution of the target stocks. Once a certain age-class or cohort of fish matures to the point where it recruits to the stock, or reaches a physical size where it is typically caught by the fishery, it is susceptible to fishing exploitation each year. The end

result is that fishing reduces the prevalence of older, larger individuals in a stock, leaving behind a stock that is skewed toward younger, smaller individuals that may have less nutritional and energetic value to predators such as Steller sea lions.

Response: Section 5.2.2.1.2 in the EIS discusses the size of prey, including the concepts presented in this comment.

CH5-77 Comment: Current fishery management may compromise the prey field and thus influence Steller sea lion foraging efficiency by large reductions in groundfish biomass, reducing prey field density, or biomass per volume of water. This would potentially lower the encounter rate between Steller sea lions and their prey. Recent research has highlighted the importance of prey density, as opposed to prey abundance, to fur seals and seabirds in the Bering Sea (Benoit-Bird et al. 2013). Like marine predators, fishermen often achieve the greatest yield per unit effort when targeting high-density aggregations of fish. Thus, the effect on the availability of high-density aggregations of prey to the predators may be even more important than the overall depletion or changes in range of a fish stock that is brought about by industrial fishing.

Response: Section 5.2.2.1.5 describes the potential effects of fishing on aggregations of prey and the potential effects on Steller sea lion foraging. NMFS agrees that high-density prey aggregations are important to Steller sea lion foraging success based on their foraging behavior. Although Benoit-Bird et al. (2013) was published after the draft EIS completion deadline, their conclusions provide additional insight into the importance of prey aggregations also noted by studies cited in Sections 5.1.1.4.3 and 5.1.1.6; the final EIS includes information in these sections from this reference.

CH5-78 Comment: NMFS also fails to address the critique of Bernard et al. (2011) that declines to rule out the "junk food" hypothesis as a possible explanation for the WDPS of Steller sea lion population decline. Bernard et al. (2011) find this hypothesis more consistent with the scientific data in the 2010 FMP biop than the "highly improbable" fishery-driven nutritional stress hypothesis. The hypothesis posits that fewer Steller sea lion pups are born because an oceanic climate shift has made high-energy prey species less available, thereby causing pups to stay with their mothers for a longer time after birth until they are big enough to survive on low-energy prey alone. The agency analyzed this hypothesis in the 2010 FMP biop and concluded that it was highly unlikely that naturally caused nutritional stress was leading to population decline. Bernard et al. (2011) show that this theory cannot be ruled out because two of the five criteria necessary for the hypothesis—heavier pups and lower birth rates in the western and central Aleutian Islands—are established in the scientific record. The remaining three factors—relative size and weight of adult sea lions, duration of pup weaning in the western and central Aleutian Islands, and length of foraging trips by sea lions in the western and central Aleutian Islands—cannot be tested due to lack of data. The EIS must comply with NEPA by explaining the relevance of, and cost of obtaining, this missing data. NEPA further requires the agency to respond to the Bernard et al. (2011) opposing point of view and explaining how it impacts the agency's analysis.

Response: The "junk" food hypothesis assumes that adverse effects may occur to Steller sea lions if they are unable to consume enough low energy prey to maintain life functions. Section 5.2.2.1.8 contains a discussion on nutritional stress, including various situations at different life stages that may result in nutritional stress, including the potential for nutritional stress for juveniles with high metabolic rates and consumption limitations. The consideration of the "junk food" hypothesis does not lead the agency to rule out the potential for fisheries effects on Steller sea lion and the need for fisheries management measures. The discussion and consideration of the "junk food" hypothesis in Section 5.2.2.1.8 uses the best scientific information available to understand the potential impacts of the alternatives.

CH5-79 Comment: Sinclair et al. (2013) includes a great deal of speculation about causes for regional Steller sea lion trend differences and completely new theories with questionable scientific support. The paper demonstrates a misunderstanding of current fishery regulations in Steller sea lion areas. No analyses support the assertions about the relationship between changes in diet and fisheries management. Nor is there anything in the report to support the speculation about how fishing and fisheries management are responsible for the changes in Steller sea lion diets. A legitimate peer review process would likely have caught these errors and questioned the assumptions. Instead, the Alaska Fisheries Science Center released the paper as a NOAA Technical Memo. NOAA guidance regarding the use of technical memoranda states as a preface: "The National Marine Fisheries Service's Alaska Fisheries Science Center uses the NOAA Technical Memorandum series to issue informal scientific and technical publications when complete formal review and editorial processing are not appropriate or feasible." Whatever made a thorough, peer review inappropriate or infeasible we can only speculate in light of the apparent import of this paper to this draft EIS. An independent analysis should be undertaken that statistically evaluates possible relationships between diet, fishing, climate conditions, and changes in sea lion numbers. It needs to evaluate the relationships in light of the leading hypotheses to explain the decline of Steller sea lions. There are several concerns with the Sinclair et al. (2013) paper referenced in the draft EIS. Comments should be incorporated into a revised Chapter 5 and responded to in NMFS's response to comments. We further recommend either that the Sinclair paper be significantly revised to address these concerns and then submitted for standard outside peer review and publication, or deleted altogether as support for the conclusions of the EIS. This paper should not be used in the EIS or the upcoming biological opinion unless these steps are taken.

- The paper concludes that changes in prey frequency in scats may be attributable to regulations on fishing to protect Steller sea lions. However, the actual data seems to better support the changes being attributable to environmental factors.
- Closures referred to in the paper as "no trawl zones" actually only apply to fisheries targeting pollock, cod, and Atka mackerel. The paper states that because offshore pelagics such as salmonids and mytophids are not found in the Steller sea lion scats that have been collected, female Steller sea lions must be nearshore feeders. However, other Federal, state, and fisheries data show something quite different for adult female Steller sea lions.
- The paper also states that Steller sea lion scat data would include offshore pelagics if they were consumed, because Steller sea lion foraging trip duration is less than digestion time for those species. Distance to deep basin waters and back is only a factor if foraging trips are direct, which clearly is not the case from the available telemetry data for female Steller sea lions.
- The theory that Steller sea lions are adapted to eat the foods available to them in their local area is not supported by any data.
- The paper focuses on only one explanation for correlating diet and Steller sea lion trends rather than considering the relative change in particular prey species.
- The report should also have noted that the change in diet corresponds to a change in the Pacific Decadal Oscillation (1999) that likely affected the relative abundances of species consumed by Steller sea lions. The report needs to list the species and provide some discussion of the changes and whether they are important.
- The paper states that "It was not the objective of this study to define the relationship between Steller sea lions diet and population decline, …" and yet the discussion and conclusions of the paper speculate about how anthropomorphic factors could be related to Steller sea lion declines.
- The paper also speculates that reduced bottom trawling may be a factor in why Steller sea lion recovery has occurred in some areas, but ignores that on-bottom trawling occurs widely in areas where Steller sea lion recovery is occurring and the management steps (including gear modifications and habitat protection areas) in place to manage benthic effects of trawls in the Aleutian Islands, Bering Sea, and Gulf of Alaska.

Response: NMFS disagrees with the commenter. The information used in the EIS meets the Information Quality Act standards used by the Agency in the dissemination of information and the review procedures used by the Alaska Fisheries Science Center for public release of information. Sinclair et al. (2013) analyses the best scientific information available on frequency of occurrence of prey in Steller sea lion diets by region, season, and among decades and was peer reviewed. The EIS references data and conclusions in Sinclair et al. (2013) on frequency of occurrence of prey items in sea lion diet by season and changes in the frequency of occurrence of fish species in the sea lion diet from 1990 through 1999 compared to 2000 through 2009. The analysis in the EIS on the effects of fisheries on sea lion prey does not include the discussion in Sinclair et al. (2013) about any potential role of fishing and fisheries management causing the changes in Steller sea lion diets.

CH5-80 Comment: The EIS should provide greater detail on the use and limitations of scat frequency of occurrence (FO) to describe the contribution of various prey species to the Steller sea lion diet. Inferring a Steller sea lion's diet using the FO method provides a biased review of the animal's diet. NMFS fails to address this bias in the draft EIS. The draft EIS should provide a summary and results (wherever possible) of other, emerging methods to assess Steller sea lion diet (e.g., fatty acid analysis). The EIS should provide an updated estimate of FO for Pacific cod, pollock, and Atka mackerel in Steller sea lion scat that is corrected for bias and includes the distribution of the lengths of prey. The draft EIS should provide finer scale information on Atka mackerel fishery length, which is available in the 1998 biological opinion. Scat samples collected in April should be attributed to "summer" similar to telemetry data.

Response: Sections 5.1.1.5 and 5.2.2.1.1 describe Steller sea lion food habits and diet based on the best scientific information available. These sections review the analysis of diet using frequency of occurrence in scats, including limitations of this method, and provide a discussion of comparative diet studies using fatty acids, stable isotopes, and genetics. Length of prey was added to Section 5.2.2.1.2. Seasons for scat groupings is based on breeding seasons. Telemetry data are divided by quarters to make it comparable to fisheries and juvenile movements. Data are grouped based on the needs of the respective data types and analyses.

CH5-81 Comment: Current fishery management may compromise the prey field and thus influence Steller sea lion foraging efficiency by changing the spatial and temporal distribution of fish stocks. At reduced population density, a fished stock's distribution may contract, reducing sea lion foraging efficiency at the edges of the distribution and causing Steller sea lions to contract their foraging range. Alternatively, fished stocks may contract their distribution based on habitat characteristics—assuming an ideal free distribution—and at lower density may contract to areas of primary habitat preference over secondary ones. If important Steller sea lion rookeries or haulouts overlap spatially with these secondary fish habitat areas, the outcome could be declines in foraging success and population status in or near the fished stock's secondary habitat. Finally, intense fishing pressure may result in gaps or holes in the distribution of the fished stock that persist for some time, especially for patchily distributed species like Atka mackerel, that return to multiple spawning grounds each year. This would result in localized depletion of prey, with prey patches that are fewer and farther between.

Response: Section 5.2.2.1 discusses how the fisheries may cause localized depletion of Steller sea lion prey.

CH5-82 Comment: The draft EIS provides no quantitative comparative distribution of fishing depths (by fishery) and Steller sea lion dive depths. For the most part, the draft EIS in Chapter 5 and elsewhere (Chapters 3 and 7) presents dissimilar data sets from which the actual extent of overlap cannot be estimated. Despite public comment requesting proportional distribution of dive depths by Steller sea lions, the draft EIS persists in focusing on maximum diving depth and maximum dive duration.

The draft EIS does not provide a balanced presentation of the available information by quantifying only the extreme end of the range in the text for juveniles and adult females. For example, the draft EIS omits the mean dive depth for juveniles indicating that the average juvenile dive is short and shallow and close to shore. The draft EIS fails to include in the text discussion the studies in the Aleutian Islands showing the mean diving depth and mean dive duration for adult females.

Response: Chapter 3 provides the location of Atka mackerel and Pacific cod catch in relation to the 200 meter bathymetry in Figures 3-5, 3-6, and 3-9 through 3-16. This information was not available for pollock. Section 5.1.1.6 described the at-sea habitat use by Steller sea lions including dive information. The depth of foraging and fishing is described in Section 5.2.2.1.3 providing mean depths and durations in the tables that accompany the text. Whether mean sea lion depths necessarily reflect depths at which foraging occurs (described in Section 5.1.1.6) is questionable; however, all foraging must occur within the limits set by the maximum dive depths.

CH5-83 Comment: In 2006, NMFS Alaska Region asked for assistance on the question of updating overlap of size of prey. In its "Request for assistance on ESA Section 7 consultation," NMFS asked in question #24: "Is there size overlap between sea lion diet and fishery catch? Provide length distribution of fishery catch (by season) for pollock, Pacific cod, and Atka mackerel. Update Figure 40b in the 1998 biological opinion for pollock, Pacific cod, and Atka mackerel." NMFS did not complete this task in the response to questions (Mecum 2006) for the 2010 draft and final biological opinion. Nor has NMFS completed this quantitative update for the draft EIS despite extensive public comment and scientific criticism. Despite these pointed criticisms (as well as extensive public comment), the analytic approach laid out by NMFS (May 2013) repeats another non-quantitative "yes/no" exposure analysis (from NMFS 2000 biological opinion) and then states at page 6: "From this analysis, NMFS determined that the groundfish fisheries were likely to compete with Steller sea lions for Atka mackerel, Pacific cod, and pollock (NMFS 2000). Given the best available information today, NMFS maintains that the fisheries are likely to compete with Steller sea lions for fish and thus the focus of the 2014 biological opinion will be on the fisheries for these three species."

Response: Section 5.2.2.1.2 of the EIS discusses the extent of size overlap between fish in the Steller sea lion diet and fish caught in the groundfish fishery. Section 5.2.2.1.2 describes research that found considerable overlap between the size of pollock and Atka mackerel taken by sea lions and the fishery. NMFS agrees that information on the size of Pacific cod caught in the fisheries and eaten by sea lions should be included in Chapter 5, and NMFS has revised the final EIS with this information. NMFS presented an errata to the Council in June 2013, that revises the sentence referenced by the commenter such that it reads as follows, "Given the best available information today, NMFS maintains that the fisheries may compete with Steller sea lions for fish and thus the focus of the 2014 biological opinion will be on the fisheries for these three species."

CH5-84 Comment: The analysis in Chapter 2 fails to review or quantify the effects of ongoing closures of pollock under Alternative 1 with respect to the overall prey field for Steller sea lions. The draft EIS at page 2-6 has a discussion of Aleutian Islands pollock management, but neither this discussion, nor the discussion of pollock in Chapter 5 present any data regarding the effect of the closure on pollock stocks or the effect on pollock availability to Steller sea lions as prey. Neither Chapter 2, Chapter 3, nor Chapter 5 provide data on the amount of pollock that remained in the water and were available as prey for Steller sea lions This information should have been included in order for the reader to weigh the effects of pollock measures under each alternative.

