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Final Supplemental Environmental Impact Statement for the Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet

April 2014

Prepared by:

Department of the Navy

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Lead Agency:
United States Department of the Navy

In accordance with Chief of Naval Operations Instruction 5090.1D
Pursuant to National Environmental Policy Act Section 102(2) (C)

FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE INTRODUCTION OF THE P-8A MULTI-MISSION MARITIME AIRCRAFT INTO THE U.S. NAVY FLEET
April 2014

Abstract

The Department of Navy (Navy) prepared a *Supplemental Environmental Impact Statement (SEIS) for the Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet*. The purpose of the proposed action is to provide facilities and functions to support dual-siting the P-8A at two established maritime patrol home bases. This SEIS supplements the 2008 Final Environmental Impact Statement (FEIS) with additional alternatives to provide facilities and functions associated with the proposed home basing action, changes to circumstances at the home base locations, and the latest P-8A project information.

Two alternatives and the No Action Alternative are considered, which include the following installations: Naval Air Station (NAS) Jacksonville, Florida; NAS Whidbey Island, Washington; Naval Base (NB) Coronado, California; and Marine Corps Base (MCB) Hawaii Kaneohe Bay, Hawaii. The Navy has identified Alternative 1 as the preferred alternative. Alternative 1 considers the environmental effects of home basing P-8A squadrons at two locations: six fleet squadrons and the Fleet Replacement Squadron (FRS) at NAS Jacksonville and six fleet squadrons at NAS Whidbey Island. Under Alternative 1 there would be a permanent, rotating squadron detachment at MCB Hawaii Kaneohe Bay and periodic squadron detachments at NB Coronado. Alternative 1 presents the greatest re-use of existing facilities and optimizes manpower, simulators, and facilities at NAS Jacksonville and NAS Whidbey Island.

In November 2008, the Navy completed the Final EIS for the Introduction of the P-8A aircraft into the U.S. Navy Fleet, which evaluated the environmental impacts of home basing 12 P-8A fleet squadrons (72 aircraft) and one FRS (12 aircraft) at established maritime patrol home bases (Navy 2008a). The Assistant Secretary of the Navy for Energy, Installations, and Environment reviewed the FEIS, and after carefully weighing the operational, social, and environmental impacts of the proposed action, determined the Navy would home base five fleet squadrons and the FRS at NAS Jacksonville, Florida; four fleet squadrons at NAS Whidbey Island, Washington; and three fleet squadrons at MCB Hawaii Kaneohe Bay, Hawaii, with periodic squadron detachments at NB Coronado, California (Alternative 5). A notice of the Record of Decision (ROD) was published in the *Federal Register* (FR) on January 2, 2009 (74 FR 100). Since this decision, the Navy has determined that home basing P-8A squadrons at two locations could provide potential cost savings while still meeting current strategic operational objectives. Consistent with the guidance provided in 40 CFR 1502.9, the purpose of this SEIS is to supplement the basing alternatives and analysis contained in the 2008 FEIS in light of current circumstances and information.

This SEIS evaluates the direct, indirect, and cumulative effects of the proposed action on airspace and airfield operations, noise, air quality, land use, socioeconomics, transportation, topography and soils, water resources and wetlands, biological resources, cultural resources, hazardous materials and waste, and safety.

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Executive Summary

The proposed action evaluated in this Supplemental Environmental Impact Statement (SEIS) is to provide facilities and functions to dual-site the P-8A Multi-Mission Maritime Aircraft at two established maritime patrol home bases. This document supplements and incorporates by reference the *Final Environmental Impact Statement (FEIS) for Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet*, completed in November 2008 (hereinafter referred to as the 2008 FEIS) (Navy 2008a).

The Assistant Secretary of the Navy for Installations and Environment reviewed the 2008 FEIS, and after carefully weighing the operational, social, and environmental impacts of the proposed action, determined the Department of the Navy (Navy) would home base five fleet squadrons and the Fleet Replacement Squadron (FRS) at Naval Air Station (NAS) Jacksonville, Florida; four fleet squadrons at NAS Whidbey Island, Washington; and three fleet squadrons at Marine Corps Base Hawaii Kaneohe Bay (MCB Hawaii Kaneohe Bay), Hawaii, with periodic squadron detachments at Naval Base (NB) Coronado, California (referred to as "NAS North Island" in the 2008 FEIS)[1] (Alternative 5). The Record of Decision (ROD) was signed on December 23, 2008 (hereinafter referred to as the 2008 ROD), and a notice of this signing was published in the *Federal Register* (FR) on January 2, 2009 (74 FR 100) (see Appendix A). Since this decision, the Navy has determined that home basing P-8A squadrons at two locations could provide potential cost savings while still meeting current strategic operational objectives.

This SEIS has been prepared by the Navy in accordance with Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Part 1500); the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] 4321); and Department of the Navy regulations for implementing NEPA (32 CFR Part 775).

Consistent with the guidance provided in 40 CFR 1502.9, the purpose of this SEIS is to supplement the basing alternatives and analysis contained in the 2008 FEIS in light of current conditions and new information. Circumstances, conditions, and information that have undergone significant change since the 2008 ROD are reexamined. This document considers home basing P-8A fleet squadrons and the FRS at two locations in order to meet the current requirements of the Navy, maximize the efficiency of support facilities and simulation devices, and optimize the number of personnel required. Accordingly, the process for developing home basing alternatives sought to ensure the efficient and economical transition to the P-8A at two locations. This SEIS assesses the potential environmental effects of home basing P-8A squadrons, the related changes in aircraft operations and personnel, and facility modifications and construction requirements identified since the 2008 ROD.

By supplementing the 2008 FEIS, this SEIS advances NEPA's purpose of informing Navy decision-makers and the public about the environmental effects of the proposed action to home base P-8A squadrons. This analysis is not to be considered independent of the 2008 FEIS.

ES.1 Purpose and Need

The purpose of the proposed action, as described in the 2008 FEIS, was to provide facilities and functions to support home basing the P-8A at established maritime patrol home bases, replacing the retiring P-3C aircraft. Established maritime patrol home bases include: NAS Jacksonville; NAS Whidbey Island; and MCB Hawaii Kaneohe Bay. Maritime patrol aircraft are also periodically detached to NB Coronado. The Navy needed and continues to need to efficiently and effectively retire aging P-3C aircraft and transition

[1] The naming convention of the command has changed. In the 2008 FEIS, the installation was referred to as "NAS North Island." In the 2014 SEIS, the installation is referred to as "NB Coronado." NAS North Island is part of the NB Coronado complex, which consists of eight separate installations under a single command.

P-8A aircraft into the fleet while maintaining a maritime patrol capability that sustains national defense objectives and policies.

The purpose of the current proposed action is to provide facilities and functions to dual-site the P-8A at two established maritime patrol home bases. Dual-site home basing could provide potential cost savings while reducing redundancies and still meeting current strategic operational objectives. As such, this SEIS analyzes the environmental impacts associated with home basing aircraft at two rather than three locations.

ES.2 Proposed Action

In this SEIS, the proposed action is to provide facilities and functions to dual-site the P-8A aircraft at two established maritime patrol home bases. In addition, this SEIS incorporates changes to circumstances at the home base locations, and the latest P-8A program information. The proposed action, as described in the 2008 FEIS, was to provide facilities and functions that support the home basing of the P-8A at established maritime patrol home bases.

ES.3 Summary of Siting Alternatives and Preferred Alternative

This SEIS analyzes the following alternatives:

Alternative 1. Alternative 1 considers the environmental effects of home basing P-8A squadrons at two locations: six fleet squadrons and the FRS at NAS Jacksonville and six fleet squadrons at NAS Whidbey Island. Alternative 1 considers a permanent, rotating squadron detachment at MCB Hawaii Kaneohe Bay and periodic squadron detachments at NB Coronado.

Alternative 2. Alternative 2 considers the environmental effects of home basing P-8A squadrons at two locations: five fleet squadrons and the FRS at NAS Jacksonville and seven fleet squadrons at NAS Whidbey Island. Alternative 2 considers a permanent, rotating squadron detachment at MCB Hawaii Kaneohe Bay and periodic squadron detachments at NB Coronado.

No Action Alternative. The No Action Alternative represents current conditions in April 2014 to be used as a baseline of comparison against which environmental consequences can be measured. The No Action Alternative describes the conditions if no further implementation of the 2008 ROD were to occur. The No Action Alternative represents conditions at the time of a new home basing decision:

- At NAS Jacksonville, training facilities and hangars exist to support the P-8A transition. By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft.
- At NAS Whidbey Island and MCB Hawaii Kaneohe Bay, facilities and functions exist to continue supporting P-3C operations as the P-8A transition has not begun at these locations.

The No Action Alternative does not meet the purpose of and need for the proposed action to provide facilities and functions to home base at two locations; however, the No Action Alternative is carried forward for analysis as it represents a baseline condition against which environmental consequences can be measured.

Preferred Alternative. Alternative 1, home basing six fleet squadrons and the FRS at NAS Jacksonville and six fleet squadrons at NAS Whidbey Island, is the preferred alternative because it meets mission requirements, optimizes operational efficiencies related to training and logistics support functions, minimizes environmental impacts, and provides cost savings compared to Alternative 2. Alternative 1

presents the greatest re-use of existing facilities and optimizes manpower, simulators, and facilities at NAS Jacksonville and NAS Whidbey Island.

The alternatives being considered in this SEIS are summarized in Table ES-1.

Table ES-1 Summary of Siting Alternatives

	P-8A Home Basing Locations			
SEIS Alternatives	**NAS Jacksonville**	**NAS Whidbey Island**	**MCB Hawaii Kaneohe Bay**	**NB Coronado**
ALT 1	6 P-8A Fleet Squadrons and FRS	6 P-8A Fleet Squadrons	Permanent, Rotating P-8A Squadron Detachment	Periodic P-8A Squadron Detachments
ALT 2	5 P-8A Fleet Squadrons and FRS	7 P-8A Fleet Squadrons	Permanent, Rotating P-8A Squadron Detachment	Periodic P-8A Squadron Detachments
No Action Alternative[1, 2]	4 P-8A Fleet Squadrons and FRS; 2 P-3C Fleet Squadrons	3 P-3C Fleet Squadrons	3 P-3C Fleet Squadrons	Periodic P-3C and P-8A Squadron Detachments

Notes:

1 The No Action Alternative represents current conditions in April 2014 to be used as a baseline of comparison against which environmental consequences can be measured. The No Action Alternative describes the conditions if no further implementation of the 2008 ROD were to occur.

2 Two P-3C squadrons at NAS Jacksonville and three P-3C squadrons at NAS Whidbey Island and MCB Kaneohe Bay would continue to operate under the No Action Alternative. The No Action Alternative does not meet the purpose and need for the proposed action, but it is carried forward for analysis because it represents a baseline condition against which environmental consequences can be measured.

ES.4 Description of Siting Alternatives

Further descriptions of each of the siting alternatives are provided below in ES.4.1 (Aircraft Loading), ES.4.2 (Airfield Operations), ES.4.3 (Personnel Loading), and ES.4.4 (Facilities).

ES.4.1 Aircraft Loading

The following provides the aircraft loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay for the 2014 baseline (No Action Alternative) and both of the home basing alternatives specific to the P-3C and P-8A squadrons. The authorized aircraft for each of the P-8A fleet squadrons has increased from six to seven aircraft per squadron to meet war-fighting requirements. The authorized aircraft for each of the P-3C squadrons is eight aircraft. However, based on the aging inventory of P-3C aircraft, some of the P-3C squadrons are operating with less than the full authorized aircraft per squadron; therefore, the assumption that the full complement of eight P-3C aircraft per squadron would be operating at each of the installations would be conservative.