Response: Chapter 2 is a description of the alternatives rather than an analysis of effects of the alternatives. Chapter 3 is the analysis of the effect of the alternatives on target species stocks, including pollock (Section 3.4). Section 3.4.1 provides a summary of historical changes in acceptable biological

catch (ABC), total allowable catch, and catch showing an increase in pollock ABC since the closure of the fishery in the late 1990s. Section 5.2.2.2 of the EIS provides a discussion of the effects of the pollock fishery under Alternative 1 on Steller sea lion prey resources. NMFS agrees that more pollock is potentially available to Steller sea lions with the fishery closure than with the fishery open. Table 5-37 provides the amount of critical habitat closed to directed pollock fishing, showing where pollock would not be harvested in critical habitat by area under Alternative 1. Considering the harvest of pollock is primarily from critical habitat and pollock appears to occur primarily inside critical habitat, Table 5-37 provides the potential effect of the harvest of pollock under Alternative 1 on Steller sea lion pollock prey availability. Similar tables were provided under the action Alternatives 2 through 5 (Tables 5-54 through 5-56, 5-69 through 5-71, and 5-82). In consideration of the Aleutian Islands pollock ABC shown in Figure 3-17, these tables in Section 5.2.2 give an estimate of the pollock that remains in the water and available to Steller sea lions under the alternatives.

CH5-85 Comment: The EIS needs to re-evaluate the basis for the determination that the Pacific cod fisheries are a "fishery of concern" as the initial determination is based on frequency of occurrence in scat that is subject to bias and overestimates the importance of gadids in Steller sea lion diet. Based on 1990 to 2005 data, scat analyses indicate that Pacific cod is at best a minor component of sea lion diets from information given in the 2010 FMP biop.

Response: The EIS continues to identify Pacific cod as a principal prey species based on frequency of occurrence in scat data as described in Section 5.2.2.1.1. Taking into account the limitations of this type of data described in Section 5.1.1.5, frequency of occurrence data remains the best estimation of diet for free ranging pinniped species. Pacific cod occurs in over 10 percent of the scats in the Aleutian Islands in the winter (Table 5-19), and therefore, remains a fishery of concern for Steller sea lions.

CH5-86 Comment: The draft EIS does not provide an analysis of the effects of Alternative 4 on the availability of prey to Steller sea lions, or why Alternative 4 fails to meet ESA requirements given new information available since the 2010 FMP biop was completed. Yet, NMFS has already provided verbal commentary to the Council that strongly indicates that Alternative 4 is unacceptable. To be complete and objective, and in order for the public to provide meaningful comment on each of the alternatives, the draft EIS needs to be modified to include NMFS's analysis of the effects of fishing on Steller sea lions under each alternative. With regard specifically to Alternative 4, NMFS needs to document and quantify the effects of fishing on prey availability under Alternative 4 management measures. There is over a decade of data on which to base an estimate of these effects, but no such analysis is provided. Chapter 2 (and possibly Chapter 5) needs to include this analysis and clearly document how the management measures in Alternative 4 do not provide a sufficient prey field for the WDPS of Steller sea lions, if that is the agency's conclusion.

Response: The analysis of effects of the alternatives on prey availability is in Sections 5.2.2.2 through 5.2.2.6. Chapter 2 is a description of the alternatives, rather than an analysis of their effects. This analysis uses the best available information to describe the potential effects of all the alternatives on Steller sea lion prey availability. The effects are described in context of the performance standards (Section 1.10.3) that are likely to be used in an ESA consultation. In June 2013, NMFS provided a review of the Council's preliminary preferred alternative in relation to the performance standards described in the draft EIS.

CH5-87 Comment: The draft EIS identifies the importance of Pacific cod in Steller sea lion diet as an area of controversy, however, Section 5.2 does not include information on the size distribution of cod occurring in Steller sea lion scat or harvested in the Aleutian Islands cod fisheries. This size distribution information is available in existing NMFS documents and public comment, and should be included in Chapter 5. For example, a draft EA prepared by NMFS in 2000 on Interactions between the Pacific Cod

Fisheries in the Bering Sea, Aleutian Islands, and GOA and Steller sea lions stated that the mean size of Pacific cod eaten by Steller sea lions was approximately 50 cm in length.

Response: The EIS uses the best scientific information available to describe Pacific cod prey for Steller sea lions. Pacific cod is among the top prey items in two decades of diet data from the GOA through the western Aleutian Islands with highest frequencies occurring in winter. In Section 5.1.1.5, the estimated size of Pacific cod in Steller sea lion scat is listed along with walleye pollock and is approximately 60 cm. Sections 5.1.1.5 and 5.2.2.1.1 in the final EIS have been revised to include more information on Pacific cod eaten by Steller sea lions from Sinclair et al. (2013), which is cited as Sinclair et al. (draft) in the draft EIS, and from (McKenzie and Wynne 2008), which has information on Pacific cod prey size in the Gulf of Alaska. Additional information on Pacific cod prey size is considered with the confounding issues with prey size discussed in Section 5.2.2.1.2.

13.5.11 Recovery

CH5-88 Comment: Compare the most recent estimate for total population in the U.S. WDPS of Steller sea lions to the best estimate for total U.S. WDPS population in 2000. Compare the most recent estimate for total U.S. WDPS population to the downlisting population criteria of 53,100.

Response: Section 5.1.1 discusses the Steller sea lion population as it relates to the recovery plan, and Section 5.1.1.2 provides the most recent population estimates for the WDPS of Steller sea lions from 1990 to 2012. The current total population estimate for the U.S. portion of the WDPS is approximately 52,200 animals compared to 42,500 animals estimated in 2000. The 2008 Recovery Plan for Steller sea lions has several delisting criteria including estimated total population based on non-pup counts and non-pup population trends in sub-regions. One criterion is the statistically significant increase in the U.S. WDPS population for 15 years on average based on non-pup counts. If the population had a 1.5 percent increase from 2000, the population was projected to be 53,100 animals in 2015. The action analyzed in the EIS is not to downlist Steller sea lions, but the adoption of fishery management measures to insure the Alaska groundfish fisheries are not likely to jeopardize the continued existence of Steller sea lions or adversely modify or destroy their designated critical habitat. Section 5.1.1.1 has been revised to mention the total population estimate from 2000 and the criterion from the recovery plan for the total U.S. WDPS population to be estimated at 53,100 animals by 2015 based on slow, steady population growth from 2000.

CH5-89 Comment: Clarify that the 42,500 population reference in the Recovery Criteria is the total population estimate for the U.S. WDPS of Steller sea lions in 2000 (and not the non-pup population as is currently stated). Provide the methodology used to arrive at the 42,500 population estimate in the Recovery Plan for the U.S. WDPS (from the population viability analysis in the recovery plan).

Response: The 2008 Recovery Plan for Steller sea lions is incorporated by reference in the EIS and discussed in Sections 1.9.4 and 5.1.1. Those sections focus on aspects of the recovery plan that inform the analysis. The action analyzed in the EIS is protection measures to insure the groundfish fisheries are not likely to jeopardize the continued existence of Steller sea lions or adversely modify or destroy their designated critical habitat. Section 5.2 describes the methods used to analyze the effects of the alternatives on Steller sea lions, which do not use historical population estimates. The methodology for developing the population estimate in 2000 from the recovery plan is outside the scope of the analysis of the effects of the alternatives as this type of information is not used in the analytical methods described in Chapter 5.

13.5.12 Uncertainty/lack of information

CH5-90 Comment: The EIS should clarify how NMFS can rationally determine the impact that an action will have on the human or natural environment when it cannot even establish that any impact even exists. Indeed, the relevance of the precise role that humans have played in the decline of the Steller sea lion is at the crux of the decision to restrict fisheries.

Response: NMFS uses the best scientific information available to determine the potential impacts on the human environment and describes the information and method of analysis used in each chapter for the environmental components (Chapters 3 through 7) and social and economic effects (Chapters 8 through 10). The analysis in Chapter 5 is based on Steller sea lion biology and potential direct and indirect effects of the fisheries on Steller sea lions. The method of the analysis of the effects on Steller sea lions is explained in Section 5.2.1 for incidental takes, Section 5.2.2 for prey availability, and Section 5.2.3 for disturbance.

When information does not allow the effects to be determined, the EIS explains that the effects are unknown. As explained in the executive summary, when information is unavailable, but the agency determines that information is essential to a reasoned choice among alternatives, and the overall costs of obtaining it are not exorbitant, the agency shall include the information in an EIS (40 CFR 1502.22). This EIS contains the information essential to a reasoned choice among alternatives in that it provides information on how the alternative minimize potential fishery impacts on Steller sea lions and how the alternatives are more or less constraining for the fisheries.

Also, when an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking (40 CFR 1502.22). This EIS also identifies where information is lacking and discusses the relevance of the unavailable information, the existing credible scientific evidence relevant to adverse impacts on Steller sea lions, and an evaluation of such impacts based upon scientific approaches. As described in Chapter 5, NMFS does not have the information to precisely ascribe the amount to which human and natural factors are contributing to the decline in Steller sea lions in the Central and Western Aleutian Islands. Moreover, insufficient information exists to quantify Steller sea lion population effects related to prey availability from various levels of fishing in the Aleutian Islands. The cost of obtaining sufficient information to fill in the current unknowns, given the unprecedented amount of research ($241 million from FY92 to FY11) directed toward understanding the causes of the Steller sea lions' decline and lack of recovery, seems out of reach of NMFS—especially considering the present fiscal times.

This EIS provides the decision makers with the ability to compare and contrast the effects of the alternatives on the human environment by disclosing information on fishery removals of prey and critical habitat closures under the alternatives within the action area. The analysis assumes that fishery removals of prey may adversely affect the WDPS of Steller sea lions as determined in NMFS (2010a). Our logic further assumes that incremental increases in prey removals and opening more areas of critical habitat, relative to status quo could have incremental, adverse effects on prey availability for Steller sea lions. This EIS also identifies future research, including modeling Steller sea lion predator-prey interactions, food web modeling, and diet studies, focal studies of Steller sea lion foraging behavior, Steller sea lion diet, fish abundance, fish movement, oceanography, ocean productivity, and fisheries impacts in contrasting areas of Steller sea lions population trend and in areas where Steller sea lions forage. This work will enable NMFS to better understand the interactions between fisheries and Steller sea lions.

CH5-91 Comment: The draft EIS does not analyze all significant issues and information relevant to the proposed action and effects of the alternatives on Steller sea lions, the environment, and Alaska

communities, as required by NEPA. Although the draft EIS references the two reviews of the 2010 FMP biop, no genuine or detailed attempt is made in the draft EIS to address the issues raised in the reviews or the public comments received on the draft and final 2010 FMP biops. The draft EIS does not address the conclusion of those reviews that there is no scientific support for commercial fisheries jeopardizing Steller sea lions through competition for prey, resulting in nutritional stress and reduced natality. Anything short of a full and fair analysis of all of the information and issues set forth in the reviews of the 2010 FMP biop will result in NMFS once again violating NEPA. Additional analyses must be performed to address the issues raised in the reviews of the 2010 FMP biop. The draft EIS should contain a stand-alone section addressing the conclusions of the 2010 FMP biop, the recommendations of the reviews, and the Agency's response to each controversial issues and uncertainty identified by the reviews. NMFS's mistaken rationale is that the analyses are applicable only in the forthcoming section 7 consultation and that if the section 7 process generates new information, NMFS will evaluate the need to prepare a supplemental draft EIS at that time. Deferring analysis of relevant and contrary scientific information violates fundamental NEPA principles. A thorough EIS must be completed before a decision is made.

Response: NMFS disagrees. The EIS analyzes all significant issues and information relevant to the proposed action and effects of the alternatives on Steller sea lions, the environment, and Alaska communities. Chapters 3 through 7 analyze all significant issues and information relevant to the proposed action and the human environment, including Steller sea lions. Impacts on Alaska communities are analyzed in Chapters 8 and 10. NMFS used the best scientific information available, including information from the reviews of the 2010 FMP biop, to inform the analysis of the potential effects of the alternatives on the human environment. Chapter 5 addresses portions of the reviews of the 2010 FMP biop that informed the analysis used in the EIS for the effects of the alternatives on Steller sea lions prey resources in Section 5.2.2.1.9. The EIS analyzes the issues relevant to informed decision making on the alternatives, based on the best scientific information available, and incorporates the issues identified in the reviews as appropriate and documents these in the EIS. NMFS is still in the process of conducting appropriate analyses in response to external reviews of the 2010 FMP biop. NMFS does not know at this time whether these additional studies are likely to change the agency's understanding of the potential effects of fisheries on Steller sea lions. This cannot be determined until these studies are completed. Until such time, NMFS will continue to work with the Council to identify a preferred alternative for completion of the EIS within the schedule ordered by the U.S. District Court for the District of Alaska. Resolving scientific uncertainty and refining methods for data analysis are continual processes, and NMFS is always improving the information available on all of the issues under NMFS's responsibility. However, NMFS recognizes the need to assess the data and analyses available today to make timely decisions. NEPA accommodates the fact that information evolves by establishing the guidelines for when to supplement an EIS and how to address incomplete and unavailable information.

CH5-92 Comment: NMFS fails to insure the scientific integrity of the draft EIS. NMFS states that it used the best science available to inform its decision that continued closures and restrictions would prevent jeopardy of the WDPS of Steller sea lions. However, this decision is contradicted by the agency's statement that "NMFS does not have the information to precisely ascribe the amount to which human and natural factors are contributing to the decline in Steller sea lions in the Central and Western Aleutian Islands. Moreover, insufficient information exists to quantify Steller sea lion population effects with various levels of fishing" (draft EIS page 5-69). Thus, the best science available to NMFS cannot establish that fisheries are causing a decline in the WDPS population, or that if they were, a certain amount of restriction would remedy the effect. The document contains few actual conclusions about whether human or natural factors are resulting in population effects on the Steller sea lion WDPS. Instead, it admits that "insufficient information exists to quantify Steller sea lion population effects with various levels of fishing" (draft EIS page 5-63). This leaves both the Council and the public with no way of knowing what NMFS analyzed or how it reaches its conclusions in the draft EIS. As the Council notes in its June 2013 motion, "whether such a significant negative impact on Steller sea lions from the

groundfish fisheries exists is as relevant under NEPA as it is under the ESA," and therefore must be addressed in the EIS. The best science available to NMFS cannot establish that fisheries are causing a decline in the WDPS population, or that if they were, a certain amount of restriction would remedy the effect. The agency's determination that closures and restrictions are necessary therefore does not and cannot plausibly follow from its conclusion that the available science does not establish whether or to what extent fisheries are affecting Steller sea lions.

Response: NEPA requires that environmental information is available to public officials and citizens before decisions are made and before actions are taken. In Section 5.2.2.2, the EIS identifies the type of information that is available to analyze the effects of the alternatives on Steller sea lion prey availability and provides the reasons why most analyses in the EIS are qualitative, and not quantitative. When information was available to quantify difference among alternatives (e.g., amount of catch inside critical habitat under the alternatives) that information was provided. A qualitative analysis based on the best scientific information available to describe the potential impacts of the alternatives allows decision makers to compare and contrast the effects to inform choosing a preferred alternative. The EIS clearly explains the methods and assumptions used in the analysis and how the conclusions in the EIS were reached. Chapter 5 details the incomplete and unavailable information that prohibits a full quantitative analysis of the effects of fishing on Steller sea lions. The EIS provides an analysis that allows the decision makers to understand the different level of effects expected from the alternatives on Steller sea lions and to understand those effects based on performance standards from the 2010 FMP biop and as modified based on the reviews of the 2010 FMP biop. For further information, please see the responses to Chapter 5 comments on population effects analysis.

CH5-93 Comment: The public is left with the impression that NMFS intends to counter the reviews of the 2010 FMP biop based on further work that is in various stages of completion. In so doing, rather than basing the discussion on peer-reviewed scientific information, NMFS describes a set of unpublished and in-process or soon-to-be-in-process studies, some of which have not even been started. This is inconsistent with the standard set by 40 CFR 1502.24. It appears that the agency is developing new theories on how fisheries may affect Steller sea lions without regard to the weight of scientific evidence in the literature. Rather than fairly evaluating alternative expert opinions, the public is left with the impression that the agency's mind was already made up on the central issue of whether there are reasonably foreseeable significant adverse environmental impacts from fishing—the exact opposite of what NEPA requires.

Response: NMFS disagrees. The information provided in the EIS complies with 40 CFR 1502.24. In the EIS, NMFS uses the best scientific information available, including the reviews of the 2010 FMP biop and information that has become available after the completion of the 2010 FMP biop. Some of this information is from peer reviewed publication and some is from Alaska Fisheries Science Center (AFSC) researchers. Information from AFSC was reviewed to ensure the information released meets the agency standards for the particular type of information under the Information Quality Act and followed AFSC procedures for review and release of information. NMFS has identified issues from the reviews of the 2010 FMP biop that will need additional analyses by the agency, prioritizing the work by the available resources and the need of the information to better understand the potential effects of the groundfish fisheries on Steller sea lions. Chapter 5 describes the methods used to analyze the effects of the alternatives on Steller sea lions, which do not use the type of information that would come from the additional analyses of issues raised by the reviews of the 2010 FMP biop. For the Record of Decision, NMFS will take a hard look at all of the information provided, from its own scientists as well as from outside sources, and make appropriate determinations based on that information for its statutory responsibilities under the Magnuson-Stevens Act and the ESA.

CH5-94 Comment: NMFS has not taken a hard look, as required under NEPA, at the issue of whether fisheries compete with Steller sea lions. No direct, conclusive, or strong evidence exists in the 2010 FMP biop that fisheries compete with Steller sea lions in the central and western Aleutian Islands and elsewhere, as shown by the reviews of the 2010 FMP biop, including the CIE, the State sponsored scientific review panel, and Dr. Ian Boyd. In Section 5.2.2 of the draft EIS, NMFS makes many conclusory, albeit non-definitive, statements to this effect, without providing scientific support.

Response: NMFS disagrees that it did not take a hard look at the issues identified in the EIS. A hard look at the information requires NMFS to include the best available information in the EIS and to thoroughly consider that information when making a determination. Chapter 5 contains the best scientific information available related to fishery competition with Steller sea lions. In April 2013, the Council's Scientific and Statistical Committee found the draft EIS analysis to be not only a balanced treatment of the issues that provides the reader with a full picture of the strengths and weaknesses of the data available, but an excellent compendium of information on the interactions of fishing and Steller sea lions.

CH5-95 Comment: Instead of disclosing in the draft EIS the fact that numerous studies since 2000 have looked for and failed to find statistically significant relationships between Steller sea lions and groundfish fishing under previous mitigation measures (Alternative 4), the draft EIS inaccurately relies on "data gaps," e.g., "gaps" that the agency sees because it cannot find a study that supports its hypothesis of chronic nutritional stress caused by prey removals. An EIS must contain "a reasonably thorough discussion of the significant probable environmental consequences" of a proposed action and the alternatives to the action. This requires an agency to evaluate what impacts are likely, not to engage in a relentless search for negative impacts in the face of credible scientific information, which supports a conclusion that such negative impacts do not exist. Unfortunately the "looking for adverse impacts in the absence of indicators of such impacts" approach is exactly the approach taken in Chapter 5 and throughout the draft EIS. This alone compels substantial revision of Chapters 2 and 5 to provide rigorous and objective information for the public and the Council.

Response: The impetus for the action analyzed in the EIS was the conclusion of NMFS's 2010 FMP biop that it could not insure that the groundfish fisheries, as authorized in 2010, were not likely to jeopardize the continued existence of the WDPS or adversely modify designated critical habitat. Thus, it is appropriate for the EIS to consider potential effects of the alternatives with consideration of the findings and information used in previous biological opinions. Chapter 2 is the description of the alternatives. Chapter 5 provides the types of information available related to potential effects of the alternatives on Steller sea lions, including the differing viewpoints on whether fisheries have an effect on Steller sea lions and their critical habitat.

CH5-96 Comment: NMFS must revise its performance standards in light of the new information in the reviews of the 2010 FMP biop. NMFS believes Alternative 1 is not likely to jeopardize Steller sea lions or adversely modify their critical habitat based on its performance standards. However, these performance standards are not based on the most current information available. NMFS states that "no additional new information was identified during scoping on this EIS that would lead to different performance standards" (draft EIS page 1-21). In fact, NMFS identified reviews of the 2010 FMP biop as new information. These reviews challenge the premises underlying the performance standards, and necessitate the creation of new standards. NMFS has an independent obligation under NEPA to evaluate the effects of its proposed action on listed species and their critical habitats. The agency must do so in the EIS by considering whether the performance standards are reflective of the relationships between listed species and their prey, and whether they need to be modified in light of the voluminous additional data received after the 2010 Environmental Assessment. NMFS evaluate the performance standards in light of the incomplete or unavailable information documenting the relationships that form the hypotheses and premises on which the performance standards are based. This includes the hypothesis that Steller sea

lions are prey-constrained or nutritionally-constrained in the sub-areas where the population may not be recovering or growing as rapidly as previously was anticipated.

Response: The performance standards from the 2010 FMP biop were analyzed and modified based on information in the reviews of the 2010 FMP biop and used in the EIS to inform the analysis (Section 1.10.3). Section 5.1.1 and 5.2.2.1.9 include the discussion of the types of studies that have been conducted or that are in progress or planned under the topics related to Steller sea lion biology and fisheries interaction. Additional research to further understand the impacts of the fisheries on Steller sea lions is identified in Chapter 11. As new information becomes available, NMFS will continue to evaluate the performance standards used to determine appropriate fisheries management measures to protect Steller sea lions and their critical habitat.

CH5-97 Comment: The draft EIS fails to address significant data gaps. While the agency purports to list areas of scientific uncertainty and speculation, it neglects to explain how the available data establishes that human or natural factors are resulting in population effects on the Steller sea lions.

Response: The EIS identifies the gaps and quality of scientific information following the Council for Environmental Quality regulations at 40 CFR 1502.22. In the Executive Summary, NMFS identifies the areas of controversy and the issues to be resolved. Under Areas of Controversy, NMFS explains that the EIS identifies where information is lacking, discusses the relevance of the unavailable information, summarizes existing credible scientific evidence relevant to adverse impacts on Steller sea lions, and evaluates impacts based on scientific approaches. As described in Chapter 5, NMFS does not have the information to precisely ascribe the amount to which human and natural factors are contributing to the decline in Steller sea lions in the Central and Western Aleutian Islands. Moreover, insufficient information exists to quantify Steller sea lion population effects with various levels of fishing. The cost of obtaining sufficient information to fill in the current unknowns, given the unprecedented amount of research ($241 million from fiscal year 1992 to fiscal year 2011) directed toward understanding the causes of the Steller sea lions' decline and lack of recovery is beyond the resources now available to the agency under present fiscal conditions. Research activities are prioritized and conducted within available resources. This EIS also identifies future research, including modeling Steller sea lion predator-prey interactions, food web modeling and diet studies, focal studies of Steller sea lion foraging behavior, Steller sea lion diet, fish abundance, fish movement, oceanography, ocean productivity, and fisheries impacts in contrasting areas of Steller sea lion population trends and in areas where Steller sea lions forage. This work will enable NMFS to better understand the interactions between fisheries and Steller sea lions and will be conducted as resources allow.

CH5-98 Comment: The draft EIS contains an inadequate discussion of the reasons for and implications of its incomplete data, as required by NEPA. NMFS admits that it does not have sufficient data to determine whether the proposed action will have significant adverse effects, and it relies on the purportedly exorbitant cost of obtaining the data as an excuse for not doing so. However, the agency fails to explain what costs would be necessary to make an informed decision regarding the potential impacts that humans may have on the Steller sea lion population. It must demonstrate that the cost of obtaining the necessary missing information is exorbitant and explain the relevance of the missing information.

Response: Chapter 11 has been revised in the final EIS to include a summary of the types of research that would further inform the effects of the fisheries on Steller sea lions and address the estimated costs of doing this type of research and which projects are funded and are scheduled. There are many questions to answer to understand the potential effects of groundfish fisheries on Steller sea lions that can be explored through either smaller focused studies (e.g., Atka mackerel tagging) or large multidisciplinary studies (e.g., adaptive management experiment). The small scale studies may provide limited, focused answers that may be used to piece together the bigger picture of potential fisheries effects. Whether small scale or

large studies, the available resources and priorities for fisheries and Steller sea lion research affect the capability to obtain information that can be used to understand fisheries effects on Steller sea lions. For example, there have been at least four previous attempts over the last 15 years to design an adaptive management experiment to examine the potential indirect effects of commercial groundfish fisheries on the WDPS of Steller sea lions. One approach involved the establishment of one or more paired treatment and control areas that were open and closed to fisheries, respectively. The proposed experimental durations were all quite long, ranging from 5 to 20 years depending on the model design and assumptions. This was because all of the experiments used population-level responses, which could take a long time to manifest due to the long 10-year generation time of Steller sea lions, and their relatively "plastic" life history involving variable duration of maternal dependence of young. The success of any adaptive management experiment depends on how well the size, number, and location of treatment and control areas incorporated knowledge of Steller sea lion biology, seasonal movements, foraging ecology, and stock structure. This would require relatively large treatment and control areas across the entire Alaskan range of the WDPS in order to capture as much of the seasonal and ontogenetic movements as possible. No adaptive management experiments have been implemented, largely because of the exorbitant costs to NMFS and the groundfish fishing industry.

CH5-99 Comment: NMFS expresses the opinion that the State-sponsored scientific review panel review of the 2010 FMP biop is invalid. The concern here is that NMFS is taking issue with the reviews of the 2010 FMP biop conclusions without having even presented or evaluated the studies on which they are based, while at the same time basing much of the analysis in Chapter 5 on incomplete studies or in-house reports that have not been evaluated or peer reviewed. This demonstrates a callous disregard for the scientific process, and certainly calls into question the objectivity of the analysis in Chapter 5 and the agency's compliance with the standard set by 40 CFR 1502.25(a).

Response: Nowhere in the EIS does NMFS provide the opinion that Bernard et al. (2011) is "invalid." NMFS has carefully reviewed the Bernard et al. (2011) report and considered its findings in the analysis in Chapter 5. The results of Bernard et al. (2011) are being further evaluated by NMFS, as explained in Section 5.2.2.1.9. NMFS used the best scientific information available to support the analysis and presented findings on both sides of the controversy on whether groundfish fisheries have an effect on Steller sea lions. The EIS describes the types of information used, including published studies, technical memorandum, and other agency data so the reader is able to understand the type of information used in the EIS. All information used meets the Information Quality Act and AFSC procedures for the release of agency information, ensuring scientific integrity.

CH5-100 Comment: The 2001 reasonable and prudent alternative from the 2001 FMP biop is not a valid adaptive management experiment for two reasons:

- When the 2001 reasonable and prudent alternative was implemented, Steller sea lion sub-area population declines were occurring at approximately the same rate as current rates on both sides of 178° West longitude.
- Atka mackerel fishing was not occurring east of 178° West longitude in Area 542 prior to 2001 and Atka mackerel fishing west of 178° West longitude in critical habitat continued at a somewhat lower level. The curtailment of Atka mackerel fishing east of 178° West longitude was only a "paper" regulation.

Response: While the fisheries management measures in the Aleutian Islands were not specifically designed as an adaptive management experiment, the information gathered after the implementation of these fisheries can inform consideration of changes to fisheries management. Working with the Council, fishery management measures can be adapted to changes in fishing behavior or changes in Steller sea lion

population trends and based on new information related to the Aleutian Islands ecosystem. The movement of Steller sea lions and adaptive management studies in relation to fishing (Punt and Fay 2006) is mentioned in Section 5.1.1.4.3. An adaptive management experiment to address Steller sea lions and groundfish fishing in the Aleutian Islands has not been designed or implemented for the groundfish fisheries.

CH5-101 Comment: For each of the alternatives, in cases where NMFS is unable to provide a comprehensive analysis of predicted effects of fishing activity on Steller sea lion foraging and survival, provide a description of important information that is needed but lacking, and how NMFS plans to acquire such information. It is important to fill these data gaps, or at the very least, recognize they exist and lay out a plan to fill them. Without sufficient data, there is no way to determine what effect the proposed measures will have on the spatial distribution of stock biomass of prey species and its relationship to Steller sea lion foraging success. In other words, no matter which alternative NMFS chooses, it has little basis for assessing the impacts to Steller sea lions without better information and dedicating more resources to studying fish stocks in the western and central Aleutian Islands and Steller sea lion vital rates and foraging patterns.