Table ES-2 provides a summary comparison of baseline and end-state P-3C and P-8A aircraft loading by alternative and home basing location.

ES.4.1.1 NAS Jacksonville Aircraft Loading

The 2008 ROD authorized five P-8A fleet squadrons and the FRS to be home based at NAS Jacksonville (42 aircraft). Transition to the P-8A is underway at NAS Jacksonville based on the 2008 ROD. Under Alternative 1, NAS Jacksonville would home base six fleet squadrons and the FRS (54 P-8A aircraft).

Under Alternative 2, NAS Jacksonville would home base five fleet squadrons and the FRS (47 P-8A aircraft).

Table ES-2 Comparison of 2014 Baseline (No Action Alternative) and 2020 End-State P-3C and P-8A Aircraft Loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative[1])		2020 End-State (P-8A)	
	P-3C	P-8A[1]	ALT 1	ALT 2
NAS Jacksonville				
Number of Fleet Squadrons	2	4	6	5
Aircraft Authorized per Squadron	8	7	7	7
Fleet Aircraft Authorized	16	28	42	35
FRS Aircraft Authorized	6	6	12	12
Total Aircraft Loading	22	13[2]	54	47
NAS Whidbey Island				
Number of Fleet Squadrons	3	0	6	7
Aircraft Authorized per Squadron	8	0	7	7
Total Authorized Aircraft	24	0	42	49
MCB Hawaii Kaneohe Bay				
Number of Fleet Squadrons	3	0	0	0
Aircraft Authorized per Squadron	8	0	0	0
Fleet Aircraft Authorized	24	0	0	0
Detachment Aircraft[3]	0	0	2[3]	2[3]
Total Aircraft Loading	24	0	2[3]	2[3]

Notes:

1 Two P-3C squadrons at NAS Jacksonville and three P-3C squadrons at NAS Whidbey Island and MCB Hawaii Kaneohe Bay would continue to operate under the No Action Alternative.

2 By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft. In 2014, personnel and infrastructure requirements will be in place, and P-8A flight aircrews will be flying the full number of projected flight events using a smaller complement of P-8A aircraft. This condition would continue until the full complement of P-8A aircraft is delivered.

3 Under Alternatives 1 and 2, P-8A aircraft are not assigned to MCB Hawaii Kaneohe Bay. PACOM requirements would be met by rotating detachments of two P-8A aircraft to MCB Hawaii Kaneohe Bay.

ES.4.1.2 NAS Whidbey Island Aircraft Loading

The 2008 ROD authorized four P-8A fleet squadrons to be home based at NAS Whidbey Island (24 P-8A aircraft). Alternative 1 would home base six fleet squadrons (42 P-8A aircraft), and Alternative 2 would home base seven P-8A fleet squadrons (49 P-8A aircraft).

ES.4.1.3 MCB Hawaii Kaneohe Bay Aircraft Loading

The 2008 ROD authorized three fleet squadrons to be home based at MCB Hawaii Kaneohe Bay (18 P-8A aircraft). Under Alternatives 1 and 2, no fleet squadrons would be home based at MCB Hawaii Kaneohe Bay; however, two P-8A aircraft would rotate on a permanent basis to support PACOM requirements.

ES.4.2 Airfield Operations

Air operations in the 2008 FEIS analysis were estimated based on a new and untested airframe and training simulator system. Since 2008, ongoing data analysis and evolving training requirements based on simulator fidelity have resulted in a decrease in the number of air operations expected. Additionally, the flight profiles are better understood with the completion of the flight test program. Currently, trained fleet (non-FRS) pilots would be expected to use a simulator for approximately 70 percent of their training

requirements, with the remaining 30 percent of their training conducted in the air. Training requirements and the number of flights for FRS pilots have not changed.

Table ES-3 provides a summary comparison of baseline and end-state aircraft operations by alternative and home basing location.

Table ES-3 Comparison of 2014 Baseline and 2020 End-State Airfield Operations at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative)	2020 End-State[1] ALT 1 (2020)	2020 End-State[1] ALT 2 (2020)
NAS Jacksonville			
P-3C[2, 3]	13,596	0	0
P-8A[2, 3]	13,884	24,000	22,821
C-130	446	446	446
H-60	8,732	8,732	8,732
C-40	852	852	852
E-2C	1,404	1,404	1,404
PA-42	259	259	259
Other Transient Aircraft	4,450	4,450	4,450
Total Airfield	**43,623**	**40,143**	**38,964**
NAS Whidbey Island			
P-3C[2, 3, 4]	14,629	0	0
P-8A[2, 3, 4]	0	10,290	11,618
EA-18G[5, 6, 7]	50,577	50,577	50,577
EP-3[7]	4,870	0	0
C-9A	874	0	0
C-40	0	2,277	2,277
Transient Aircraft	516	1,390	1,390
Total Airfield	**71,466**	**64,534**	**65,862**
MCB Hawaii Kaneohe Bay			
P-3C	20,189	0	0
P-8A	0	208	208
Total Navy Aircraft Operations	**20,189**	**208**	**208**

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 The projected decrease in P-8A operations compared to baseline P-3C and P-8A operations is associated with an increased use of simulators for P-8A training, unique to the P-8A program, which offsets in-aircraft flights.

3 P-3C and P-8A squadrons are not based aboard aircraft carriers; therefore, neither P-3C nor P-8A aircraft currently conduct FCLP operations at any of the home bases or related outlying landing fields (OLFs).

4 During the transition to the P-8A, when both P-3Cs and P-8As are present at NAS Whidbey Island, the combined number of P-3C and P-8A operations will not exceed the number of P-3C operations under baseline conditions.

5 The analysis assumes that all electronic attack operations at NAS Whidbey Island in 2014 would be conducted by EA-18G aircraft. It is anticipated that one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014 and would contribute approximately 1,100 EA-6B operations, or about 2 percent of the total annual EA-18G operations, until fully transitioned to EA-18G aircraft.

6 EA-18G operations under Alternatives 1 and 2 do not include the addition of two new expeditionary VAQ squadrons at NAS Whidbey Island. The addition of new EA-18G aircraft at NAS Whidbey Island and related impacts to airfield operations are being evaluated in a separate EIS.

7 The VQ-1 squadron (EP-3 aircraft) at NAS Whidbey Island is in the process of being disestablished. This disestablishment will be complete by the end-state year of the proposed action.

ES.4.2.1 NAS Jacksonville Aircraft Operations

The total number of P-8A operations at NAS Jacksonville at end-state year 2020 under Alternatives 1 and 2 would be up to 17 percent less than the 27,480 baseline P-3C and P-8A combined operations. Under Alternative 1, 24,000 P-8A operations would occur, a 13-percent decrease, and under Alternative 2, 22,821 operations would occur, a 17-percent decrease.

ES.4.2.2 NAS Whidbey Island Aircraft Operations

The total number of P-8A operations at NAS Whidbey Island at end-state year 2020 under Alternatives 1 and 2 would be up to 30 percent less than the baseline P-3C operations. Under Alternative 1, 10,290 P-8A operations would occur (a 30-percent decrease), and under Alternative 2, 11,618 operations would occur (a 21-percent decrease).

ES.4.2.3 MCB Hawaii Kaneohe Bay Aircraft Operations

The total number of Navy aircraft operations at MCB Hawaii Kaneohe Bay at end-state year 2020 under Alternatives 1 and 2 would be 99 percent less than the 20,189 baseline P-3C operations. Under both alternatives, 208 P-8A operations, a 99-percent decrease, would be projected to occur.

ES.4.3 Personnel Loading

Table ES-4 provides a summary comparison of the personnel loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay for the 2014 baseline and both of the home basing alternatives specific to the P-3C and P-8A squadrons.

Table ES-4 Comparison of 2014 Baseline and 2020 End-State P-3C and P-8A Personnel Loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay

		P-8A Personnel (2020)	Change (+/-) from 2014	P-8A Personnel (2020)	Change (+/-) from 2014
NAS Jacksonville	**2014 Baseline P-3C/P-8A Personnel (No Action Alternative)[1]**	**ALT 1 (6 squadrons + FRS)**		**ALT 2 (5 squadrons + FRS)**	
Officers	615	574	-41	506	-109
Enlisted	2,004	1,623	-381	1,426	-578
Total	**2,619**	**2,197**	**-422**	**1,932**	**-687**
NAS Whidbey Island	**2014 Baseline P-3C Personnel (No Action Alternative)[2]**	**ALT 1 (6 squadrons)**		**ALT 2 (7 squadrons)**	
Officers	487	488	+1	556	+69
Enlisted	1,371	1,280	-91	1,477	+106
Total	**1,858**	**1,768**	**-90[4]**	**2,033**	**+175[4]**

Table ES-4 Comparison of 2014 Baseline and 2020 End-State P-3C and P-8A Personnel Loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay

		P-8A Personnel (2020)	Change (+/-) from 2014	P-8A Personnel (2020)	Change (+/-) from 2014
MCB Hawaii Kaneohe Bay	**P-3C Personnel (2014)[2]**	**ALT 1 (permanent squadron detachment)**		**ALT 2 (permanent squadron detachment)**	
Officers	358	15	-343	15	-343
Enlisted	1,085	87	-998	87	-998
Total	**1,443**	**102[3,5]**	**-1,341**	**102[3,5]**	**-1,341**

Notes:

1 The 2014 baseline assumes four of six P-8A squadrons, two P-3C squadrons, and a combination P-3C/P-8A FRS.

2 The 2014 baseline assumes three P-3C squadrons and no P-8A squadrons.

3 The 102 P-8A personnel are transient and therefore not permanently assigned to MCB Hawaii.

4 The projected decrease in personnel at NAS Whidbey Island under Alternative 1 and slight increase under Alternative 2, despite an increase in aircraft loading under both alternatives, is the result of fewer personnel assigned to a P-8A squadron compared to a P-3C squadron.

5 There would be a loss of approximately 75 civilian/contract personnel at MCB Hawaii Kaneohe Bay. Approximately 85 civilians are currently employed in the maintenance of P-3C aircraft. The P-8A detachment under Alternatives 1 and 2 would only require 10 civilian/contract personnel.

ES.4.3.1 NAS Jacksonville Personnel Loading

The total number of P-8A personnel at NAS Jacksonville at end-state year 2020 under Alternatives 1 and 2 would be up to 26 percent less than the baseline P-3C and P-8A personnel loading. The number of P-8A personnel under Alternative 1 would total 2,197, a 16-percent decrease compared to the baseline personnel numbers. Under Alternative 2, the number of P-8A personnel would total 1,932, a 26-percent decrease compared to baseline personnel numbers.

ES.4.3.2 NAS Whidbey Island Personnel Loading

The total number of P-8A personnel at NAS Whidbey Island at end-state year 2020 under Alternatives 1 and 2 would either decrease by 5 percent or increase by 9 percent compared to baseline P-3C personnel. P-8A personnel under Alternative 1 would total 1,768 (a 5-percent decrease). Under Alternative 2, the number of P-8A personnel would total 2,033 (a 9-percent increase).