Response: Chapter 11 discusses the research needs to further understand fisheries management and the potential effects of fisheries on Steller sea lions. Section 11.1.1 describes the fisheries research that will provide a better understanding of the abundance and distribution of potential prey species that are harvested in the groundfish fisheries. Section 11.1.2 provides a discussion of the research needed to understand predator-prey relationship for Steller sea lions, fisheries interactions, and diet and food web modeling. All research activities are dependent on priorities and funding.

Since Atka mackerel is the main prey item of Steller sea lions in the Aleutian Islands, Atka mackerel tagging studies have been conducted in the eastern and central Aleutian Islands to examine local abundance around rookeries and major fisheries locations. Currently NMFS in collaboration with the North Pacific Fisheries Foundation is conducting a study in the central Aleutian Islands and is funded to conduct a study in the western Aleutian Islands in 2014–2015 (as referenced in 11.1.2). These studies will examine Atka mackerel abundance and the relative abundance of rockfish, pollock, and Pacific cod at local scales relevant to the sea lions and the fishery. In addition, during the Atka mackerel recovery studies, NMFS is planning to conduct small acoustic surveys in the areas where tagged sea lions have been foraging to examine abundance of rockfish, pollock, and Pacific cod. Section 11.1.2 has been revised to indicate that this study is funded and now scheduled.

13.6 Chapter 7 Comments

These comments are on Chapter 7, ecosystem analysis. The comments on Chapter 7 were primarily related to multispecies modeling and predator/prey relationships.

CH7-1 Comment: A 10 percent reduction in Atka mackerel mortality leading to a 6 percent increase in sea lion biomass based on Aydin (2010) was not explained in the 2010 FMP biop. Further discussion in the EIS should include:

A. Address how to reduce Atka mackerel rates the additional 2 percent beyond the closure of the Atka mackerel fishery (8 percent) to reach the modeled 10 percent.
B. How many years would it take to reach the 6 percent increase in sea lion biomass?
C. Would the increases in biomass persist (for sea lions and Atka mackerel)?
D. What would be the effect of closing both the Pacific cod and Atka mackerel fisheries on sea lions?

Response: A. Section 7.7 of the EIS discusses Aydin (2010) concerning the modeling of groundfish, Steller sea lions, and fishery interactions. This section does not address management measures to further reduce Atka mackerel fishing an additional 2 percent as this further reduction is not part of the alternatives analyzed in the EIS.

B. Figure 7-10 shows the equilibrium state of the Aleutian Islands simulated ecosystem, including Steller sea lions, after 50 years of reducing Atka mackerel mortality by 10 percent. Information on how long it would take to reach 6 percent is not currently available, and exploratory modeling indicates there would be substantial uncertainty in any provided estimate.

C. As this simulation presents an equilibrium result, this would be expected to persist as long as fishing pressures and baseline modeled environmental variables do not change.

D. See Chapter 5 for discussion of the potential effects of the closure of Pacific cod and Atka mackerel fisheries on sea lions under Alternative 6. Aydin (2010), and therefore Section 7.7 of the EIS, do not simulate closing both the Pacific cod and Atka mackerel fisheries and the effect on sea lions. In terms of predicting effects on levels of potential prey, Aydin (2010) and Section 7.7 do conjecture that if fishing is reduced simultaneously on Pacific cod and Atka mackerel, it is possible that the reduced mortality on Pacific cod would result in an increased mortality on Atka mackerel that would be greater than the mortality removed from Atka mackerel by fishing closures (EIS, Section 7.7). However, modeling in Aydin (2010) also suggests that competition with pollock has a stronger effect on Atka mackerel than predation by Pacific cod (also in Section 7.7).

CH7-2 Comment: The EIS needs to incorporate the multi-species food web model as it is the model that incorporates predator/prey relationships. The EIS should use analytical methods that include predator/prey relationships. The EIS should incorporate the conclusions of Aydin (2010) on the multi-species modeling that indicated little to no benefit to Steller sea lions from closure and restriction of the Aleutian Islands Pacific cod fisheries.

Response: Section 7.7 discusses Aydin (2010) concerning the multi-species modeling of Atka mackerel/Pacific cod interactions in the Aleutian Islands. The analysis of the effects of the alternatives included predator/prey relationships. Section 7.5.1 describes modeling of predator and prey relationships. Section 7.8.2.3 discusses the potential impacts of the alternatives on predator/prey interactions. Section 5.2.2.2 uses more recent information described in Section 3.2.4 regarding prey interaction between Atka mackerel and Pacific cod to conclude that there are no beneficial effects from prey removal, including Pacific cod, on Steller sea lion prey availability.

CH7-3 Comment: Figure 7-13 for Aleutian Islands Pacific cod also refers to a similar figure for Atka mackerel (biomass distribution by size by Aleutian Islands management areas), however this figure is apparently omitted and is missing in the draft EIS.

Response: The EIS text referring to Figure 7-13 is discussing Pacific cod only, and the issue that Pacific cod biomass by life stage is not uniform across Areas 541–543. The reference in the title to Figure 7-13 regarding Atka mackerel was an error and has been removed.

CH7-4 Comment: NMFS further fails to adequately explain its multispecies model. The agency must explain the conclusions it has drawn from its chosen methodology, and the reasons it considered the underlying evidence to be reliable. For example, NMFS's model includes changes in mortality of 10 percent. However, NMFS does not explain how it arrived at the percentage or why it is appropriate. Furthermore, the data that NMFS includes in the draft EIS models the effects of reducing Pacific cod and Atka mackerel mortality. Each action alternative discussed in the draft EIS would open additional water

to fisheries when compared to the no-action alternative. Opening these waters could seemingly increase cod and mackerel mortality. The EIS must explain how these data are reliable if it is seemingly irrelevant to the question of how opening fisheries would affect groundfish populations.

Response: Figures 7-8 to 7-10 demonstrate simulated changes in food web dynamics and are included to illustrate the interrelationships between Pacific cod, Atka mackerel, Steller sea lions, and other species. This represents the best scientific information available on food web dynamics in the Aleutians. The effects of reducing mortality can provide information that allows one to compare and contrast the effects of the different levels of fishing under the alternatives.

The 10 percent mortality change was conducted as part of an overall sensitivity analysis and results should be seen as the relative effect of a small change around the baseline; e.g., the appropriate measure is how, with a 10 percent change in input mortality, the biomass of affected species changes as a fraction of that 10 percent. For example, if a 10 percent change in one location leads to a 20 percent change elsewhere, the ratio of response to change is 2/1, and is expected to be linear as long as the perturbations remain small, so any perturbation between approximately 1 and 20 percent should give the same ratio and same interpretation of results. Outside of a small perturbation, the responses would be increasingly nonlinear and less reliable (i.e., not sufficiently reliable to use) given the difficulty in fitting nonlinear functional responses (see response to Comment CH2-17). This additional explanation has been added to Section 7.7 to provide the reader will more background information on considerations in modeling interactions.

CH7-5 Comment: NMFS explicitly states that it cannot compare the impact that any of the alternatives will have on the ecosystem (draft EIS at page ES-45). The EIS must explain why this information is unavailable and how it is relevant to NMFS's analysis. NMFS cannot take a hard look at the environmental effect of its proposed action without this information. It conducted its analysis on the assumption that prey removal caused by the fisheries adversely affect Steller sea lions by competing for prey. However, NMFS does not adequately explain this assumption, which does not agree with NMFS's statement that it cannot compare the impacts of any of the alternatives on the ecosystem. This shows that the agency cannot assess the impact that fishery closures will have on the Steller sea lion prey or its ecosystem. There is therefore no rational basis for the conclusion that the proposed action will benefit the WDPS by continuing the fishery restrictions.

Response: Chapter 7 used the best scientific information available on the Aleutian Islands and compared the impact of the alternatives in Section 7.8.2. As explained in the Executive Summary, the complications of the Aleutian Islands ecosystem in combination with the lack of data do not allow conclusions on the effects of the alternatives on the entire ecosystem. Chapter 7 evaluates impacts to the ecosystem indicators in the Aleutian Islands by alternative to provide an understanding of the potential impacts on these indicators by alternative. NMFS determined that it had sufficient information to discern the potential impacts on the environmental components addressed in Chapters 3 through 7, even though it lacked sufficient data to make accurate determinations for the entire ecosystem. The proposed action is not intended to benefit the WDPS of Steller sea lions, rather it is to insure the groundfish fisheries are not likely to jeopardize the continued existence of the WDPS of Steller sea lions or adversely modify or destroy their designated critical habitat. However, NMFS has sufficient information to ensure that it can choose an alternative that best meets the purpose and need for this action (see Section 1.3).

13.7 Chapter 8 Comments

Chapter 8 provides an economic analysis of the impacts of the alternatives on fleets, communities, and other affected groups. Comments received on Chapter 8 covered a wide range of issues related to the analysis, including the analysis of changes in fleet behavior in response to the regulatory measures, the "revenues-at-risk" methodology, and a variety of other topics, including the analysis of employment impacts, safety, the interaction of the Steller sea lion measures and freezer longline buyback, coverage of trawl vessels delivering to motherships, mitigation measures, suggestions for improving the organization of the analysis, and the value of Steller sea lions.

13.7.1 Redeployment

CH8-1 Comment: The EIS should analyze the redistribution of the fishing fleets, and the flexibility of the fleets to harvest other species or change gear types from previous regulation such as Amendment 80, and various catch share programs.

Response: The EIS reviews, sector by sector, the potential for redeployment by the vessels regulated by the alternatives. Fleet sectors examined include trawl catcher/processors (Section 8.3.3), non-trawl catcher/processors (Section 8.4.3), trawl catcher vessels (Section 8.5.3), and non-trawl catcher vessels (text within Section 8.6.1). Available models do not permit quantitative estimates of redeployment. The analysis is primarily qualitative, discussing the potential opportunities open to the fleets.

CH8-2 Comment: On page 8-85 of the draft EIS the analysis states that the development and increase in harvest of arrowtooth flounder, Kamchatka flounder, and Greenland turbot coincided with the implementation of Amendment 80, and was therefore caused by Amendment 80. If Amendment 80, in fact, caused this change, the causality should be explained. Much of this shift resulted simply from opportunistic fishing choices.

Response: Before Amendment 80, halibut prohibited species catch (PSC) allowances were provided separately for individual species or groups of species. The PSC allowance for turbot, Kamchatka flounder, and arrowtooth flounder was set equal to zero. This precluded directed fishing for these species by trawl vessels. Amendment 80 converted the individual species PSC limits to global cooperative limits that can be allocated by the cooperative among different target species as it chooses. This made it possible to target turbot, Kamchatka flounder, and arrowtooth flounder, and trawl harvests of these species began in 2008. NMFS edited the text to explain this.

CH8-3 Comment: On page 5-119 of the draft EIS, the text said that "the Aleut Corporation … have reallocated their Aleutian Islands pollock total allowable catch (TAC) to the Bering Sea." The text should clarify that this reallocation to the Bering Sea is away from the Aleut Corporation to other entities and that the Aleut Corporation does not benefit from the TAC in the Bering Sea. Thus the Aleut Corporation loses the potential benefit associated with the harvest of that quota.

Response: NMFS agrees that, when the Aleut Corporation is unable to harvest its pollock allocation in the Aleutian Islands, and this allocation is reallocated to the Bering Sea, the benefits from the harvest in the Bering Sea do not accrue to the Corporation, but rather to American Fisheries Act (AFA) firms, and to communities benefitting from Western Alaska Community Development Quota (CDQ) allocations. The text in EIS Section 8.7.5 has been changed to reflect this comment.

CH8-4 Comment: On page 8-84 of the draft EIS, the analysis incorrectly suggested that the Amendment 80 vessels and motherships fish in the limited access yellowfin sole fishery.

Response: The analysis did not mean to suggest that these vessels fished for limited access yellowfin sole, but that motherships, including some Amendment 80 vessels, receive fish from trawl vessels participating in the limited access yellowfin sole fishery. This text was confusing and NMFS has revised and clarified it.

CH8-5 Comment: The analysis on pages 8-85 and 8-86 of the draft EIS suggested that the Amendment 80 fleet expanded catches of Gulf flatfish to "offset costs," which resulted in excessive use of halibut PSC. The relevance of this is unclear, given that the analysis does not seem to have verified that the vessels with increased activity are, in fact, vessels that have historically participated in the Aleutian Islands Atka mackerel and Pacific cod fisheries affected by the Steller sea lion measures. In fact, many Amendment 80 vessels that were impacted by the mackerel and cod closures do not even qualify to fish flatfish in the Gulf of Alaska. In addition, the movement would seem to have been in response to lost revenues, rather than costs.

Response: The text is relevant because it points to a potential opportunity for redeployment of some Amendment 80 vessels and the potential implications for indirect impacts on fleets not directly regulated by this action. Regulations at Table 39 to 50 CFR part 679 allow some Amendment 80 vessels to move into the Gulf of Alaska to directed fish for flatfish, although internal cooperative management measures may impose limits on this. NMFS agrees that the sentence "This happened in 2012, with arrowtooth flounder and deep-water flatfish" on page 8-86 of the draft EIS drew a stronger conclusion than the evidence presented supports, and NMFS has deleted this sentence. NMFS also rewrote the final sentence in the paragraph to take out the unnecessary language about why the cited redeployment might occur. The language "offset costs" has thus been removed from the final EIS. NMFS added text to refer explicitly to Table 39 to 50 CFR part 679 and its limits on vessel movements in the final EIS.

CH8-6 Comment: Throughout, the analysis fails to even consider the number of vessels that have License Limitation Program (LLP) endorsements that would allow for participation in fisheries outside of those regulated by the Steller sea lion measures. Some vessels may have no opportunity to fish in Gulf of Alaska fisheries because of a lack of endorsements for participation in those areas or eligibility to fish for flatfish. These numbers are easily accessible and should be included in the analysis.

Response: LLP endorsement holdings by freezer-longline vessels and pot catcher/processors are discussed in Section 8.2.2, holdings by hook-and-line, pot, and jig catcher vessels are discussed in Section 8.2.4, and holdings by trawl catcher vessels in Section 8.2.3. However, a review of the LLP text in the draft EIS in response to the comment revealed that the analysis did not include evaluations of LLP holdings for trawl catcher/processors, and that the trawl catcher vessel discussion was not as detailed as those for non-trawl gear sectors. NMFS added LLP discussions for trawl catcher/processors (in Section 8.2.1) and trawl catcher vessels (in Section 8.2.3) equivalent in detail to those for non-trawl gear.