ES.4.3.3 MCB Hawaii Personnel Loading

The total number of P-8A personnel at MCB Hawaii at end-state year 2020 under Alternatives 1 and 2 would be 93 percent less than the baseline P-3C personnel loading. P-8A personnel under both alternatives would total 102, a 93-percent decrease.

ES.4.4 Facilities

The Navy conducted facility assessments at each installation to determine new construction or renovation requirements and potential site locations at each alternative home base. Table ES-5 summarizes facility renovation square footage, new-construction-area acreage, new impervious surface acreage, and total construction costs associated with each alternative at the home base locations.

Table ES-5 Facility Summary for All Installations

	ALT 1	ALT 2	No Action Alternative
NAS Jacksonville			
P-8A and P-3C Squadrons	6 P-8A Fleet Squadrons and FRS	5 P-8A Fleet Squadrons	4 P-8A Fleet Squadrons and FRS; 2 P-3C Fleet Squadrons
Facility Renovation (square feet)	2,723	2,723	0
New Construction Area (acres)	36.10	36.10	0
New Impervious Surface (acres)	12.89	12.89	0
Total Construction Costs	**$20,752,000**	**$20,752,000**	**$0**
NAS Whidbey Island			
P-8A and P-3C Squadrons	6 P-8A Fleet Squadrons	7 P-8A Fleet Squadrons	3 P-3C Fleet Squadrons
Facility Renovation (square feet)	96,125	96,125	0
New Construction Area (acres)	13.76	21.86	0
New Impervious Surface (acres)	9.16	15.76	0
Total Construction Costs	**$111,097,258**	**$180,200,104**	**$0**
MCB Hawaii Kaneohe Bay			
P-8A and P-3C Squadrons	Permanent, Rotating P-8A Squadron Detachment	Permanent, Rotating P-8A Squadron Detachment	3 P-3C Fleet Squadrons
Facility Renovation (square feet)	26,490	26,490	0
New Construction Area (acres)	1.62	1.62	0
New Impervious Surface (acres)	1.1	1.1	0
Total Construction Costs[1]	**$11,260,000**	**$11,260,000**	**0**

Note:

[1] Total construction costs include all project costs associated with readying the installation for the P-8A aircraft. These costs can include new facility construction, renovation, and/or reconfiguration of existing facilities; mitigation actions; and remediation procedures. Construction costs vary between installations and under different alternatives based on an installation's unique set of needs and on the number of aircraft proposed under each alternative.

ES.4.4.1 NAS Jacksonville Facilities

Alternatives 1 and 2 would require facility renovation and construction at NAS Jacksonville. The proposed MILCON planning includes one project, in FY 2014.

Both siting alternatives would require the following:

- Construction of a 1,000-foot-long overrun to the approach end of Runway 10;
- Construction of a parallel taxiway and taxiway connectors for the overrun;
- Construction of a new, 400-foot-long asphalt blast pad at the west end of the overrun;
- Renovation of portions of Hangar 511; and
- Reconfiguration of the existing Combat Aircraft Loading Area (CALA) to accommodate two P-8A aircraft.

Construction of the 1,000-foot overrun would include installation of runway edge lights, runway threshold lights, runway guard lights, runway centerline lights, and taxiway edge lights. The overrun is required to provide P-8A aircraft with sufficient safety margins when operating fully loaded in low air density conditions—i.e., on hot and humid days.

Hangar 511 renovations would include interior alterations for a planned tug pull-through lane, changes in the interior adjoining shop space, reconfiguration of door controls, and reconfiguration of office and shop spaces.

Construction of the P-8A trainer facility and associated parking to support the P-8A at NAS Jacksonville was analyzed in the 2008 FEIS. Construction of these facilities is complete and is supporting the P-8A mission already underway at NAS Jacksonville. Additional P-8A aircraft would be accommodated by Hangar 511. Sufficient space exists on the parking apron near the hangar.

ES.4.4.2 NAS Whidbey Island Facilities

Alternatives 1 and 2 would require facility renovation and construction at NAS Whidbey Island. The proposed MILCON planning includes two phases for Alternative 1: one in fiscal year (FY) 14 and one in FY15. Alternative 2 would require three phases: one in FY14, one in FY15, and one in FY16.

Both siting alternatives would require the following:

- Demolition of existing Building 126 (housing P-3C simulator support equipment and personnel) and construction of a new two-story P-8A trainer facility (101,104 sq ft);
- Modification of 4,320 sq ft of Building 2738 for additional classroom and instructor office space for P-8A training;
- Demolition of existing Building 2704 (storage for deployable gear and equipment for home-ported Mobile Tactical Operations Center [MTOC] units) and renovation of Building 2771 (20,000 sq ft) for a MTOC;
- Construction of a new two-story Tactical Operations Center (TOC) (20,261 sq ft) adjacent to Building 2771, including space for Wing 10 administration;
- Expansion of Hangar 6 (14,059 sq ft) and hangar bay modification (20,059 sq ft);
- Temporary expansion of Hangar 9 (6,000 sq ft) to fully enclose P-3C aircraft during the construction period;
- Reuse and minor interior renovation to Hangar 7 (53,739 sq ft) to accommodate VQ-1 squadron relocation out of Hangar 6;
- Construction of a Sensitive Compartmented Information Facility adjacent to Hangar 7 (1,000 sq ft)];
- Modifications to Building 2740 for reuse as a Sensitive Compartmented Information Facility;
- Construction of a Ground Support Equipment Shop (3,500 sq ft) and Outdoor Storage Area (12,000 sq ft) adjacent to Hangar 6, to be surrounded by approximately 825 feet of chainlink fence; and
- Renovation and reuse of Building 219 as storage to house deployable gear and equipment for home-ported MTOC units.

Modifications to Hangar 6 involve cutting notches in the hangar structure above the centerline of the bay doors to allow ingress/egress of P-8A aircraft, and replacement of the existing hangar doors. In addition, the existing maintenance bays would be extended to provide required clearances between interior walls and aircraft.

Alternatives 1 and 2 would require expansion of the existing aircraft parking ramp and paving of additional area for aircraft parking. Approximately 400,000 sq ft would be required for Alternative 1 (six squadrons), while approximately 697,000 sq ft would be required for Alternative 2 (seven squadrons). Expansion of the apron requires demolition of Buildings 2707, 2666, 2786, 2621A, 2635, 2800, 2528, and 2621. Expansion of the existing apron would also require relocation of the existing aircraft rinse facility (6,300 sq ft) and relocation of the existing liquid oxygen (LOX) and sonobuoy storage facilities (16,203 sq ft).

Alternative 2 (seven squadrons) requires construction of a new two-bay P-8A hangar (83,087 sq ft) adjacent to Hangar 6. Construction of the new hangar would not be required under Alternative 1. The hangar would require demolition of Buildings 2888, 2889, and 2890 and would contain a high-bay space and crew and equipment space.

Alternatives 1 and 2 also require construction of new vehicle parking (8,810 sq ft) on the west side of Charles Porter Avenue to support the additional squadron personnel.

ES.4.4.3 MCB Hawaii Facilities

No new structures would be required to accommodate a permanent detachment under Alternatives 1 and 2. Modification of the interiors of the existing TOC (Building 6470) and Hangar 104 would accommodate P-8A detachment aircrews. Existing taxiway and shoulder at the aircraft parking apron would be expanded to accommodate a taxiway for the P-8A. The existing aircraft rinse facility would be expanded to accommodate the larger P-8A airframe.

ES 4.5 Summary of Alternatives

Table ES-6 provides a summary of proposed aircraft loading, aircraft operations, personnel loading, and new construction at the home bases under each of the alternatives.

ES.5 Public Involvement

The Navy published a Notice of Intent (NOI) to announce the preparation of this SEIS on November 15, 2012, and forwarded courtesy notification and coordination letters to elected officials; federal, state, and local government agencies; American Indian tribes; non-governmental groups; and individuals most likely to be interested in the supplemental analysis. The Navy established a public website (www.mmaseis.com) to provide updated information on the project, which includes a description of the proposed action and alternatives, an explanation of the supplemental NEPA process, the project schedule, and information on the public involvement process. Additionally, the public website allows the public to sign up on a mailing list to be notified of project updates.

The Draft SEIS availability and public meetings were announced using numerous methods: publishing notices in the *Federal Register*, publishing display advertisements in local daily and weekly newspapers, mailing notification letters and postcards, issuing press releases, holding media events, and maintaining the project website. The U.S. Environmental Protection Agency (EPA) published a Notice of Availability (NOA) for the Draft SEIS in the *Federal Register* on September 20, 2013; a Notice of Public Meetings was published by the Navy in the *Federal Register* on the same date. Public meetings were scheduled for NAS Whidbey Island on October 8, 2013, and for NAS Jacksonville on October 17, 2013. The notice also announced a 45-day public comment period (September 20, 2013, through November 4, 2013). Due to the federal government shutdown from October 1 to October 16, 2013, the public meetings were rescheduled to November 7, 2013, for NAS Jacksonville and to November 13, 2013, for NAS Whidbey Island. The public comment period was extended to December 2, 2013, to ensure the community had ample opportunity to provide input. In total, the public comment period comprised 76 days. Notifications

of the rescheduled public meetings and comment period extension were made using the same methods listed above.

Table ES-6 Summary of Proposed P-8A Home Basing Alternatives

	Aircraft Loading	Aircraft Operations[2]	Personnel Loading	New Construction
NAS Jacksonville				
2014 Baseline (No Action Alternative) (4 P-8A Fleet Squadrons and FRS; 2 P-3C Fleet Squadrons)	35[1]	27,480	2,619	$0
Alternative 1 (6 P-8A Fleet Squadrons and FRS) (net change)	54 (+19)	24,000 (-3,480)	2,197 (-422)	$20,752,000
Alternative 2 (5 P-8A Fleet Squadrons and FRS) (net change)	47 (+12)	22,821 (-4,659)	1,932 (-687)	$20,752,000
NAS Whidbey Island				
2014 Baseline (No Action Alternative) (3 P-3C Fleet Squadrons)	24	14,629	1,858	$0
Alternative 1 (6 P-8A Fleet Squadrons) (net change)	42 (+18)	10,290 (-4,339)	1,768 (-90)[3]	$111,097,258
Alternative 2 (7 P-8A Fleet Squadrons) (net change)	49 (+25)	11,618 (-3,011)	2,033 (+175)[3]	$180,200,104
MCB Hawaii Kaneohe Bay				
2014 Baseline (No Action Alternative) (3 P-3C Fleet Squadrons)	24	20,189	1,443	$0
Alternative 1 (Permanent Rotating Squadron Detachment) (net change)	2 (-22)	208 (-19,981)	102[4] (-1,341)	$11,260,000
Alternative 2 (Permanent Rotating Squadron Detachment) (net change)	2 (-22)	208 (-19,981)	102[4] (-1,341)	$11,260,000

Notes:

1 By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft.

2 The projected decrease in P-8A operations compared to baseline P-3C operations is associated with an increased use of simulators for P-8A training, unique to the P-8A program, which offsets in-aircraft flights.

3 The projected decrease in personnel at NAS Whidbey Island under Alternative 1 and slight increase under Alternative 2, despite an increase in aircraft loading under both alternatives, is the result of fewer personnel assigned to a P-8A squadron compared to a P-3C squadron.

4 The 102 P-8A personnel are transient and therefore not permanently assigned to MCB Hawaii Kaneohe Bay.

A total of 89 individuals signed in at the two meetings. Comments were received from individual members of the public, elected officials (i.e., federal, state, and local representatives), federal regulatory and state resource agencies, local agencies, businesses, and community groups. A total of 83 comments were received during the comment period, many of which addressed multiple issues. The Navy prepared responses to each individual comment. Revisions to the SEIS in response to comments have been completed to improve the accuracy and thoroughness of the analysis presented in the Draft SEIS, but they do not alter any conclusions regarding the nature or magnitude of impacts on any resource.

ES.6 Summary of Potential Environmental Impacts

Table ES-7 provides a summary of potential environmental impacts by alternative at each home basing location.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Airfield Operations	**NAS Jacksonville** No adverse impacts to airspace and airfield operations. 8% decrease in total airfield operations. **NAS Whidbey Island** No adverse impacts to airspace and airfield operations. 10% decrease in total airfield operations. **MCB Hawaii Kaneohe Bay** No adverse impacts to airspace or airfield operations. 99% decrease in Navy aircraft operations.	**NAS Jacksonville** No adverse impacts to airspace and airfield operations. 11% decrease in total airfield operations. **NAS Whidbey Island** No adverse impacts to airspace and airfield operations at NAS Whidbey. 8% decrease in total airfield operations. **MCB Hawaii Kaneohe Bay** No adverse impacts to airspace or airfield operations. 99% decrease in Navy aircraft operations.	No change in airfield operations at any home bases.
Noise	**NAS Jacksonville** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. 9% increase in off-station area, and an increase of 68 people within the greater than or equal to 65 dB DNL noise contour. No populations are considered at risk for potential hearing loss (PHL) as no populations are located within the 80 dB DNL or greater noise contour. **NAS Whidbey Island** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep	**NAS Jacksonville** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. 8% increase in off-station area and increase of 56 people within the greater than or equal to 65 dB DNL noise contour. No populations are considered at risk for potential hearing loss (PHL) as no populations are located within the 80 dB DNL or greater noise contour. **NAS Whidbey Island** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep	No change in off-station area and population of 1,093 persons exposed to DNL greater than or equal to 65 dB at NAS Jacksonville. No change in off-station area and population of 11,636 persons exposed to DNL greater than or equal to 65 dB at NAS Whidbey Island. No change in off-station area and population exposed to DNL greater than or equal to 65 dB at MCB Hawaii Kaneohe Bay.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
	disturbance. Less than 1% increase in off-station area, 1 acre of additional residential land, and an increase of 11 people within the greater than or equal to 65 dB DNL noise contour. No new populations would be at risk for PHL under Alternatives 1 or 2. **MCB Hawaii Kaneohe Bay** No significant operational or construction noise impacts. P-8A contribution to the overall noise environment at MCB Hawaii Kaneohe Bay would be negligible.	disturbance. Less than 1% increase in off-station area, 1 acre of additional residential land, and increase of 16 people within the greater than or equal to 65 dB DNL noise contour. No new populations would be at risk for PHL under Alternatives 1 or 2. **MCB Hawaii Kaneohe Bay** No significant operational or construction noise impacts. P-8A contribution to the overall noise environment at MCB Hawaii Kaneohe Bay would be negligible.	
Air Quality	**NAS Jacksonville** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary. **NAS Whidbey Island** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary. **MCB Hawaii Kaneohe Bay** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary.	**NAS Jacksonville** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary. **NAS Whidbey Island** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants, except for a slight increase in NO_X. Construction emissions would be temporary. **MCB Hawaii Kaneohe Bay** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary.	No construction emissions or change in regional air quality at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Land Use	**NAS Jacksonville** No significant impacts to local and regional land use. 4 additional acres of residential land within greater than 65 dB DNL noise zone. **NAS Whidbey Island** No significant impacts to local and regional land use. 1 additional acre of residential land within greater than 65 dB DNL noise zone. **MCB Hawaii Kaneohe Bay** No significant impacts to local and regional land use. No off-station land use impacted by aircraft operations.	**NAS Jacksonville** No significant impacts to local and regional land use. 3 additional acres of residential land within greater than 65 dB DNL noise zone. **NAS Whidbey Island** No significant impacts to local and regional land use. 1 additional acre of residential land within greater than 65 dB DNL noise zone. **MCB Hawaii Kaneohe Bay** No significant impacts to local and regional land use. No off-station land use impacted by aircraft operations.	No change to local or regional land use at any home base.
Socioeconomics – Population and Housing	**NAS Jacksonville** No significant impacts to population and housing. 0.1% decrease in regional population. **NAS Whidbey Island** No significant impacts to population and housing. 0.2% decrease in regional population. **MCB Hawaii Kaneohe Bay** No significant impacts to population and housing. 0.3% decrease in regional population.	**NAS Jacksonville** No significant impacts to population and housing. 0.2% decrease in regional population. **NAS Whidbey Island** No significant impacts to population and housing. 0.5% increase in regional population. **MCB Hawaii Kaneohe Bay** No significant impacts to population and housing. 0.3% decrease in regional population.	No change in regional population in the vicinity of any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Socioeconomics – Regional Economy	**NAS Jacksonville** No significant impacts to regional economy. Increase of $20.8M in economic benefits generated by one-time construction expenditures and a decrease of $46.4M in total military employee annual earnings. **NAS Whidbey Island** No significant impacts to regional economy. Increase of $111.1M in economic benefits generated by one-time construction expenditures and a decrease of $8.4M in total military employee annual earnings. **MCB Hawaii Kaneohe Bay** Significant negative impacts to regional economy. Increase of $11.3M in economic benefits generated by one-time construction expenditures and a decrease of $211.8M in total annual earnings.	**NAS Jacksonville** No significant impacts to regional economy. Increase of $20.8M in economic benefits generated by one-time construction expenditures and a decrease of $81.0M in total military employee annual earnings. **NAS Whidbey Island** No significant impacts to regional economy. Increase of $180.2M in economic benefits generated by one-time construction expenditures and an increase of $25.2M in total military employee annual earnings. **MCB Hawaii Kaneohe Bay** Significant negative impacts to regional economy. Increase of $11.3M in economic benefits generated by one-time construction expenditures and a decrease of $211.8M in total annual earnings.	No change in military employee total annual earnings at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Socioeconomics – Education	**NAS Jacksonville** No significant impacts to Duval County School District. Less than 1% decrease in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **NAS Whidbey Island** No significant impacts to the Oak Harbor School District. 0.7% decrease in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **MCB Hawaii Kaneohe Bay** Potential significant negative fiscal implications for local schools. 17.4% decrease in total school district enrollment.	**NAS Jacksonville** No significant impacts to the Duval County School District. Less than 1% decrease in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **NAS Whidbey Island** No Significant impacts to the Oak Harbor School District. 1.8% increase in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **MCB Hawaii Kaneohe Bay** Potential significant negative fiscal implications for local schools. 17.4% decrease in total school district enrollment.	No change in school district enrollment in the vicinity of any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Socioeconomics – Environmental Justice	**NAS Jacksonville** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **NAS Whidbey Island** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **MCB Hawaii Kaneohe Bay** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children.	**NAS Jacksonville** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **NAS Whidbey Island** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **MCB Hawaii Kaneohe Bay** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children.	No disproportionately high and adverse human health and environmental effects on minority and low income populations, and no environmental health or safety risks for children at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Topography and Soils	**NAS Jacksonville** No significant impact to topography and soils from addition of 12.89 acres of new impervious surface. **NAS Whidbey Island** No significant impact to topography and soils from addition of fill material and 9.16 acres of new impervious surface. **MCB Hawaii Kaneohe Bay** No significant impact to topography and soils from addition of 1.1 acres of new impervious surface.	**NAS Jacksonville** No significant impact to topography and soils from addition of 12.89 acres of new impervious surface. **NAS Whidbey Island** No significant impact to topography and soils from addition of fill material and 15.76 acres of new impervious surface. **MCB Hawaii Kaneohe Bay** No significant impact to topography and soils from addition of 1.1 acres of new impervious surface.	No change to topography, and no impacts to soils at any home bases.
Water Resources (water quality, floodplains, groundwater)	**NAS Jacksonville** No significant impact to water resources at NAS Jacksonville with implementation of storm water control measures. **NAS Whidbey Island** No significant impact to water resources at NAS Whidbey Island with implementation of storm water control measures. **MCB Hawaii Kaneohe Bay** No significant impacts to water resources with implementation of storm water control measures.	**NAS Jacksonville** No significant impact to water resources at NAS Jacksonville with implementation of storm water control measures. **NAS Whidbey Island** No significant impact to water resources at NAS Whidbey Island with implementation of storm water control measures. **MCB Hawaii Kaneohe Bay** No significant impacts to water resources with implementation of storm water control measures.	No impact to water resources at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Water Resources (wetlands)	**NAS Jacksonville** No impact to wetlands. **NAS Whidbey Island** Approximately 0.8 acre of wetland fill. Wetlands removed to construct new facilities would be replaced at an approved mitigation site through the Clean Water Act Section 404 permitting process. **MCB Hawaii Kaneohe Bay** No impact to wetlands.	**NAS Jacksonville** No impact to wetlands. **NAS Whidbey Island** Approximately 2.44 acres of wetland fill. Wetlands removed to construct new facilities would be replaced at an approved mitigation site through the Clean Water Act Section 404 permitting process. **MCB Hawaii Kaneohe Bay** No impact to wetlands.	No impact to wetlands at any home bases.
Biological Resources (vegetation, wildlife, marine mammals)	**NAS Jacksonville** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 12.89 acres of herbaceous vegetation. **NAS Whidbey Island** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 9.16 acres of herbaceous vegetation. **MCB Hawaii Kaneohe Bay** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 1.1 acres of herbaceous vegetation	**NAS Jacksonville** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 12.89 acres of herbaceous vegetation. **NAS Whidbey Island** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 15.76 acres of herbaceous vegetation. **MCB Hawaii Kaneohe Bay** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 1.1 acres of herbaceous vegetation	No impact to vegetation, wildlife, or marine mammals at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Biological Resources (threatened and endangered species)	**NAS Jacksonville** No effect on piping plover, red-cockaded woodpecker, manatee, wood stork, Eastern indigo snake, frosted salamander, sea turtles, or shortnose sturgeon. **NAS Whidbey Island** No effect on golden paintbrush, streaked horned lark, Taylor's checkerspot, Steller sea lion, humpback whale, Southern resident killer whale, Puget Sound/Georgia Basin bocaccio, Puget Sound Chinook salmon, Puget Sound steelhead, canary rockfish, yelloweye rockfish, southern eulachon, and southern North American green sturgeon populations. May affect but not likely to adversely affect the marbled murrelet and Coastal Washington-Puget Sound bull trout. **MCB Hawaii Kaneohe Bay** No effect on the round-leaved chaff-flower, Puukaa, white hibiscus, yellow hibiscus, Loulu palm, Ohai, Hawaiian stilt, Hawaiian common moorhen, Hawaiian coot, Hawaiian duck, Newell's shearwater, Hawaiian hoary bat, Hawaiian monk seal, humpback whale, sperm whale, green sea turtle, and hawksbill sea turtle.	**NAS Jacksonville** No effect on piping plover, red-cockaded woodpecker, manatee, wood stork, Eastern indigo snake, frosted salamander, sea turtles, or shortnose sturgeon. **NAS Whidbey Island** No effect on golden paintbrush, streaked horned lark, Taylor's checkerspot, Steller sea lion, humpback whale, Southern resident killer whale, Puget Sound/Georgia Basin bocaccio, Puget Sound Chinook salmon, Puget Sound steelhead, canary rockfish, yelloweye rockfish, southern eulachon, and southern North American green sturgeon populations. May affect but not likely to adversely affect the marbled murrelet and Coastal Washington-Puget Sound bull trout. **MCB Hawaii Kaneohe Bay** No effect on the round-leaved chaff-flower, Puukaa, white hibiscus, yellow hibiscus, Loulu palm, Ohai, Hawaiian stilt, Hawaiian common moorhen, Hawaiian coot, Hawaiian duck, Newell's shearwater, Hawaiian hoary bat, Hawaiian monk seal, humpback whale, sperm whale, green sea turtle, and hawksbill sea turtle.	No effect on threatened or endangered species at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Cultural Resources	**NAS Jacksonville** No effects on historic properties or archaeological resources are expected. **NAS Whidbey Island** Adverse effect on Building 410 (Hangar 6), a property eligible for listing on the National Register of Historic Places (NRHP). No effects on archaeological resources would be expected. The Navy consulted with the Washington SHPO to develop a Memorandum of Agreement for the adverse effect on Hangar 6. **MCB Hawaii Kaneohe Bay** No adverse effects on historic properties are expected. No impacts on archaeological resources are expected. The Hawaii SHPO has concurred with the no adverse effect finding.	**NAS Jacksonville** No effects on historic properties or archaeological resources are expected. **NAS Whidbey Island** Adverse effect on Building 410 (Hangar 6), a property eligible for listing on the NRHP. No effects on archaeological resources would be expected. The Navy consulted with the Washington SHPO to develop a Memorandum of Agreement for the adverse effect on Hangar 6. **MCB Hawaii Kaneohe Bay** No adverse effects on historic properties are expected. No impacts on archaeological resources are expected. The Hawaii SHPO has concurred with the no adverse effect finding.	No effect on architectural or archaeological resources at any home bases.
Hazardous Materials and Waste	**NAS Jacksonville** No significant impacts to public health and safety from hazardous materials and waste. **NAS Whidbey Island** No significant impacts to public health and safety from hazardous materials and waste. **MCB Hawaii Kaneohe Bay** No significant impacts to public health and safety from hazardous materials and waste.	**NAS Jacksonville** No significant impacts to public health and safety from hazardous materials and waste. **NAS Whidbey Island** No significant impacts to public health and safety from hazardous materials and waste. **MCB Hawaii Kaneohe Bay** No significant impacts to public health and safety from hazardous materials and waste.	No impacts related to hazardous materials and waste at any home bases.