CH8-7 Comment: The analysis may understate the longer term effects of influxes of effort on markets and future opportunities. For example, the 2013 increase in yellowfin sole harvests have decreased the market for catches. Although these catches may appear to buoy revenues of vessels displaced by Steller sea lion measures, they can have a negative, more lasting effect on future harvest and market opportunities that can be easily overlooked, as it is unlikely to be revealed in annual harvest and production data. While the analysis acknowledges that these effects may exist, its presentation places little emphasis on these effects that can be substantial and have great consequences, particularly for a fleet that is already distressed by TAC reductions and area displacement.

Response: The data and model limitations make it impossible to make quantitative estimates of the impacts of the action on fleets that are not directly regulated by the action. Where potential impacts on fleets that were not directly regulated could be identified, these were discussed in the redeployment

sections. NMFS agrees that shifts by vessels into new species may have adverse price impacts that may affect fleets that are not directly regulated by the alternatives. The possibility of adverse yellowfin sole and rock sole price impacts that might affect Amendment 80 vessels already active in these fisheries was mentioned in Section 8.3.3.

CH8-8 Comment: The suggestion that catcher/processor vessels that lose revenues from Steller sea lion measures may have opportunities to make up for lost revenues outside of fishing and processing is speculative and unfounded.

Response: In Section 8.2.1 of the draft EIS, in a discussion of the interpretation of baseline fishing revenues, not of redeployment, the analysis indicated that catcher/processor vessels may earn revenues from non-fishing activity, mentioning, as an example, the possibility of using the vessel to process salmon. The 2010 EA for the interim final rule had mentioned that the F/V *Katie Ann*, an AFA catcher/processor active in the Aleutian Islands Pacific cod fishery, had been used to tender pink salmon in Prince William Sound in past years (NMFS 2010b, page 10-16). NMFS has revised the text to refer to this activity and to change the example from processing to tendering in the final EIS.

CH8-9 Comment: The analysis largely overlooks the costs of repositioning a vessel for participation in other fisheries. These costs include both out-of-pocket expenses and lost opportunities in Aleutian Island fisheries. Particularly with respect to Atka mackerel, the analysis suggests that some losses could be offset by topping-off on Atka mackerel incidental catches in Gulf fisheries. While the analysis downplays this potential somewhat, repositioning a vessel for an opportunity to take incidental catches to offset losses from closure of a directed fishery is very unlikely and requires first that the vessel have access to and markets for the basis species needed for these top-off harvests. The analysis fails to consider management measures likely to be imposed if a substantial top-off fishery were to develop in the Gulf of Alaska.

Response: The analysis discusses the potential costs to directly regulated fishing operations of shifting to other fishing areas and fisheries. For example, the summary of the discussion of the impact of Alternative 1 on trawl catcher/processors mentions (a) normal variable costs associated with fishing in new areas, (b) costs associated with learning to operate in new areas, (c) costs associated with fishing in new fisheries with vessels adapted to fishing in old fisheries, (d) potentially lower prices for Pacific cod in the Bering Sea than in the Aleutian Islands, and (e) costs associated with learning to operate in new markets (Section 8.3.4). Discussions of this topic are presented for non-trawl catcher/processors (Section 8.4.4), trawl catcher vessels (Section 8.5.4), and non-trawl catcher vessels (Section 8.6.1). However, these costs were not fully summarized in the summary, Section 8-20 of the draft EIS, and therefore NMFS has added text to the summary discussion. The EIS also discusses lost opportunities for fishing in the Aleutian Islands, particularly through the discussions of "revenues-at-risk" which are included in Sections 8.3 through 8.6, and Sections 8.8 through 8.12, and which are summarized in Section 8.19.

The reference in the comment to topping off in the Gulf of Alaska (GOA) appears to address text in Section 8.3.3 of the EIS. The text mentions the possibility of a shift by vessels to the GOA, but the paragraph is primarily devoted to explaining why this opportunity is limited. The paragraph follows up the preceding paragraph, which explains that "Opportunities to increase Atka mackerel harvests outside of the Aleutian Islands are very limited." The preceding paragraph discusses the Bering Sea and the cited paragraph discusses the GOA. NMFS has revised revise the cited paragraph to relate it more closely to the preceding, by adding the opening sentence, "Opportunities are also limited in the GOA."

Should a top-off fishery for Atka mackerel exceed the Atka mackerel TAC in the GOA, the Regional Administrator would prohibit retention of Atka mackerel in the GOA per regulations in 50 CFR 679.20. This action would eliminate any financial incentive to harvest Atka mackerel in the GOA and would

effectively close any "top-off" fishing that may occur for Atka mackerel. This action would only limit retention of Atka mackerel and is unlikely to impact directed fisheries in the GOA. NMFS added text about this to Chapter 8.

CH8-10 Comment: The draft Regulatory Impact Review understates the losses by overstating opportunities for vessels constrained by Steller sea lion measures to redeploy into other fisheries or other areas.

A. Much of what the analysis suggests can be done to overcome losses by redeployment is simply vessels responding to variability in fishery stocks and TACs. These tend to be short-lived fluctuations that would be more correctly characterized as supplemental income for participants able to opportunistically respond to variability. For example, the analysis overestimates future opportunities in the Bering Sea/Area 541 Atka mackerel fishery. The TAC in the Bering Sea/Area 541 attracted substantial effort from vessels displaced by the most recent Steller sea lion measures, as well as from other vessels. The analysis largely overlooks the recent decline of the TAC that reduces the opportunity in that area in the future. The analysis thereby overstates the future opportunity to make up for lost revenues from Steller sea lion measures by increased harvests of Atka mackerel in the Bering Sea/Area 541.

B. The analysis also ignores the fact that these opportunities would be pursued in the absence of the Steller sea lion measures allowing the analyst to dismiss losses to the fleet from the Steller sea lion measures by citing added catches as offsetting those losses. This characterization is incorrect and leaves readers with a false sense that losses are inconsequential or may be easily overcome by deploying vessels elsewhere.

C. Competition for the lease or purchase of quota in rationalized fisheries is already very strong and limited access fisheries have overcapacity. The analysis does acknowledge this to some extent; however, it ignores that these opportunities are less accessible because of the added pressure arising from the Steller sea lion measures, as vessels displaced by Steller sea lion measures will increase fishing pressure where these opportunities arise.

D. The analysis incorrectly assumes that the added harvests from the Bering Sea/Area 541 fishery would not have been pursued but for the Steller sea lion measures. The ability to take any advantage of the measures that facilitated Bering Sea mackerel fishing is still predicated on having Area 541 quota under Amendment 80 allocations so the Bering Sea mackerel regulations should not be viewed as a new fishing opportunity by any means.

Response: As explained at the start of Section 8.3.3, given the limited models of vessel behavior available, the EIS does not make predictions or forecasts about how vessels might redeploy into other fisheries. The analysis approached this issue qualitatively, by reviewing and explaining the options open to the fishing fleets. Where possible, the likelihood of redeployment is evaluated, given the qualitative nature of the discussion. Thus, the analysis does not overstate opportunities to offset revenue losses by redeploying. With respect to the specific points raised:

A. In Section 8.3.3, the EIS acknowledges the potentially transient nature of recent increases in the Bering Sea/Area 541 TACs, stating, "As noted in Section 8.2, the distribution of TACs among the three areas did change in 2011, in such a way that the proportion of the TAC for Area 541/BS did increase. This new distribution, which reflected changes in the distribution of the biomass observed in biennial trawl surveys, may or may not continue into the future. If future surveys show the biomass shifting west, towards Areas 542 and 543, the distribution of TACs may change so as to reduce fishing opportunities in Area 541/BS." The revenue-at-risk estimates were

based on the baseline years 2004 through 2010 and did not reflect events during the years 2011 through 2013.

B. NMFS lists potential opportunities for redeployment, and does not use these to dismiss losses to the fleet from the Steller sea lion action. NMFS agrees that as fishing conditions fluctuate through time, the relative attractiveness of different fishing opportunities will vary and fleet participation in different fisheries will vary. NMFS does not have a spatial/temporal fishing model that would make it possible to project how fleets might have deployed in the absence of the interim final rule, so it is not possible to project how fleets might have fished in 2011 to 2013 if the final rule had not been in place.

C. The EIS does acknowledge the potential constraints in fisheries where operations must purchase or lease quota to enter, or where existing fleets will face increased competition. NMFS interprets the remainder of the comment as saying that, given redeployment by the fleet into an alternative fishery, there are fewer opportunities for redeployment left in the fishery. NMFS does not disagree with this, but it does not suggest NMFS overstated redeployment opportunities.

D. NMFS believes that this comment is prompted by a paragraph in Section 8.3.3 which reads, "Opportunities to increase Atka mackerel harvests outside of the Aleutian Islands are very limited. Incidental catches of Atka mackerel taken in the Bering Sea may be retained up to the MRA, but this amount is counted against the Area 541\BS TAC. This fleet has not harvested much Atka mackerel from the Bering Sea in the past. It is possible that increased Atka mackerel prices will increase incentives for topping-off behavior." NMFS has revised this paragraph to explain that the Bering Sea harvest is counted against the Area 541/Bering Sea TAC for Amendment 80 vessels, and that it is non-Amendment 80 vessels that may have an incentive for a top-off fishery counted against the Bering Sea incidental catch allowance.

CH8-11 Comment: The analysis downplays the effects of displaced vessels on those vessels that do not participate in fisheries subject to Steller sea lion measures. These vessels are indirectly affected by greater intrusion by vessels that are displaced by the Steller sea lion measures. Productive Bering Sea flatfish and cod fishing grounds were mostly fully subscribed already and shifting a sizable fleet from the Aleutian Islands reduced everyone's efficiency and profitability.

Response: The EIS discusses the concerns created by redeployment, including those of congestion on the grounds and adverse price impacts. Section 8.3.3, on trawl catcher/processor redeployment, mentions congestion and potential adverse price impacts on yellowfin sole and rock sole. Section 8.4.3, on non-trawl catcher/processor redeployment includes a discussion of potential congestion in the Bering Sea, potential impacts on costs such as the price of bait, and the impacts of potential incidental catches of sharks and skates. Section 8.4.4 notes that "This action appears to have limited potential to adversely affect other fishing sectors through redeployment of non-trawl vessels. These vessels focus on, and are likely to continue to focus on, Pacific cod. Adverse impacts of redeployment into the Aleutian Islands, or Bering Sea, are likely to be mitigated by the large fishing areas available in the Bering Sea, and the existence of a fisheries cooperative allocating BSAI catches among freezer-longliners." The trawl catcher vessel redeployment section (Section 8.5.3) includes a paragraph on potential impacts on fleets that are not directly regulated. Section 8.6.1 indicates that the small size of the non-trawl catcher vessel fleet, and its existing involvement in fisheries outside of the Aleutian Islands, suggests that redeployment would have negligible impacts.

While issues affecting indirectly impacted fleets are dealt with in the analysis, the section on trawl catcher/processors does not include a summary paragraph on the topic similar to those in the sections on non-trawl catcher/processors and trawl catcher vessels. In the final EIS, NMFS added a comparable

paragraph to the trawl catcher/processor redeployment section (Section 8.3.3) so that this topic is less likely to be overlooked.

CH8-12 Comment: The analysis did not fully portray the difficulties of redeployment for the Pacific cod longline fleet. Because longlining requires proper depth strata, bottom contour and bathometric configuration, vessels whose fishing has been restricted in Areas 543 or 542 will not be able to be "absorbed" in Area 541 or the Bering Sea. Grounds are very limited. The Bering Sea's limited grounds are currently occupied by longliners that have historically fished those grounds. The Bering Sea vessels will be greatly disadvantaged in increased competition for finite grounds. More recognition also needs to be given to the large cost to re-deploy to the Bering Sea, the loss of the Aleutian Islands large cod market, and the potential for stranded quota, particularly in light of the upcoming Bering Sea and Aleutian Islands Pacific cod split.

Response: The EIS discusses the difficulties associated with longline catcher/processor redeployment within the Aleutian Islands and within the Bering Sea in Section 8.4.3. The issues discussed included the bathymetry of the Aleutian Islands and its interaction with the relatively large footprint of the hook-and-line gear operated by these catcher/processors, the potential Bering Sea and Aleutian Islands Pacific cod split, the increased costs of operating in the Bering Sea, the lower value of smaller Bering Sea Pacific cod, and the potential for increased incidental catches of skates and sharks. NMFS revised the text to provide a more detailed discussion of the implications of the potential Bering Sea and Aleutian Islands Pacific cod split for the fleet sectors.

13.7.2 Revenue and revenue-at-risk estimates

CH8-13 Comment: The approach to revenues-at-risk ignores distinctions between closed areas, prohibitions on retention, and TAC limits. The analysis states that a prohibition of retention of Atka mackerel in Area 543 puts the revenues from those harvests "at risk." Had the 2010 regulations not been in place, in 2013, the Area 543 mackerel TAC could have been set at up to 17,100 metric tons (mt). But due to the interim final rule there was no point in doing that, so TAC was set at 1,500 mt and if any of that is taken incidentally it cannot be retained. These harvests are not at risk, but are simply lost. The fact that the vessels in the fishery may attempt to offset those losses by catches elsewhere cannot overcome the loss from the prohibition.

Response: The term "revenue-at-risk" has been used throughout the EIS to refer to revenues associated with 2004 to 2010 harvests from areas that will be closed to fishing under a given alternative. These revenues are defined as "at-risk" rather than "as lost" because there is a possibility that revenue losses may be offset to some extent as vessels substitute other fishing activities for those foregone in the closed areas. The "at-risk" concept refers to an operation's ability, or inability, to redeploy to fish other species within a given management area. The revenues-at-risk estimates for Area 543 take full account of the prohibition on retention in that area.

CH8-14 Comment: Limiting the TAC in an area to a specific percentage of the acceptable biological catch (ABC) such as is currently required for mackerel in Area 542, where the Atka mackerel TAC cannot be set at more than 47 percent of ABC, results in a loss because TAC is lower than it would have been in the absence of that limit. For example, in 2013 the mackerel ABC for the Central Aleutian Islands sub-area is 16,000 mt and absent the Steller sea lions regulations in place could have been set at that amount but instead was set at 7,520 mt. The analysis should be revised to differentiate circumstances in which revenues are lost through prohibitions on retention and TAC limitations, from those circumstances that put revenues at risk of loss from area closures.

Response: Alternatives include both (a) TAC restrictions, and/or critical habitat area harvest restrictions expressed in terms of TAC; and (b) measures closing areas to directed fishing (effectively, an entire management area in the case of Area 543). The comment is correct that estimates of harvests from areas that remain open in a management area may overstate the actual harvests that would come from the management area if the TAC-based limits in (a) are not accounted for.

The EIS analyzes the impacts of TAC-based limits and critical habitat area closures separately, and then examines how they may interact. The Atka mackerel limits associated with Alternatives 2 and 3 are examined in Section 8.8.

In a review of the draft EIS, made in light of this comment, NMFS found that, while the draft EIS did take account of the cited Alternative 1 Atka mackerel TAC-based limit in the summary gross revenue comparisons, the topic was not discussed in Section 8.3.2, which provided the description of the impacts of the critical habitat closures. NMFS added text to that section to address this topic in the final EIS. NMFS also found an overstatement of the impact of this constraint for Alternative 1 in the tables in summary Section 8.20 reporting trawl catcher/processor revenues from Atka mackerel. Residual Atka mackerel revenues, after considering both critical habitat closures and areas limits should be $27.4 rather than $26.9 million. This has been corrected.

CH8-15 Comment: The analysis should, to the extent feasible, distinguish area closures by their potential to result in either stranded TAC or lower value harvests. These distinctions are made at times, but should be expanded to the extent possible.

Response: NMFS interprets the term "stranded" in this context as referring to a situation where it would be economic to harvest fish in ways that are ostensibly within TAC limits, and in which there is no environmental reason to limit harvest, but the harvest is prevented by regulatory restrictions. Although the term "stranded" is not used, the possibility that available Pacific cod trawl catcher vessel TAC could go unharvested in Area 543 was discussed in Section 8.11.2

Several alternatives include measures that would set ABC-based area harvest limits that exceed, in some years, harvests that came from areas remaining open after critical habitat closures have been accounted for. Situations where this occurs have been identified. The introduction of the Bering Sea and Aleutian Islands Pacific cod split in 2014 in combination with possible State of Alaska decisions with respect to the management of its Aleutian Islands Pacific cod guideline harvest level (GHL) fishery, may not leave enough Pacific cod after deductions of the GHL, incidental catch, and CDQ fish from the ABC to permit directed fishing. Steller sea lion measures that create area or sector allocations may complicate this and increase the possibility that too few fish will remain after deductions to permit directed fisheries.

The analysis discusses the harvest values associated with different alternatives and options. Sections 8.3 through 8.6, and 8.8 through 8.12, each include revenue-at-risk analyses providing estimates of the volumes and value of Atka mackerel and Pacific cod that came from areas that would have been closed, and that would have remained open, if the interim final rule had been in effect during the baseline years of 2004 to 2010. This provides an index of the relative value of harvests under the different alternatives. In Section 8.2.1, the analysis also includes a qualitative discussion of the impacts on average price that might be associated with shifts from harvesting relatively larger and more valuable Pacific cod in the Aleutian Islands to harvesting relatively smaller, less valuable, Pacific cod in the Bering Sea.

CH8-16 Comment: The 2010 EA estimated annual revenue losses between $44 and $61 million. This estimate is a more accurate depiction of the effects of the measures in place than those currently in the EIS. Losses may have been lower in the years immediately after the interim final rule became effective because of an eastward shift in Atka mackerel TAC to areas less restricted by the Steller sea lion

regulations. However, the losses have increased since as the Atka mackerel TAC has shifted back to the west. The affected Aleutian Islands dependent companies have not been able to make up for forfeited revenues in flatfish and other Bering Sea or Gulf of Alaska fisheries beyond what they would normally have done in those fisheries had the Steller sea lion regulations not been in place. The analysis needs to make this clear.

Response: Although the 2010 EA and the EIS differ in the way revenues were estimated and presented, the underlying numbers are of a similar magnitude. High and low estimates of revenues from areas that would have been open under rules approximating those in the baseline years 2004 to 2010 (Alternative 4), but that would have been closed under the status quo (Alternative 1) during the baseline years, may be estimated from data in tables in Section 8.19 (the summary section). Summing the potential upper bound estimates of sector revenues from the areas that would be opened under Alternative 4 but not Alternative 1 generates revenues of about $59 million and similarly summing low bound estimates generates revenues of about $32 million (in 2009 dollars). In light of cautions from the Council's Scientific and Statistical Committee (SSC) about interpretation of the revenue-at-risk results, NMFS has not treated the results as revenue projections, but has used the revenue results as an index of the relative restrictiveness of the different alternatives.

The revenue estimates in the 2010 EA and in the EIS were based on revenue impacts over baseline years (2004 to 2009 for the 2010 EA, and 2004 to 2010 for the 2013 draft EIS), and would not have been influenced by changes in Atka mackerel biomass location and TACs in the years 2011 to 2013. The analysis discusses the opportunities directly regulated fishing firms had to move their vessels into other fisheries in order to offset revenue losses in the regulated Aleutian Island Atka mackerel and Pacific cod fisheries.

The analysis provides some information on actual vessel redeployment in the period after the implementation of the interim final rule (Alternative 1). Trawl catcher/processor redeployment in the Pacific cod fishery is discussed in Section 8.3.3, non-trawl catcher/processor redeployment in Section 8.4.3, and trawl catcher vessel redeployment in Section 8.5.3. However, in the absence of a model that would make it possible to estimate vessel activity in 2011 to 2013 in the absence of the interim final rule, it has not been possible to estimate the extent to which any redeployment in those years was driven by the interim final rule or by other factors.

CH8-17 Comment: NMFS highlights several noteworthy flaws in its analysis, these include (1) the potential that fishing operations would have redirected their efforts had the alternatives been in place during the baseline years; (2) the inconsistency of the baseline years due to regulatory changes enacted during the 7-year period, such as Amendments 80 and 85; and (3) the failure to account for future regulatory changes, like the SSC's proposal for separate Aleutian Islands and Bering Sea ABCs starting in 2014. However, NMFS does not explain why it considers its methodology to be reliable in light of these shortcomings. Rather, the draft EIS (page 8-72) contains language indicating that the data used is actually not a reliable indicator of the proposed action's economic effects ("Given these considerations, it is clear that estimates of residual revenues and at-risk revenues contained in this analysis are not, and cannot be, projections of these values in the future if one or another of the alternatives were adopted" and, in the context of behavioral changes by vessel operators, "the at-risk and residual harvest and gross revenue will be poor guides to the actual impacts in the Aleutians themselves"). NMFS must explain why it considers the evidence underlying its selected methodology is reliable if that methodology cannot project the future economic effects of the alternatives.

Response: The issues described as "flaws" are limitations in the available data that will affect any approach to evaluating the benefits and costs of this action. NMFS has carefully documented these issues in the EIS to help the reader evaluate the analysis.

NMFS and the Council have used "revenue-at-risk" analysis to evaluate proposals for spatial closures. This approach, or very similar approaches, have been used in the Alaska Region, including in the Supplemental Steller Sea Lion EIS in 2001 (Appendix C) (NMFS 2001b), the Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska of 2005 (Appendix C) (NMFS 2005), and the 2010 Steller sea lion protection measures EA (Chapter 10) (NMFS 2010b). The Council's SSC endorsed the proposed methodological approach to Chapter 8, including the use of revenue-at-risk analysis in October 2012 (EIS, Section 8.21).

The revenues-at-risk approach provides estimates of the catch and gross revenues during a baseline period that came from areas that would have been closed if a regulatory measure had been in place. These are used as a first approximation of the change in harvest associated with closing those areas. This calculation of volumes of fish that came from within the closed areas is based on estimates made using the Alaska Region's Catch in Area (CIA) Database. This, in turn is based on the Alaska Region's Catch Accounting System data, modified by algorithms developed to allocate catch to areas with a fine spatial scale. The Council's SSC has reviewed the methods underlying the CIA. Catches from closed areas were monetized using annual species price information derived from the Alaska Fisheries Information Network and converted into real, inflation-adjusted dollars. NMFS describes the revenue-at-risk methodology in detail in Section 8.2.14, and has been careful throughout to draw attention to limitations of this methodology. Where possible, NMFS has supplemented the revenue-at-risk analysis with additional information and analysis, particularly with respect to the potential redeployment of fishing fleets as they seek to offset adverse impacts of the proposed alternatives by becoming more active in other fisheries. NMFS explains in Section 8.2.14 that it chose the revenue-at-risk methodology in the absence of good alternative approaches to the analysis. Because of the limitations of the method, several of which are discussed in the comment, NMFS has interpreted the results as an index of the relative restrictiveness of the different alternatives, rather than as a projection of future revenue impacts. This is consistent with recommendations made by the Council's SSC in April 2013 (Section 8.21). NMFS elaborated the discussion to add the points brought up in this comment response, and created a new section (Section 8.2.14) to make it easier to refer to it.

CH8-18 Comment: The draft EIS would be improved if it were to use area specific prices to account for the fish size differences. Otherwise, the revenue-at-risk methodology will understate the true revenue-at-risk if fishing operations are forced to shift from areas where fish bring higher prices to areas where prices are lower. However, NMFS indicates that it does not keep price data at the area level. Thus, there may be no reliable way to fix the problem.

Response: The comment is correct. At the wholesale level (the level at which comparisons were chiefly made), State of Alaska Commercial Operator Reports (COAR) are the only source of first wholesale revenues, and while they are widely used within the NMFS Alaska Region for this purpose, they do not have fine spatial or temporal detail. Prices are annual, BSAI-wide prices. The analysis mentions this limitation of this data source and describes an unsuccessful effort made by an Alaska Fisheries Science Center economist to identify spatial price structure using econometric techniques (Section 8.2.15). The analysis does include ex-vessel revenue estimates for catcher vessel fleets. These are based on fish ticket and COAR data. These prices are broken out separately for the Aleutian Islands and the Bering Sea, and should pick up any differences in Pacific cod prices for this fleet. However, wholesale prices were used to compare this fleet to the other sectors, in order to conduct the comparisons at the same market level. As the comment states, there is no reliable way to fix this problem. The implications for Pacific cod revenue impacts are discussed in the appropriate sector-specific sections.

CH8-19 Comment: If the directly affected fishing operations redeploy their efforts to other areas and species, this action may offset some of the adverse impact on their revenues, but it would also cause an adverse impact on other fishing operations through, for example, congestion effects or price effects. For

example, vessels that formerly fished for Pacific cod are fishing more for yellowfin sole, which is driving down the price for that species. Thus, the adverse economic impacts of the fishery management restrictions will likely be distributed more widely, both in terms of affected fishing operations and affected geographic areas and communities, than the revenue-at-risk methodology would suggest.

Response: NMFS agrees that the revenue-at-risk analysis is not complete in itself. NMFS supplemented the revenue-at-risk analysis with a discussion of the redeployment of directly regulated fleets, and in the course of this discussion addressed potential impacts on other fleets when these were identified. The specific instance of a potential adverse impact on yellowfin sole prices was mentioned in Section 8.3.3. Communities may also be impacted by this action. Community impacts are addressed in Section 8.16, and in Chapter 10.

CH8-20 Comment: Revenue-at-risk is not the only methodology that could be used to analyze the economic impact of the fishery management restrictions. Another methodology used by economists would take advantage of the "natural experiment" provided by the change in fishery management restrictions between 2010 and 2011. Comparing fish catch, revenue, and prices before and after the fishing restrictions went into place could provide a way to measure the economic impacts of the fishing restrictions. In practice, the viability of this "before-after" methodology might be limited by the relatively short time period with the fishery management restrictions in place (2011 and 2012) along with the fact that there are other factors that affect fish catch, revenue, and prices in any given season (including changes in TAC and other regulations). These data cover only Atka mackerel and Pacific cod and only the areas directly affected by the restrictions put into place in 2010, and thus only allow an analysis of the direct effects of the restrictions on those species and areas. However, the data could be extended to other areas and species in order to capture the indirect effects of the restrictions caused, for example, by directly affected fishing operations switching to other areas and species. It would be important in any such exercise to isolate only the increased fishing in other areas and for other species that would not have been pursued absent the fishery management restrictions.

Response: The proposed "before-after" methodology is a variation of the widely used "difference-in-differences" methodology. The difference-in-differences approach exploits natural experiments with two similarly situated groups, a control and a treatment group, where the treatment group was subjected to some external impact that was not felt by the control group. The treatment and control groups are then compared with respect to how outcomes of interest changed for each. The "differences" are the changes in the outcome of interest for each group, and the "difference" is the difference between these changes. Under the right circumstances both groups are subject to the same set of "background" changes, and the difference in their differences may be interpreted as a result of the impact. In the Aleutian Islands, for example, if half of the hook-and-line catcher/processors had been subjected to the closures and half had not, one might compare average gross revenues for the two groups in the year before and the year after the effective date of the interim final rule to look for the impact of the rule.

However, NMFS determined that this approach did not lend itself to analysis of the interim final rule for several reasons: (a) the analysis addressed five alternatives, not simply the interim final rule and a return to 2010 (essentially Alternative 4); (b) control groups were not available: all Aleutian Island vessels of a certain class were subject to the same impact and vessels fishing outside of the Aleutians were not considered a suitable control group due to the possibility of selection bias (that is, there were reasons some vessels were active in the Aleutian Islands and some were not); and (c) a comparison of events in two years would focus on too few years of experience. The proposed "before-after" methodology lacks the control group element in the difference-in-differences approach. However, although the analysis was primarily based on the revenues-at-risk approach, supplemented with a qualitative analysis of redeployment, before and after analyses were occasionally used to supplement the analysis. This was done in the discussion of changes in employment in Section 8.2.12, and in discussions of trawl

catcher/processor, non-trawl catcher/processor, and trawl catcher vessel redeployment in Sections 8.3.3, 8.4.3, and 8.5.3. NMFS added a paragraph based on the preceding discussion to the discussion of revenue-at-risk.