Table ES-7 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Safety	**NAS Jacksonville** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **NAS Whidbey Island** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **MCB Hawaii Kaneohe Bay** No increased safety risks or aircraft incidents due to net decrease in Navy aircraft operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error.	**NAS Jacksonville** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **NAS Whidbey Island** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **MCB Hawaii Kaneohe Bay** No increased safety risks or aircraft incidents due to net decrease in Navy aircraft operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error.	No impacts related to safety at any home bases. P-3C aircraft would continue to operate until they reach the end of their service life.

Note:
[1] Impacts presented in this table for the proposed action alternatives represent a comparison of the 2014 baseline conditions with the proposed 2020 end-state associated with the alternatives.

Key:
DNL = Day-Night Average Sound Level.
MCB = Marine Corps Base.
NAS = Naval Air Station.
NPDES = National Pollutant Discharge Elimination System.
SHPO = State Historic Preservation Office.

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Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
ACHP	Advisory Council on Historic Preservation
AESO	Aircraft Environmental Support Office
AFTT	Atlantic Fleet Training and Testing
AFWA	Association of Fish and Wildlife Agencies
agl	above ground level
AICUZ	Air Installations Compatible Use Zones
AIRFA	American Indian Religious Freedom Act
AOP	Activity Overview Plan
APE	Area of Potential Effect
APF	Appropriate Fund
APZ	Accident Potential Zone
asl	above sea level
ATC	Air Traffic Control
BAMS	Broad Area Maritime Surveillance
BASH	Bird/Wildlife Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BMP	Best Management Practice
CAA	Clean Air Act
CALA	Combat Aircraft Loading Area
CCD	Coastal Consistency Determination
CDP	Census-Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNAFR	Commander Naval Air Forces Reserve
CONUS	Continental United States
CPLO	Community Plans and Liaison Officer
CPRW	Commander Patrol and Reconnaissance Wing
CVW	Carrier Air Wing
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act

dB	Decibel
dBA	A-weighted Decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DPS	Distinct Population Segment
DRMO	Defense Reutilization Marketing Office
EA	Environmental Assessment
EDMS	Emissions and Dispersion Modeling System
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EIS/OEIS	Environmental Impact Statement/Overseas Environmental Impact Statement
EMFAC	Emission Factors Model
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
ESU	Evolutionarily Significant Unit
EW	Electronic Warfare
FAA	Federal Aviation Administration
FCA	Fleet Concentration Area
FCLP	Field Carrier Landing Practice
FCMP	Florida Coastal Management Program
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFWCC	Florida Fish and Wildlife Conservation Commission
FNAI	Florida Natural Areas Inventory
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRS	Fleet Replacement Squadron
FY	Fiscal Year
GOV	Government-Owned Vehicle
GSE	Ground Support Equipment

GCA	Ground Control Approach
GHG	Greenhouse Gas
GOV	Government-Owned Vehicle
GSE	ground support equipment
GTF	Grow the Force
GWP	Global Warming Potential
HAPs	Hazardous Air Pollutants
HARP Plan	Historic and Archaeological Resources Protection Plan
HIANG	Hawaii Air National Guard
HMLA	Marine Light Attack Helicopter
HSTT	Hawaii—Southern California Training and Testing
Hz	hertz
ICAO	International Civic Aviation Organization
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
JARPA	Joint Aquatic Resources Permit Application
JD	Jurisdictional Determination
kHz	kiloHertz
LEED	Leadership in Energy and Environmental Design
L_{eq}	Equivalent Sound Level
LID	Low Impact Development
L_{max}	Maximum (Single-Event) Sound Level
LOX	Liquid Oxygen
LTO	Landing and Takeoff Operation
MBTA	Migratory Bird Treaty Act
MCB	Marine Corps Base
MEF	Marine Expeditionary Force
MILCON	Military Construction
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MSA	Metropolitan Statistical Area
MSATs	Mobile Source Air Toxics
msl	mean sea level
MT	metric tons
MTOC	Mobile Tactical Operations Center

NA	Selected Threshold
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NASMOD	Naval Aviation Simulation Model
NAVFAC	Naval Facilities Engineering Command
NB	Naval Base
NEPA	National Environmental Policy Act
NHO	Native Hawaiian Organization
NHPA	National Historic Preservation Act of 1966
NIPTS	Noise-Induced Permanent Threshold Shift
NLR	Noise Level Reduction
NM	nautical mile
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
NS	Naval Station
NWCAA	Northwest Clean Air Agency
NWTRC	Northwest Training Range Complex
NWTT	Northwest Testing and Training
ODO	operations duty officer
OEIS	Overseas Environmental Impact Statement
OLF	Outlying Landing Field
OPAREA	Operating Area
OPNAVINST	Chief of Naval Operations Instruction
OU	Operable Unit
PA	Probability of Awakening
PACOM	United States Pacific Command
PHL	Potential Hearing Loss
POI	Point of Interest
POV	Privately Owned Vehicle

PSC	potential sources of contamination
RCRA	Resource Conservation and Recovery Act
RIMS II	Regional Input-Output Modeling System
ROD	Record of Decision
RSIP	Regional Shore Infrastructure Plan
SAAF	Short, Austere Airfield
SEIS	Supplemental Environmental Impact Statement
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SOCAL	Southern California
SOP	Standard Operating Procedure
SWAG	Shock Wave Action Generator
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
T&G	Touch-and-Go (flight operation)
TACAN	Tactical Air Navigation
TCP	Traditional Cultural Property
TOC	Tactical Operations Center
tpy	tons per year
TSD	Treatment, Storage, and Disposal
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
VAQ	Electronic Attack Squadron
VMM	Marine Medium Tiltrotor
VMT	Vehicle Miles Traveled
VMU-3	Marine Unmanned Aerial Vehicle Squadron Three
VOC	Volatile Organic Compound
VP	Patrol Squadron
VPU	Special Projects Patrol Squadron
VQ	Fleet Air Reconnaissance
WAC	Washington Administrative Code

WDFW	Washington Department of Fish and Wildlife
WGMA	Washington Growth Management Act
WMA	Wildlife Management Area
WWTF	Wastewater Treatment Facility

1 Introduction

The proposed action evaluated in this Supplemental Environmental Impact Statement (SEIS) is to provide facilities and functions to dual-site the P-8A Multi-Mission Maritime Aircraft at two established maritime patrol home bases. This document supplements and incorporates by reference the *Final Environmental Impact Statement (FEIS) for Introduction of the P-8A Multi-Mission Maritime Aircraft into the U.S. Navy Fleet*, completed in November 2008 (hereinafter referred to as the 2008 FEIS) (Navy 2008a).

1.1 Background

This document is a Final SEIS prepared by the Department of the Navy (Navy) in accordance with Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Part 1500); the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] 4321); and Department of the Navy procedures for implementing NEPA (32 CFR Part 775).

The Assistant Secretary of the Navy for Installations and Environment reviewed the 2008 FEIS, and after carefully weighing the operational, social, and environmental impacts of the proposed action, determined the Navy would home base five fleet squadrons and the Fleet Replacement Squadron (FRS) at Naval Air Station (NAS) Jacksonville, Florida; four fleet squadrons at NAS Whidbey Island, Washington; and three fleet squadrons at Marine Corps Base (MCB) Hawaii Kaneohe Bay, Hawaii, with periodic squadron detachments at Naval Base (NB) Coronado, California (referred to as "NAS North Island" in the 2008 FEIS)[2] (Alternative 5). The Record of Decision (ROD) was signed on December 23, 2008 (hereinafter referred to as the 2008 ROD), and a notice of this signing was published in the *Federal Register* (FR) on January 2, 2009 (74 FR 100) (see Appendix A). Since this decision, the Navy has determined that home basing P-8A squadrons at two locations could provide potential cost savings while still meeting current strategic operational objectives.

Consistent with the guidance provided in 40 CFR 1502.9, the purpose of this SEIS is to supplement the basing alternatives and analysis contained in the 2008 FEIS in light of current conditions and new information. Circumstances and conditions that have undergone significant change since the 2008 ROD are reexamined. By supplementing the 2008 FEIS, this SEIS informs Navy decision-makers and the public about the environmental effects of the proposed action to provide facilities and functions to home base P-8A squadrons. This analysis is not to be considered independent of the 2008 FEIS[3].

Current conditions and new information are outlined below.

- **Aircraft Maintenance Concept.** The 2008 FEIS specified that contractor logistics support would service and repair the P-8A aircraft; however, these responsibilities will now remain with the traditional squadron maintenance organization. This change results in no contractor maintenance support and an increase in enlisted personnel for aircraft maintenance over what was considered in the 2008 ROD.
- **Authorized Aircraft.** The 2008 FEIS specified the number of aircraft for a fleet squadron as six; however, the authorized aircraft per squadron were increased from six to seven to meet war-fighting requirements. This change results in an increase in aircraft at

[2] The naming convention of the command has changed. In the 2008 FEIS, the installation was referred to as "NAS North Island." In the 2014 SEIS, the installation is referred to as "NB Coronado." NAS North Island is part of the NB Coronado complex, which is composed of eight separate installations under a single command.

[3] The 2008 FEIS and supporting documents can be found online at the project website (http://www.mmaseis.com) under "Historic Documents."

the home base locations over what was considered in the 2008 ROD. The number of aircraft for the FRS (12) as described in the 2008 FEIS remains unchanged.

- **Training Simulator Capabilities.** Air operations in the 2008 FEIS analysis were estimated based on a new airframe and training simulator system. Since 2008, ongoing data analysis and evolving training requirements based on simulator fidelity have resulted in a decrease in the amount of in-flight, in-air operational training required and an increase in the use of simulators to accomplish the same pilot training. Additionally, the flight profiles are better understood, with the completion of the flight test program at NAS Patuxent River, Maryland. Currently, trained fleet pilots would be expected to use a simulator for approximately 70 percent of their training, with the remaining 30 percent of their training spent conducting in-flight, in-air operations. This distribution of simulator and in-flight training results in a decrease in the number of P-8A operations compared to what was considered in the 2008 ROD. Training requirements and the number of flights for FRS pilots have not changed.
- **Retention of Expeditionary Electronic Attack Squadron at NAS Whidbey Island.** In 2005, the Department of Defense (DoD) directed the U.S. Navy to disestablish the Expeditionary Electronic Attack (VAQ) capabilities and directed the U.S. Air Force to absorb the Expeditionary VAQ mission by 2012. Thus, the 2008 FEIS did not include the operations and facility requirements of the Expeditionary VAQ squadrons in the analysis. However, in October 2009, a Deputy Secretary of Defense memorandum directed the U.S. Navy to maintain the Expeditionary VAQ capabilities indefinitely at NAS Whidbey Island (see Chapter 1.3.4 for discussion of recent NEPA documentation related to VAQ squadrons).
- **Disestablishment of EP-3 Squadrons at NAS Whidbey Island.** Since the 2008 ROD, the Navy has made the decision to disestablish the Fleet Air Reconnaissance Squadrons One (VQ-1) and Two (VQ-2), or EP-3 aircraft, at NAS Whidbey Island. VQ-2 disestablished in August 2012 at NAS Whidbey Island. A portion of the squadron's aircraft and personnel were absorbed by VQ-1. VQ-1 will disestablish before 2020. The disestablishment was not known at the time of the 2008 ROD, and the VQ-1 and VQ-2 personnel and EP-3 aircraft operations were considered as part of the baseline and end-state conditions in the analysis supporting the 2008 FEIS.
- **Disestablishment of VPU Squadrons at NAS Jacksonville and MCB Hawaii Kaneohe Bay.** Since the 2008 ROD, the Navy made the decision to disestablish two Special Projects Patrol Squadrons (VPU) operating the P-3C aircraft. VPU-1 disestablished in April 2012 at NAS Jacksonville. A portion of the squadron's aircraft and personnel were absorbed by VPU-2 at MCB Hawaii Kaneohe Bay. VPU-2 will disestablish before 2020. The disestablishment was not known at the time of the 2008 ROD, and the VPU personnel and aircraft operations were considered as part of the baseline and end-state conditions in the analysis supporting the 2008 FEIS.
- **Additional Facility Requirements at NAS Whidbey Island.** The 2008 FEIS analyzed facility improvements and new construction associated with home basing up to seven fleet P-8A squadrons at NAS Whidbey Island. This SEIS analyzes a refined facility concept that focuses on greater facility reuse, which was not previously considered in the 2008 FEIS. In addition, facility requirements are now better understood because simulators are in production, with several installed at NAS Jacksonville. P-8A flight simulators were not yet designed at the time of the 2008 FEIS.

As described in the 2008 FEIS, the P-8A is designed to execute, with increased capabilities, maritime patrol missions currently performed by the P-3C. These functions include the primary missions of armed

anti-submarine warfare; armed anti-surface warfare; intelligence; command, control, and communications; command and control warfare; mine warfare; and mobility. Secondary mission areas include strike warfare; missions of state; non-combatant operations; fleet support operations; anti-air warfare; amphibious warfare; and homeland defense.

1.2 Purpose and Need

The purpose of the proposed action, as described in the 2008 FEIS, was to provide facilities and functions that support home basing the P-8A at established maritime patrol home bases, replacing the retiring P-3C aircraft. Established maritime patrol home bases include: NAS Jacksonville; NAS Whidbey Island; and MCB Hawaii Kaneohe Bay. Maritime patrol aircraft are also periodically detached to NB Coronado. Figure 1-1 shows the location of established maritime patrol home bases. The Navy needed and continues to need to efficiently and effectively retire aging P-3C aircraft and transition P-8A aircraft into the fleet while maintaining a maritime patrol capability that sustains national defense objectives and policies.

The purpose of the current proposed action is to provide facilities and functions to dual-site the P-8A at two established maritime patrol home bases. Dual-site home basing could provide cost savings while reducing redundancies and still meeting current strategic operational objectives. Further, reuse of existing facilities minimizes new construction and environmental impacts. As such, this SEIS analyzes the environmental impacts associated with home basing aircraft at two rather than three locations.

1.3 The Environmental Review Process

1.3.1 The National Environmental Policy Act

NEPA requires consideration of environmental effects in federal agency planning and decision making. Under NEPA, federal agencies must prepare an Environmental Assessment (EA) or an EIS for any federal action, except those actions that are determined to be "categorically excluded" from further analysis. An EIS is prepared for those federal actions that may significantly affect the quality of the natural or human environment.

In accordance with 40 CFR, Part 1502.9, a supplemental EA or EIS is prepared to amend an original environmental planning document if:

1. The agency makes substantial changes in the proposed action that are relevant to environmental concerns, or
2. There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

The intent of this SEIS is to analyze alternatives that base P-8A squadrons at two locations and to analyze changes in light of current conditions and circumstances at potential home base locations while using the latest P-8A project information to meet Navy mission requirements. Once this SEIS process is complete, a ROD will announce selection of a new P-8A home basing decision. The operational and fiscal constraints for implementing the 2008 ROD, particularly at MCB Hawaii Kaneohe Bay, are discussed in Chapter 2.4, Description of Siting Alternatives.

1.3.2 Scope of Analysis

This SEIS assesses the potential environmental effects of home basing P-8A squadrons, the related changes in aircraft operations and personnel, and facility modifications and construction requirements identified since the 2008 ROD. This SEIS will not analyze impacts of P-8A training at existing range complexes, operating areas (OPAREAs), and testing ranges. The Navy would use its existing ranges (the

same ranges currently used for tactical training of P-3C aircrews) to conduct P-8A training. Additionally, projected P-8A tactical training will be very similar to existing P-3C training, and the P-8A will employ the same weapons systems and sonobuoys as currently used by the P-3C. The potential environmental impacts associated with this training in existing military training ranges are being analyzed separately as part of the Navy's program for at-sea compliance. For further information on air operations and training, see Appendix B, "P-8A Flight Training." P-3C and P-8A aircraft at NAS Jacksonville and NAS Whidbey Island do not conduct any training operations at Outlying Landing Field (OLF) Whitehouse or Coupeville, respectively; therefore, this SEIS does not analyze training operations at OLF Coupeville or Whitehouse because those training activities would not be affected as a result of the proposed action.

Commander Naval Air Forces Reserve[4] (CNAFR) is considering a range of options with respect to replacing their aging P-3C aircraft. The transition of the Navy Reserves to the P-8A aircraft was not considered in the 2008 FEIS and is not part of the proposed action in this SEIS. Navy Reserves will continue to operate P-3C aircraft at NAS Jacksonville and NAS Whidbey Island while P-8A aircraft are being home based. Once a P-3C replacement plan is conceived, this Navy Reserve action will be evaluated in future NEPA documentation.

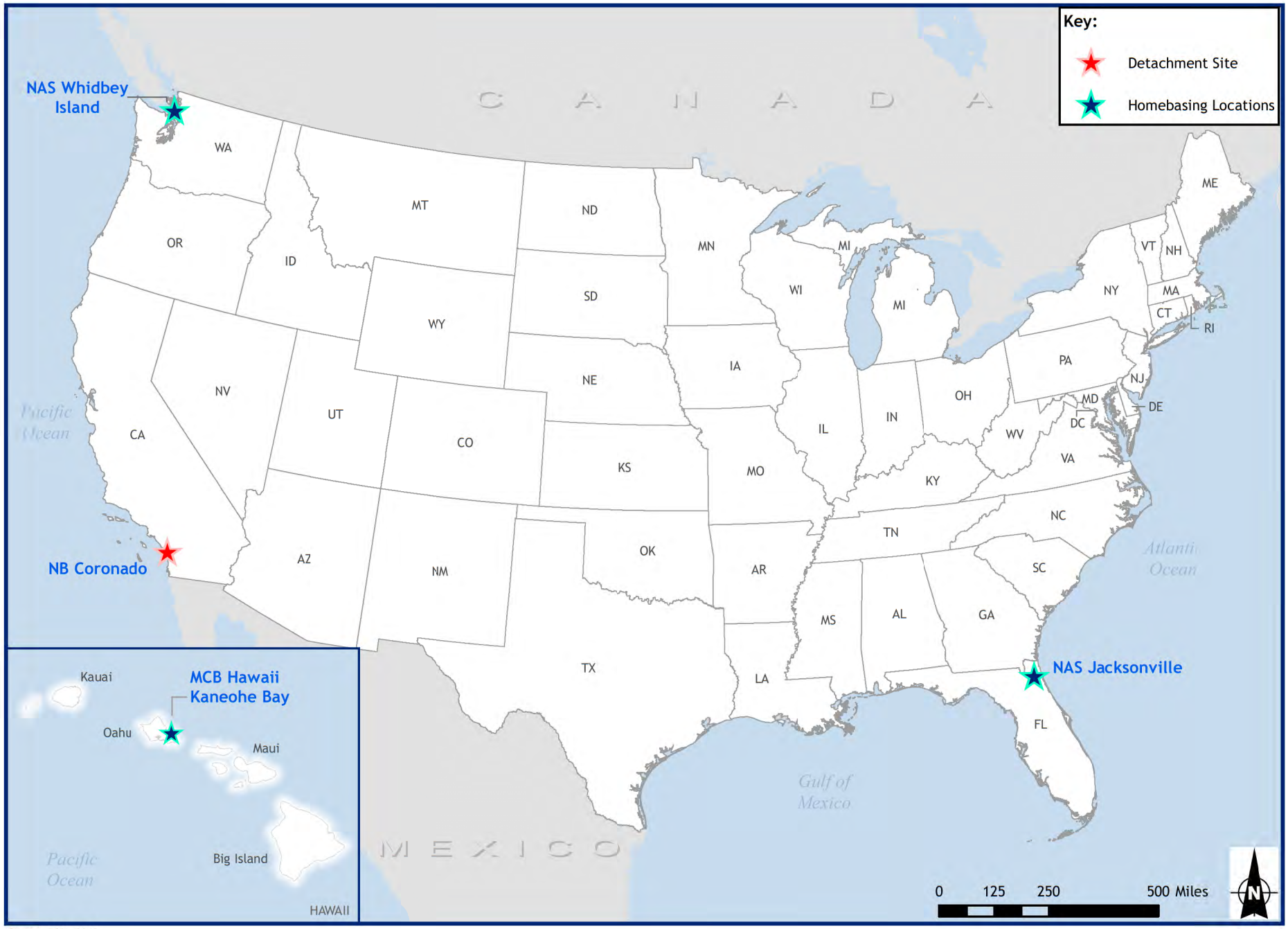
According to NEPA, CEQ regulations, and Navy procedures for implementing NEPA, agencies preparing an EIS should "focus on significant environmental issues" (40 CFR 1502.1) and "reduce excessive paperwork by discussing only briefly issues other than significant ones" (40 CFR 1500.4). In addition, the amount of data and analysis provided in an EIS "shall be commensurate with the importance of the impact" (40 CFR 1502.15), and "impacts shall be discussed in proportion to their significance" (40 CFR 1502.2).