13.7.3 Remaining issues

CH8-21 Comment: NMFS uses two methods to estimate impacts on direct employment in directly regulated fisheries. Both are subject to problems that should be addressed. One method is based on weeks fishing before and after the regulation became effective. This may understate employment impacts because it would not capture reduced fishing if a vessel continued to fish during a week, but fished for fewer days that week. A second approach does not appear to suffer from this flaw, but may be subject to other biases, if Amendment 80 vessels are not representative of other vessels fishing the affected areas. Further, NMFS focuses on time employed, but does not make estimates of compensation. It is possible that time employed may be unchanged, while compensation is reduced. A better approach to crew impacts is to perform a survey or obtain other data that would directly measure the time worked and compensation received by crew members and support personnel and allow a comparison of before and after the fishing restrictions went into place. Such data could be obtained from the financial records of fishing operations.

Response: In the 2010 EA NMFS used a new impact model recently developed at the Alaska Fisheries Science Center to provide estimates of potential direct and indirect employment impacts. These estimates depended on assumptions about potential changes in vessel activity and production and only related, ultimately, to number of jobs, without regard to whether the jobs were annual or seasonal, and whether they were part-time or full time. Before deciding whether to use this model in the EIS, NMFS examined changes in vessel activity, and estimates of annual-equivalent employment, before and after the effective date of the interim final rule. The limitations of this are carefully described in Section 8.2.12. NMFS's only conclusion from the analysis was the limited one that it did not provide support for the hypothesis that the interim final rule created large reductions in direct employment in the sectors directly regulated by the 2010 interim final rule. Because of this conclusion, NMFS did not use the employment impact model it had used in 2010. Discussions of employment impacts in the analysis are thus qualitative. The commenter is correct that NMFS has not made quantitative estimates of changes in employee compensation. The information necessary to produce quantitative estimates is not publically available in sufficient detail.

CH8-22 Comment: NMFS did not attempt to measure indirect employment effects. Although NMFS argues that the "multiplier" effects that generate indirect effects from direct effects are generally smaller in Alaska than elsewhere, they are not zero; therefore, some indirect effects should be expected to follow from the direct effects.

Response: As discussed in the response to Comment CH8-21, in 2010 NMFS made estimates of indirect employment impacts associated with the interim final rule. For reasons discussed in response to Comment CH8-21, NMFS did not use the employment impact model it had used in 2010 in the draft EIS, and thus has not made quantitative estimates of indirect employment impacts. NMFS provides a qualitative discussion of indirect impacts in Section 8.16, and in Chapter 10 (on community impacts). The language in Section 8.16 refers to community impacts without explicitly specifying that these are employment and income impacts, and the language will be clarified to make this explicit. Section 10.4.3 on the fishery dependency and vulnerability to adverse community-level impacts of the proposed alternatives especially goes into detail about the interconnections between the fisheries and indirectly impacted economic sectors.

CH8-23 Comment: On pages 8-66 and 8-67 of the draft EIS, NMFS attempts to show that the interim final rule does not have large employment impacts in the fishing sectors it directly regulates based on the number of weeks per year that groundfish fishing vessels are active. However its calculation is inadequate to show actual employment impacts because it (1) accounts for a week of fishing even if a vessel was only fishing for a single day; (2) does not account for the income of the persons employed on these vessels, (3) only looks at one component of firm employment, (4) does not account for indirect or induced employment, and (5) does not compare employment to an explicit counter-factual in which the interim final rule had not become effective. Although NMFS acknowledges the limited application of its calculations, it still relies on those calculations to attempt to show that the interim final rule has no negative impacts on employment. NMFS must explain why it believes this data to be reliable in light of its shortcomings, and NMFS needs to address alternative approaches for addressing employment impacts, including indirect employment effects.

Response: NMFS does not assert that this data would be reliable for making estimates of employment impacts, and NMFS does not use it for this purpose. Moreover, NMFS did not assert that there would be no negative impacts on employment on the basis of this data. As the EIS states in Section 8.2.12, "These results do not preclude adverse employment impacts from the interim final rule..." In response to this comment NMFS reviewed the Section 8.2.12 discussion and made modifications to the language to clarify the limited nature of the conclusion. NMFS provides a qualitative discussion of possible employment changes.

CH8-24 Comment: Allowing retention in Area 543 and increasing the TAC available in Area 542 may have a positive effect on safety since increased numbers of vessels fishing close to one another in Area 543 may promote safety. Moreover, mothership operations, with their fleet operations, may be safer than isolated catcher/processors.

Response: Safety is discussed in Section 8.18.1. The analysis notes three things applicable to this comment: (1) increasing fishing westward moves fishing operations further from search and rescue resources; (2) decreasing fishing density increases risk (so conversely, increasing the number of vessels nearby should decrease risk); and (3) increasing the number of fishing vessels less than 60 feet long increases risk. NMFS added the following sentences to this discussion: "Should additional fishing pressure take place in Areas 542 and 543, these vessels will be further away from traditional U.S. Coast Guard search and rescue assets. Due to this distance, any prospective search and rescue response from these assets will take longer, potentially putting mariners at additional risk. If as a result of fleet redeployment to these areas vessels are operating in closer proximity to each other, safety could potentially be improved due to good Samaritan assistance, although this could not be guaranteed."

CH8-25 Comment: The action undermines the objectives of the Federal buyback of freezer longliners in the BSAI. In 2007, the freezer longline fleet borrowed $35 million in Federal buyback loans to reduce an overcapacity in the fleet. These funds were used to buy out three vessels with LLP permits and Pacific cod endorsements, and one latent LLP permit. In 2012, the members entered into a second buyback agreement with NMFS to further efforts to reduce over-capacity. Closing areas to the Aleutian Islands longline fleet and forcing all or some of these vessels into the Bering Sea exacerbates a situation that the Federal Government has just recently invested in alleviating.

Response: NMFS does not agree with the view expressed, and sees these two issues as not directly related. Reducing the number of separate licenses available to fish in a fishery is not the same thing as eliminating overcapacity if individual license holders are free to use inputs more intensively. Since the interim final rule became effective in 2011, the fleet has announced the construction of three new freezer longliners to replace existing capacity in the fleet. In October 2012, the Council took action to increase the maximum length overall in the freezer longline sector to 220 feet. Both these measures may increase

input use per license. Moreover, in 2010 the firms in this sector formed a private fisheries cooperative that makes it possible for them to rationalize fishing activity in the BSAI and to change fishing capacity as necessary to respond to changing circumstances. Finally, restriction of the area within which the fleet may operate in order to protect the population of Steller sea lions is not, with respect to the fleet overcapacity, different in principle from other conservation oriented restrictions, such as restricting the volume of Pacific cod the fleet may harvest in order to protect the Pacific cod stock when it is low.

CH8-26 Comment: The analysis of Alternatives 2 and 3 on pages 8-130 to 8-150 of the draft EIS is very confusing. The section begins with a comparison of various provisions that would set (or limit) TACs based on ABCs. These TACs are then compared to "Alternative 2 catches," which seem to be projected catches. The section later goes on to compare these Alternative 2 catches to projections under other alternatives. This ordering creates a few issues for readers. First, the reader must guess the meaning and means of generating "Alternative 2 catches." Second, the reader must revisit the comparison of the TAC option to the "Alternative 2 catches" to understand how those options compare to other alternatives. Switching the ordering of these discussions would provide a more transparent analysis.

Response: NMFS appreciates the feedback and, after reviewing the section, has made the proposed change in the final EIS.

CH8-27 Comment: The statement that "The results are not a forecast, but a thought experiment" on page 8-150 of the draft EIS does not seem appropriate for an analysis.

Response: NMFS agrees and removed the sentence from the text of the final EIS.

CH8-28 Comment: The draft EIS insufficiently evaluates the socio-economic impacts of the proposed action and fails to adequately explain how those impacts may be mitigated.

Response: Section 8.16 and Chapter 10 provide detailed background information and analysis for a range of impacted communities, included those of Adak, Atka, Unalaska, other Alaskan communities, Pacific Northwest communities, CDQ communities, and Aleut Corporation shareholders. These represent communities of interest as well as geographically defined communities. Alternative 1, the status quo, is the interim final rule that became effective in January 2011; Alternatives 2 through 5, were developed based on recommendations from the Council and the Council's Steller Sea Lion Mitigation Committee. The measures in Alternatives 2 through 5 that allow for more fishing than Alternative 1 mitigate the impacts of Alternative 1.

CH8-29 Comment: The analysis lists effects without a coherent synthesis that would allow a reader to understand the overall economic impact of the action on fleets affected by the Steller sea lion measures. For example, even the summary discussion of redeployment of displaced vessels seems to just list other fishing opportunities (with some qualification of the potential of each opportunity) with little discussion of the overall potential of vessels to successfully pursue those opportunities or the impacts on other fleets that would be subject to this influx of effort. This can be juxtaposed against the assertion (on page 8-87 of the draft EIS) that operating costs would be lower if the fleet affected by the Steller sea lion measures chooses not to fish. This statement clearly demonstrates the equivocation of the analysis, which seems to bounce from one extreme (lost revenues being made up through added fishing) to the other (reduced costs from not fishing). These assertions should be balanced against their potential to occur, so that the reader has a better sense of probable (not just possible) effects. In many cases, the losses are impossible to recover because of prohibitions on retention, or reduced TACs, or are unlikely to be recovered because of area closures that prevent or reduce the value of harvests.

Response: The difficulty in understanding the overall economic impacts of each alternative is due in part to the complexity of the alternatives and options that must be analyzed. It is also a result of the information gaps and absence of modeling frameworks that would allow systematic comparisons of impacts using a common metric. Section 8.19 provides a high level summary of the impacts of the different alternatives on fleet sectors and communities, depending in significant part on the relative rankings created by the estimates of residual revenues associated with the different alternatives. This text is repeated in the executive summary.

CH8-30 Comment: The analysis confuses the nature of impacts by periodically, and incorrectly, referring to losses as a cost. For example, the beginning of Section 8.3.3 on page 8-77 of the draft EIS refers to the increase in costs from restricted fishing grounds as the primary effect on the fleet of the Atka mackerel and Pacific cod fishery limitations of the status quo. Losses and costs may occur simultaneously, but are separate items that have a compounding effect that must be considered. A thorough review of the draft EIS needs to be undertaken to correctly distinguish losses from added costs.

Response: NMFS has separately identified potential revenue losses where fishing is restricted by regulation, and the potential for increased costs of fishing in areas to which the fleet may redeploy. The text at the start of Section 8.3.3 sought to introduce a discussion of redeployment, by making the point that as regulations change the relative cost of harvesting fish on different grounds, fishing operations will respond by changing their behavior so as to maximize their profits under the new conditions. NMFS revised the text at this point to clarify its language.

CH8-31 Comment: The analysis integrates trawl catcher vessels that deliver to motherships with trawl catcher/processors to avoid confidentiality issues. As a result, the analysis often fails to distinguish the different opportunities of these two different vessel types and that losses to a catcher vessel differ from those of a catcher/processor operating as a catcher/processor and then again differ from those losses as a catcher/processor acting as a mothership.

Response: NMFS acknowledges that restrictions on the distribution of data, required to protect the confidentiality of individual vessel gross revenue estimates, make it impossible to provide as much detail on trawl catcher vessels delivering to mothership fishing operations as is provided for other sectors. Those delivering Atka mackerel to catcher/processors acting as motherships are grouped in the trawl catcher/processor sector while those delivering Pacific cod to motherships are grouped with those delivering Pacific cod to shoreside processors. The number of operations in each group is small enough that only limited information can be released.

However, NMFS has been able to provide some background and analysis. The numbers of trawl vessels making Atka mackerel deliveries to catcher/processors, and the number of catcher/processors accepting those deliveries are summarized in Table 8-2, while similar counts for vessels delivering and receiving Pacific cod are summarized in Table 8-3. There is a discussion of numbers of vessels, and a limited discussion of revenues involved, in Section 8.2.1. A discussion of mothership operations in Section 8.3.3 includes a discussion of the relationship between Amendment 80 and the evolution of mothership activity, and of trends in numbers of catcher vessels making mothership deliveries. In Section 8.5 the analysis notes that mothership activity is the predominate operational mode for trawl catcher vessels operating in Area 543. Figures 3-11 to 3-14 in Chapter 3 show the locations of Pacific cod trawl catcher vessel harvests for vessels making deliveries to shoreside plants and to motherships; this provides insights into the differences and similarities of the operations of the two classes of vessels. These figures are discussed in Section 8.5.3 of Chapter 8. In Section 8.11.2, there is a discussion of the potential for certain options to Alternative 2 to prevent the full harvest of Pacific cod quota in Area 543 because of the use of motherships by the Pacific cod trawl catcher vessels there.

CH8-32 Comment: Each Steller sea lion is worth $2 million to me and most Americans.

Response: NMFS notes this personal comment. In Section 8.2.10, the EIS summarizes the available scientific information on the value U.S. citizens place on the health of the Steller sea lion population.

13.8 Chapter 10 Comments

Chapter 10 provides a socioeconomic analysis of the alternatives and effects on communities. Comments on Chapter 10 dealt with impacts on affected communities, especially with impacts on Adak, and the coverage of impacts on State of Alaska fish taxes, Western Alaska Community Development Quota (CDQ) royalties, and mitigation measures.

CH10-1 Comment: NMFS does not adequately estimate the economic impacts of the proposed action or any other alternative on the state's tax revenue. NMFS uses aggregate tax data to demonstrate the ratio of fishing industry-related taxes to all other taxes. One problem with the shared state tax data is that they are aggregated across species and do not detail the specific revenues received from Atka mackerel, Pacific cod, and pollock. This makes it difficult to identify effects due to the fishing restrictions, which affect only certain species. The aggregated tax data is inadequate regarding how the proposed action will actually affect tax revenue. The draft EIS acknowledges that this is not an accurate way to represent data and that the information set does not provide insight into the changes in tax revenue that would stem from each alternative (footnote 61 on page 8-61 of the draft EIS). Yet, NMFS relies on the data to attempt to show the impact that the alternatives will have on taxes. The draft EIS should address whether it is possible to use disaggregated tax data for the species at issue, if such data are available.