The following resource areas are evaluated in detail in this SEIS:

- Aircraft Operations
- Noise
- Air Quality
- Land Use
- Socioeconomics
- Topography and Soils
- Water Resources and Wetlands
- Biological Resources
- Cultural Resources
- Hazardous Materials and Waste
- Safety

Some resources were eliminated from detailed analysis in this SEIS for all home base locations because the proposed action would not affect these resources or would not result in noticeable effects to them. The resources eliminated from detailed analysis include:

[4] Reserve squadrons are manned by a combination of full-time and part-time reservists and full-time active-duty Navy personnel. Reserve squadrons maintain readiness in anticipation of rapid deployment. In contrast, fleet squadrons are those in the active-duty Navy that deploy in regular cycles.



Source: ESRI, 2012

Figure 1-1
Maritime Patrol Home Bases

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- **Infrastructure and Utilities.** The change in personnel at each home base, when considered in light of the baseline personnel associated with the P-3C, would either result in a decrease or a negligible increase in water use, wastewater discharge, power use, and solid waste generation; therefore, no impacts related to increases in demand for and capacity of existing infrastructure and utilities would be anticipated at any location.
- **Community Services.** Changes to existing community services, including fire protection and emergency, security, and medical services, would either not occur or be negligible for the home bases and surrounding communities at any location.
- **Transportation.** The number of privately owned vehicles (POVs), miles traveled, and the projected traffic would either decrease or slightly increase under either of the proposed alternatives when compared to transportation associated with P-3C personnel, and roadway level of service would not be expected to change; therefore, no additional congestion-relief or transportation requirements would be anticipated on or around any home base or its surrounding community.

1.3.3 Environmental Review Process

During the public involvement process in developing the 2008 FEIS, the Navy conducted a public scoping period (December 2006 to March 2007) and public comment period (March to April 2008). Scoping was conducted following the Notice of Intent (NOI) publication in the *Federal Register* in December 2006. The Navy held four public scoping meetings, attended by 86 persons. A total of 29 comments were received. Following the U.S. Environmental Protection Agency's (EPA) publication of a Notice of Availability (NOA) and the Navy's publication of a Notice of Public Meetings in the *Federal Register* in March 2008, the Draft EIS was available for public comment from March to April 2008. The Navy held four public meetings, which were attended by 60 people. A total of 94 comments were received, which were addressed in the 2008 FEIS. Transcripts of the proceedings are provided in Appendix C of the 2008 FEIS.

The Navy published a NOI to announce the preparation of this SEIS on November 15, 2012, and forwarded courtesy notification and coordination letters to elected officials; federal, state, and local government agencies; American Indian tribes; non-governmental groups; and individuals most likely to be interested in the supplemental analysis. The Navy established a public website (www.mmaseis.com) to provide updated information on the project, which includes a description of the proposed action and alternatives, an explanation of the supplemental NEPA process, the project schedule, and information on the public involvement process. Additionally, the public website allows the public to sign up on a mailing list to be notified of project updates.

1.3.3.1 Notifications of Draft SEIS Availability and Public Meetings

The Navy would like to thank the elected officials; federal, state, and local agencies; and the public for taking the time to review the Draft SEIS, attend the public meetings, and/or submit comments. The public comment period and the public meetings are an important aspect of the environmental analysis process.

The Draft SEIS availability and public meetings were announced using numerous methods: publishing notices in the *Federal Register*, publishing display advertisements in local daily and weekly newspapers, mailing notification letters and postcards, issuing press releases, holding media events, and maintaining the project website. Copies of all notices announcing the Draft SEIS availability and public meetings are provided in the Public Meeting Summary Report (Appendix I).

The EPA published a NOA for the Draft SEIS in the *Federal Register* on September 20, 2013; a Notice of Public Meetings was published by the Navy in the *Federal Register* on the same date. As stated in the

Notice of Public Meetings, public meetings were scheduled for NAS Whidbey Island on October 8, 2013, and for NAS Jacksonville on October 17, 2013. The notice also announced a 45-day public comment period (September 20, 2013, through November 4, 2013). The public comment period provided opportunities for government agencies, elected officials, Native American tribes, organizations, and individuals to express their concerns regarding the analyses conducted in support of the Draft SEIS. Throughout the Draft SEIS public comment period, comments were received and compiled for consideration during the preparation of the Final SEIS.

The Navy also published a series of display advertisements in 10 newspapers that serve the potentially affected communities in the vicinity of NAS Jacksonville, NAS Whidbey Island, MCB Hawaii Kaneohe Bay, and NB Coronado. Table 1-1 shows the local newspapers used for the notifications and their publication dates.

Table 1-1 Newspaper Display Advertisements for Public Meetings

Newspaper	Coverage Area	Dates
NAS Jacksonville		
Florida Times-Union	Jacksonville, FL	September 20, 2013
		October 10, 2013
		October 14, 2013
		October 15, 2013
		October 16, 2013
NAS Whidbey Island		
Whidbey News Times	North and Central Whidbey Island, WA	September 21, 2013
		September 28, 2013
		October 2, 2013
		October 5, 2013
South Whidbey Record	Southern Whidbey Island, WA	September 21, 2013
		September 28, 2013
		October 2, 2013
		October 5, 2013
Whidbey Examiner	Central Whidbey Island, WA	September 26, 2013
		October 3, 2013
Journal of the San Juan Islands	The island of San Juan, WA, and the surrounding area	September 25, 2013
		October 2, 2013
Skagit Valley Herald	Mount Vernon, WA	September 20, 2013
		October 5, 2013
		October 6, 2013
		October 7, 2013
Anacortes American	Anacortes, WA	September 25, 2013
		October 2, 2013
MCB Hawaii Kaneohe Bay		
Honolulu Star Advertiser	Honolulu, HI	September 20, 2013
NB Coronado		
San Diego Union-Tribune	San Diego, CA	September 20, 2013
Coronado Eagle	Coronado, CA	September 25, 2013

Due to the federal government shutdown from October 1 to October 16, 2013, the public meetings were rescheduled to November 7, 2013, for NAS Jacksonville and to November 13, 2013, for NAS Whidbey Island. The public comment period was extended to December 2, 2013, to ensure the community had ample opportunity to provide input. In total, the public comment period comprised 76 days. Notifications

of the rescheduled public meetings and comment period extension were made using the same methods listed above. Table 1-2 shows the local newspapers used for the notifications and their publication dates.

Table 1-2 Newspaper Display Advertisements for Rescheduled Meetings and Comment Period Extension

Newspaper	Coverage Area	Dates
NAS Jacksonville		
Florida Times-Union	Jacksonville, FL	October 28, 2013
		November 4, 2013
		November 5, 2013
		November 6, 2013
NAS Whidbey Island		
Whidbey News Times	North and Central Whidbey Island, WA	October 26, 2013
		November 2, 2013
		November 9, 2013
South Whidbey Record	Southern Whidbey Island, WA	October 26, 2013
		November 2, 2013
		November 9, 2013
Whidbey Examiner	Central Whidbey Island, WA	October 31, 2013
		November 7, 2013
Journal of the San Juan Islands	The island of San Juan, WA, and the surrounding area	October 30, 2013
		November 6, 2013
Skagit Valley Herald	Mount Vernon, WA	October 28, 2013
		November 6, 2013
		November 10, 2013
		November 11, 2013
		November 12, 2013
Anacortes American	Anacortes, WA	October 30, 2013
		November 6, 2013
MCB Hawaii Kaneohe Bay		
Honolulu Star Advertiser	Honolulu, HI	October 29, 2013
NB Coronado		
San Diego Union-Tribune	San Diego, CA	October 29, 2013
Coronado Eagle	Coronado, CA	October 30, 2013

The newspaper display advertisements provided the times, dates, and locations of the public meetings. Each newspaper determined the placement of the notices. Newspaper advertisements were published at the beginning of the comment period, approximately two weeks prior to each meeting, and, when possible, on three consecutive days before each meeting.

The Navy provided several additional notifications regarding the availability of the Draft SEIS and notice of public meetings, inviting members of the public to comment on the Draft SEIS and attend public meetings. Specifically, the Navy sent out more than 185 copies of a notification letter and postcard to agencies, elected officials, Native American tribes, organizations, and individuals for both the initial announcement and the notice of rescheduling. In addition, 62 printed copies of the Draft SEIS and 46 CDs containing electronic files of the Draft SEIS were sent to those requesting copies.

The Navy issued several press releases to the local media in the vicinity of the potentially affected installations related to the Draft SEIS availability and public meetings: one on September 20, 2013, announcing release of the Draft SEIS and public meetings; one on October 3, 2013, announcing

cancellation of the October 8, 2013, public meeting in Oak Harbor, Washington; one on October 9, 2013, announcing cancellation of the October 17, 2013, public meeting in Orange Park, Florida; and a final press release on October 22, 2013, announcing the dates for rescheduled public meetings in Oak Harbor, Washington, and Orange Park, Florida, as well as extension of the public comment period to December 2, 2013. Due to the federal government shutdown from October 1 through October 16, 2013, the public meetings were rescheduled to November 7, 2013, for NAS Jacksonville and to November 13, 2013, for NAS Whidbey Island. The public comment period was also extended to December 2, 2013, to ensure the community had ample opportunity to provide input.

The project website (http://www.mmaseis.com) was updated concurrently with the publication of the Notice of Availability of the Draft SEIS in the *Federal Register*. The project website provided information such as the Notice of Availability, the Notice of Public Meetings, notice of public comment period extension, electronic copies of the Draft SEIS, and locations where paper copies of the Draft SEIS were available locally for review. The project website also included the public meeting schedule, four ways to comment on the Draft SEIS, electronic versions of the information materials used at the public meetings, and press releases. During the public comment period, the website accepted online comments on the Draft SEIS. Between September 20, 2013, and December 2, 2013, the website was visited 1,116 times.

Printed copies of the Draft SEIS were made available for public review during the comment period at the following seven local libraries: Webb-Wesconnett Regional Branch (Jacksonville, FL), Oak Harbor City Library (Oak Harbor, WA), Anacortes Public Library (Anacortes, WA), La Conner Regional Library (La Conner, WA), Coupeville Public Library (Coupeville, WA), Kaneohe Public Library (Honolulu, HI), and Coronado Public Library (Coronado, CA).

1.3.3.2 Public Meetings

Public meetings provide members of the community the opportunity to ask the Navy questions about information in the Draft SEIS, as well as to provide written and oral comments. In November 2013, the Navy held public meetings in the cities of Orange Park and Oak Harbor (see Table 1-4). The public meetings were held in an "open house" format in order to facilitate effective two-way communication between meeting attendees and Navy subject matter experts. Navy project team representatives (i.e., Navy personnel, civilian Navy staff, and support contractors) were available to explain the project and analysis in the Draft SEIS. A total of 89 individuals signed in at the two meetings.