Response: In response to this comment, NMFS contacted the Alaska Department of Revenue and the Alaska Division of Community and Regional Affairs and obtained information on shared Atka mackerel and Pacific cod fishery revenues. Because of State of Alaska confidentiality concerns these data remain highly aggregated. NMFS investigated the potential for making its own independent estimates of species specific tax revenues, but found it was unable to make estimates with confidence. NMFS revised Section 8.2.11 as necessary to describe the results of this investigation. NMFS added text to the analysis to discuss the impacts on tax revenues retained by the State of Alaska, independently of those shared with communities. The information on fishery taxes in Sections 8.2.11 and 10.3 was provided to show the importance of fisheries related revenues (from their own fisheries taxes and from state shared tax revenues) to the municipalities in the action area in relation to both other sources of revenue and to municipal expenditures. In Chapter 10 this helped illustrate community dependence on fisheries and potential vulnerability to regulations restricting harvests. Chapter 10 has been modified to elaborate on the impacts of fishing restrictions on municipal revenues. The EIS does not say that this is an inaccurate way to represent the data cited data; it does discuss the limitations of the available data and the use to which the data can be put. NMFS edited this footnote to emphasize that the data do not provide "quantitative" insight. Subsequent analysis in Section 8.16 and Chapter 10 provides qualitative discussion of the impact of fisheries restrictions on tax revenues.

CH10-2 Comment: Since the interim final rule was implemented, marine fuel sales in Adak have dropped nearly in half, representing a significant decline in overall volumes sold. This volume loss will result in a net income loss in the absence of substantial price increases. While the Aleut Enterprise LLP had an overall profit in fiscal year 2012, fuel sales operations in Adak were not profitable. Since fishing vessels can go elsewhere to buy fuel, the Aleut Enterprise LLP will have to substantially raise fuel prices to the community to maintain fuel sales profitability. Higher fuel prices would not be sustainable for any length of the time and the community would die.

Response: Impacts of the action on catcher/processor port visits to Adak are an important determinant of the impact on fuel sales, and a new methodology to estimate port visits was developed specifically for the EIS to shed additional light on this issue. Section 8.16 discusses the impact of the alternatives on port visits and associated sales of goods and services in general terms. Section 10.4.3.1.3 discusses the importance of fuel sales to Adak, the change in sales since the interim final rule was implemented in 2011, and the impact of these changes on Adak.

CH10-3 Comment: The nation and state have stakes in the continued existence of Adak because it provides a deep-water port in a busy and remote transportation corridor (it is the western-most publicly accessible deep-water port in the Nation). This affects state and national economic and security interests. These have a value that would be lost if Adak disappears and that needs to be taken into account.

Response: In response to this comment, NMFS modified Section 8.16, which discusses the community impacts, adding a discussion of this issue.

CH10-4 Comment: The draft EIS correctly identifies Adak as the community with the greatest impact potential. The impacts have been real and were a major contributor to the loss of the seafood processor in Adak.

Response: NMFS acknowledges this comment.

CH10-5 Comment: Though I believe the economic analysis is excellent, there is one potentially major flaw. The analysis may not sufficiently take into account Adak's current situation. It must be understood the community is already teetering on the edge of existence. The inability to fish pollock, the loss of the SBX Radar project home ported in Adak, and now the additional regulations have been important setbacks. The community is dying. Any further reduction in economic opportunity would only hasten the decline.

Response: The EIS discusses Adak's fishery dependency and its vulnerability to adverse community-level impacts of restrictions on regional fishery activity (see Section 10.4.3.1 in general; see Section 10.4.3.1.3 for a specific discussion of the key importance of the fisheries to the local economy as result of other potentially locally important sectors seeing little activity or not providing previously anticipated returns, including the SBX radar project). The inability of the Aleut Corporation to realize the potential benefits of its Aleutian Islands pollock allocations is discussed in Section 3.4 (and especially Section 3.4.3), and Section 8.7, while the specific limited engagement of Adak in that fishery is discussed in Section 10.2.7. The EIS acknowledges that the direct and indirect impacts of restrictions on fishing and activity and economic output could reverberate throughout the community and threaten the progress made to date by Adak with regard to building a stable residential population (see Section 10.4.1.3).

CH10-6 Comment: The EIS must also account for the impact of its proposed action on Adak, which has a large minority population. This is an environmental justice issue. As discussed in the draft EIS, Icicle Seafoods closed its operations in Adak, largely as a result of the interim final rule restrictions (draft EIS at page 8-238). The draft EIS acknowledges that this closure "will likely result in a broad and deep economic and social impacts for the community of Adak that are not reflected in the current community impacts analysis" (draft EIS at ES-59). NEPA requires that the EIS must adequately discuss these adverse impacts that its proposed action will have on Adak.

Response: The commentator is correct that the draft EIS refers to wide and deep economic and social impacts for the community of Adak "that are not reflected in the current community impacts analysis in Chapter 10" (footnote 2 on page ES-59 of the draft EIS). This statement in the footnote is incorrect. Sections 8.16 and Chapter 10 document the dependence of Adak on nearby fisheries, its vulnerability to

regulatory restrictions, and rank alternatives with respect to their potential impacts on Adak. NMFS has modified the footnote to remove this statement. This footnote was inserted shortly before the draft EIS was released, to note the recent decision of the local Pacific cod processor to withdraw from Adak. Since that time a new processor has begun operations there. Because the footnote reflects dated information, and was incorrect, the footnote has been removed. The draft EIS does not assert that Icicle Seafoods closed its operations in Adak largely as a result of the interim final rule restrictions. The comment appears to be based on a footnote at the start of draft EIS Section 8.15 which noted that Icicle had announced its intent to withdraw from the plant in April 2013, and that Icicle representatives reportedly cited several reasons for its decision, including (1) regulatory uncertainty, (2) concern over the Pacific cod stock in the region, and (3) high operating costs at Adak. While the restrictions on the Pacific cod fishery undoubtedly played a role in reducing the profitability of the plant at Adak, NMFS notes that the firm operating the processing plant entered bankruptcy in 2009, a year before the interim final rule was published, that Icicle began operating in Adak in 2011, after the interim final rule had become effective, and that it withdrew from the plant at a time when the regulatory proposals pertaining to the interim final rule that were under consideration would have relaxed its provisions, and that in 2013 a new firm took steps to begin processing Pacific cod at Adak. Other factors may have played an important part in Icicle's decision, including the Pacific cod stock and operating cost concerns cited by Icicle representatives, the prospective Aleutian Islands-Bering Sea Pacific cod total allowable catch split in 2014, and plans to expand shorebased Pacific cod buying at nearby Atka.

CH10-7 Comment: NMFS fails to evaluate what the continued loss of royalties stemming from fishery closures will mean for CDQ communities and their Alaska Native populations, as it is unable to differentiate between the impacts that each of the proposed alternatives will have. This is an environmental justice concern. The draft EIS acknowledges that the CDQ communities will likely be adversely affected by the proposed action (draft EIS at pages 10-87 to 10-88). However, NMFS fails to discuss what effect the loss of royalties resulting from the continued restrictions will have on these communities. It states that "it is not possible with existing information to differentiate between the impacts of the different proposed action alternatives on the CDQ groups," and that it is "likely that such impacts would be most directly tied to AI Atka mackerel CDQ holdings specifically and that these impacts would be at least somewhat mitigated by the fact that dependency of any particular CDQ group on AI Atka mackerel CDQ holdings is likely to be relatively low." These general statements about possible effects do not meet NEPA's "hard look" standard. If the agency has incomplete information on which to make this determination, it must also explain the relevance of this missing information, and why it is not included.

Response: The impact of the alternatives on communities, including CDQ communities, is discussed in Section 8.16. The methodology used to rank the alternatives with respect to CDQ impacts is based on estimates of changes in estimated revenues to sectors and species during the baseline years 2004 to 2010. The commenter is correct that the text on page 10-88 of the draft EIS says it is not possible to differentiate between the impacts of the proposed action alternatives on the CDQ groups. NMFS has corrected the text to add the modifying clause, "beyond the qualitative rankings provided in Section 8.16." The text in Chapter 10 has been revised to explain the relevance of missing information, and why it is not included.

CH10-8 Comment: The draft EIS does not adequately address mitigation measures for the socio-economic impacts of the proposed action as required by NEPA. NMFS includes two discussions of mitigation of adverse impacts on low or minority populations but neither of these meets the NEPA standard. First, NMFS concludes that impacts to CDQ communities related to the fluctuations in CDQ royalty income for any given species are potentially mitigated by relative diversity of their portfolio of CDQ holdings (and therefore potential CDQ royalties) across all CDQ species and relative dependence of individual CDQ groups on royalty income as opposed to direct income based on other investments" (draft EIS at page 10-87). NMFS shows that royalties have accounted for a minority of CDQ income, but it does

not evaluate what the loss of this minority of income will mean to the community. Furthermore, stating that a community can rely on less of its income is not a mitigation measure, but merely a statement of fact describing what will necessarily occur if royalties are reduced. Second, NMFS states that "for groups holding Pacific cod CDQ, potential impacts related to the proposed Steller sea lion protection measures are also mitigated to some degree by the fact that CDQ Pacific cod allocations are not specific to the AI subarea and may be harvested elsewhere in the Bering sea" (draft EIS at page 10-88). The agency provides insufficient evidence of the ability to harvest cod elsewhere.

Response: In neither of the two instances cited was "mitigation" used in its legal sense to refer to possible actions incorporated into one or more of the alternatives to reduce the burden of the action on some group. NMFS has revised the text to substitute language less likely to create confusion. In Section 10.4.3.6.1, NMFS will replace references to "mitigation" in reference to CDQ communities with references to "minimization."

The comment is in error in asserting that the draft EIS only looks at two narrowly defined mitigation measures. The EIS is fundamentally concerned with alternatives to mitigate the impacts of the interim final rule. Alternative 1, the status quo, includes all the Steller sea lion protection measures that became effective in the interim final rule in the Aleutian Island Areas 541, 542, and 543 in January 2011. The remaining alternatives, Alternatives 2 through 5, are designed to mitigate adverse impacts of Alternative 1 on fishermen, communities, and fishing businesses. Many elements of these alternatives were developed by the Council's Steller Sea Lion Advisory Committee in several meetings during 2012. Alternative 4 reverts management (with certain exceptions) to the measures in effect in 2010, the year before the interim final rule became effective. Chapters 8, 9, and 10 evaluate the impacts of these four mitigating action alternatives on a wide range of directly and indirectly regulated fleets, and different communities. Other chapters in the EIS evaluate the impacts of the alternatives on the different components of the natural environment.

13.9 Chapter 11 Comments

These comments are on Chapter 11, research needs and prioritization. The comments received on Chapter 11 were primarily on the types of research that need to be conducted to further understand the potential effects of fisheries on Steller sea lions and groundfish surveys.

CH11-1 Comment: The EIS should address the prioritization of resources for fish biomass surveys in the Aleutian Islands to heighten the importance of Atka mackerel and Pacific cod in survey design.

Response: Section 11.1.1 of the EIS discusses groundfish surveys used to inform management of the fisheries and identifies additional surveys that would inform the status of groundfish in the Aleutian Islands in the winter, an energy important time for Steller sea lions. Complementary information about the biomass and distribution of Atka mackerel and Pacific cod is being gathered through tagging studies described in Chapter 11. Atka mackerel poses a particular problem for surveys using trawl gear because of spatially patchy distribution and the unknown distribution of biomass in areas that cannot be sampled with a trawl. The issue of estimating groundfish biomass in untrawlable habitat is one that NMFS is addressing nationwide through a group called the Strategic Initiative on Sampling in Untrawlable Habitat. While the echo-integrated trawl surveys target pollock, the Aleutian Islands biennial bottom trawl survey prioritizes important commercial species like Atka mackerel and Pacific cod in the survey design. Consistent with recent Resource Assessment and Conservation Engineering Division assessment surveys, sampling effort for each stratum was determined using a modified Neyman optimum allocation sampling strategy, which considers relative abundances of commercially important groundfish species from the previous five surveys of the area and the current ex-vessel value of each species. The Aleutian Islands

bottom trawl survey completes approximately 420 stations by the two contracted fishing vessels over a 72-day period. Improving survey estimates for Pacific cod and Atka mackerel would require adding an additional vessel during the limited sampling window to substantially add sampling stations or possibly conducting additional and alternate stations for targeted species in a synthetic sampling design that builds on the long-term bottom trawl survey. Changes to survey design to optimize estimation of biomass for a single species would jeopardize its utility as a long-term multispecies survey. Additional data collection beyond the scope of the existing Aleutian Islands survey would require significant increases in Alaska Fisheries Science Center funding and staffing. This information on prioritization has been added to Section 11.1.1. This additional information will provide a better understanding of the limitations in conducting trawl surveys.

CH11-2 Comment: The EIS should include a discussion of needed research on Atka mackerel movement and possible permitting barriers. The EIS should include a discussion on the difficulty in obtaining permits in order to conduct fish movement studies inside Steller sea lion critical habitat and what effect this regulatory impediment is having on fisheries research. The discussion should include avenues to facilitate and expedite the permitting process for research necessary to explore fish movement and the potential, or lack thereof, for localized depletion.

Response: Sections 3.2.5 and 11.1.2 of the EIS include discussions of research on Atka mackerel movement. Section 5.2.4 includes an analysis of the potential impact of this research on Steller sea lions and other marine mammals to facilitate consultation that may be needed to support the issuance of a scientific research permit for the study. The Fisheries Interaction Team of the Alaska Fisheries Science Center in collaboration with the North Pacific Fisheries Foundation (NPFF) is scheduled to conduct a Steller sea lion prey study and Atka mackerel tagging study focusing on the Western Aleutian Island subarea in 2014–2015. The study will include one Atka mackerel tag release cruise in May/June of 2014 and two Atka mackerel recovery cruises in September 2014 and March 2015. Funding for this study was provided by North Pacific Research Board, NPFF, and NMFS. Section 11.1.2 has been revised to include this information.

CH11-3 Comment: Given the lack of data and information on which to assess population-level effects of increased fish harvests in and around the western and central Aleutian Islands, NMFS should closely monitor for evidence of the effects such harvests may have on Steller sea lion foraging success, vital rates at the population, statistical area, and rookery levels, and progress towards overall recovery.

Response: NMFS agrees that monitoring the potential effects of the fisheries on Steller sea lions is important to understand the potential for recovery. Research on fisheries effects on Steller sea lions is described in Chapter 11 and in Section 3.2.5.

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