Table 1-3 Dates, Locations, and Attendance at Public Meetings

Installation	Date	Location	Number of Attendees
NAS Jacksonville	November 7, 2013	Holiday Inn Hotel & Suites Orange Park 620 Wells Road Orange Park, FL 32073	8
NAS Whidbey Island	November 13, 2013	North Whidbey Middle School 67 NE Izett Street Oak Harbor, WA 98277	81

Prior to each meeting, the local media were invited to attend a media availability event. On November 6, 2013, one day prior to the Jacksonville public meeting, the media availability event was held at Hangar 511 on NAS Jacksonville. Representatives from five media outlets attended (104.5 FM Newstalk WOKV, WJXT Channel 4, Action News Jacksonville, WJCT TV and 89.9 FM, and Jax Air News). The media in the areas surrounding NAS Whidbey Island were invited to a media availability event prior to the local public meeting, but the event was not conducted because no media outlets were able to attend.

1.3.3.3 Draft SEIS Public Comments

Comments were received from individual members of the public, elected officials (i.e., federal, state, and local representatives), federal regulatory and state resource agencies, local agencies, businesses, and community groups. Table 1-4 summarizes the number of comments submitted through the four methods made available to the public during the 76-day comment period. Many of the 83 comment submittals addressed multiple issues.

Table 1-4 Summary of Public Comments

Method of Comment Submittal	NAS Jacksonville and Vicinity	NAS Whidbey Island and Vicinity	Other[1]	Total Comment Submittals Received
Written comments submitted at public meetings	0[2]	27	6	33
Oral comments dictated to stenographer at public meetings	1	3	0	4
Written comments submitted on project website	1	28[3]	4	33
Written comments mailed to the Navy	1	5	7	12
Total	**3**	**63**	**17**	**83**

Notes:

1 "Other" may include comments regarding MCB Hawaii, NB Coronado, and/or general comments on the project that are not location-specific.

2 One written comment was received at the public meeting for NAS Jacksonville. This was a copy of a mailed letter from the mayor of Jacksonville, Florida, and has been included in the "written comments mailed to the Navy" category.

3 One commenter submitted the identical comment on the website twice and by mail. This comment was counted only once as a website comment.

Several topic areas were brought up in the 83 comment submittals. In total, the Navy responded to 183 comments. The majority of the comments were related to the following specific topics:

- Several commenters in the NAS Jacksonville and NAS Whidbey Island communities expressed support for the P-8A home basing in their respective communities.
- Several commenters in the NAS Whidbey Island communities expressed concerns regarding noise, safety, and air quality impacts from aircraft operations.
- Several commenters in the NAS Whidbey Island communities expressed concerns regarding changes in flight operations at NAS Whidbey Island's Ault Field and OLF Coupeville as a result of the P-8A home basing.
- Several commenters in the NAS Whidbey Island communities expressed concerns regarding impacts to natural resources, including water quality, wildlife, and threatened and endangered species.
- Several commenters in the NAS Whidbey Island communities requested that the Navy consider alternative locations for P-8A home basing.

All comments submitted during the comment period with corresponding responses from the Navy are provided in Appendix J.

1.3.4 Related Environmental Documents

1.3.4.1 Installation Documentation

Related EISs and EAs have been or are currently being prepared for actions at the installations considered for home basing of the P-8A. These documents have been considered in the preparation of this SEIS and are summarized below.

EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island

An EIS is being prepared to identify and evaluate the potential environmental consequences associated with ongoing and future EA-18G operations at NAS Whidbey Island's Ault Field and OLF Coupeville. The EIS is also evaluating the introduction of two additional expeditionary VAQ squadrons (a total of 10 additional EA-18G aircraft) and the addition of three EA-18G aircraft to the training squadron. Additionally, the EIS is addressing the construction and renovation of facilities at Ault Field over a three-year period to accommodate additional aircraft and the addition of 860 personnel and approximately 2,150 family members to NAS Whidbey Island and the surrounding community. An NOI was published on September 5, 2013. In December 2013, the Navy conducted a series of public scoping meetings. The Draft EIS is anticipated to be released to the public in spring 2015.

2012 Final EA for the Transition of Expeditionary EA-6B Prowler Squadrons to EA-18G Growler

A Finding of No Significant Impact (FONSI) for the EA was signed on October 30, 2012. This EA analyzed the potential environmental effects of transitioning the Expeditionary VAQ squadrons at NAS Whidbey Island from the retiring EA-6B Prowler to the EA-18G Growler in the 2012-2014 timeframe. The action includes retaining the Expeditionary VAQ mission capabilities at NAS Whidbey Island; performing the in-place transition of three existing Expeditionary VAQ squadrons home based at NAS Whidbey Island from the EA-6B aircraft to the EA-18G aircraft; potentially relocating one Reserve Expeditionary VAQ EA-6B squadron from Joint Base Andrews to NAS Whidbey Island and transitioning from the EA-6B aircraft to the EA-18G aircraft; adding up to 11 EA-18G aircraft to the FRS at NAS Whidbey Island to support the Expeditionary VAQ community; modifying certain facilities at the NAS Whidbey Island airfield, Ault Field, to provide infrastructure and functions to support the new aircraft; and a modest increase in personnel to support the Expeditionary VAQ community. In-place transitions of the expeditionary and reserve squadrons to the EA-18G will be completed by 2015, prior to the arrival of P-8A aircraft at NAS Whidbey Island. Relocation of VAQ-209 from Joint Base Andrews was completed in July 2013.

2005 Final EA for Replacement of EA-6B Aircraft with EA-18G Aircraft at NAS Whidbey Island

This document analyzed the environmental consequences of transitioning VAQ fleet squadrons at NAS Whidbey Island from EA-6B Prowler aircraft to EA-18G Growler aircraft. A FONSI was signed in 2005. Due to changes in the procurement strategy, it has taken longer to complete the transition of VAQ fleet squadrons than envisioned in 2005. Transitions are planned to be complete in 2015, prior to the arrival of P-8A aircraft at NAS Whidbey Island.

2012 Final EIS for the Basing of MV-22 and H-1 Aircraft in Support of III Marine Expeditionary Force Elements in Hawaii

A ROD was signed in August 2012 for the basing and training of MV-22 tilt-rotor Osprey and H-1 Cobra and Huey attack/utility aircraft squadrons in support of III Marine Expeditionary Force (MEF) elements in Hawaii. The decision is to proceed with the preferred alternative to implement projects at MCB Hawaii Kaneohe Bay, conduct aviation operations at training facilities and state airports statewide, and construct improvements at selected training facilities.

The selected alternative will base and operate up to two Marine Medium Tiltrotor (VMM) squadrons (up to 12 MV-22 Osprey aircraft per squadron, for a total of 24 aircraft) and one Marine Light Attack Helicopter (HMLA) squadron (15 AH-1 Cobra attack and 12 UH-1 Huey utility helicopters, for a total of 27 aircraft). Facilities to accommodate the squadrons will be developed on the southeast side of the runway at MCB Hawaii Kaneohe Bay. Projects will include demolition, new construction, and renovation. Over 2,000 active duty personnel, civilians, and dependents will be associated with the VMM and HMLA squadrons.

The Marine Corps's (USMC's) preferred alternative takes into account the facilities modifications and new construction included in the Navy's 2008 FEIS and ROD.

EA to Relocate Marine Unmanned Aerial Vehicle Squadron Three to Hawaii

An EA is being prepared to identify and evaluate the potential environmental impacts associated with relocating a USMC unmanned aerial vehicle squadron from California to Hawaii, and to conduct activities within the region. Unmanned Aerial Vehicle Squadron Three (VMU-3) personnel and equipment would be located at MCB Hawaii Kaneohe Bay; however, training would be conducted at other locations in Hawaii, including Wheeler Army Air Field, Oahu; Pacific Missile Range Facility, Kauai; and Pohakuloa Training Area, Hawaii. VMU-3 currently operates the RQ-7B Shadow and would operate the newly-developed RQ-21A Integrator.

2011 Grow the Force EA

A FONSI was signed in August 2011 for six Military Construction (MILCON) projects to support the additional personnel assigned to MCB Hawaii Kaneohe Bay under the USMC-wide "Grow the Force" (GTF) initiative. In addition to the construction projects, this action provided for an additional 579 active-duty personnel and an estimated 391 dependents (an approximate total of 970 persons) to be assigned to MCB Hawaii Kaneohe Bay. The 970 persons represented a 5-percent increase in the March 2010 baseline population. The GTF personnel started arriving in fiscal year (FY) 2008 with incremental additions completed through FY 2012.

1.3.4.2 Navy At-Sea Compliance

Potential environmental impacts associated with P-8A training in existing military training ranges and OPAREAs are being analyzed separately as part of the Navy's program for at-sea compliance. These related EISs are being prepared concurrently and have been considered in the preparation of this SEIS, as summarized below. For further information on air operations and training, see Appendix B, P-8A Flight Training.

2013 Final EIS/OEIS for Atlantic Fleet Training and Testing

A ROD was signed in November 2013 for current and future training and testing in the Atlantic Fleet Training and Testing (AFTT) study area, which includes at-sea areas where P-3C and P-8A aircraft train. The AFTT Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) analyzed current P-3C and future P-8A training requirements in the western Atlantic Ocean, Gulf of Mexico, and parts of the Caribbean Sea; therefore, this SEIS will not analyze impacts of P-8A training in these at-sea areas. The selection of a home basing alternative different from the 2008 ROD would not change the training requirements in the AFTT study area. The training requirement is based on fleet training exercises, not the number of squadrons at a certain location.

2013 Final EIS/OEIS for Hawaii–Southern California Training and Testing

A ROD was signed in December 2013 for current and future training and testing in the Hawaii–Southern California (SOCAL) Training and Testing (HSTT) Study Area, which includes areas where P-3C and P-8A aircraft would train. The HSTT EIS/OEIS analyzed current P-3C and future P-8A training

requirements in the Hawaii and SOCAL region; therefore, this SEIS will not analyze impacts of P-8A training at existing range complexes, OPAREAs, and testing ranges. The selection of a home basing alternative different from the 2008 ROD would not change the type of training in the HSTT ranges.

2010 Final EIS/OEIS for Northwest Training Range Complex

A ROD was signed in October 2010 to support and conduct current, emerging, and future training and research, development, test, and evaluation activities in the Northwest Training Range Complex (NWTRC), which includes at-sea areas where P-3C and P-8A aircraft train. The NWTRC EIS/OEIS analyzes current P-3C and future P-8A training requirements in the Northwest; therefore, this SEIS will not analyze impacts of P-8A training at existing range complexes, OPAREAs, and testing ranges. The selection of a home basing alternative different from that of the 2008 ROD would not change the type of training in the NWTRC.

2014 Draft EIS/OEIS for Northwest Training and Testing

An EIS is being prepared to identify and evaluate the potential environmental consequences associated with training and testing activities, primarily within existing range complexes, OPAREAs, testing ranges, and selected pier-side locations in the Pacific Northwest, which include areas where P-3C and P-8A aircraft would train. The Northwest Training and Testing (NWTT) EIS/OEIS analyzes current P-3C and future P-8A training requirements in the Northwest; therefore, this SEIS will not analyze impacts of P-8A training at existing range complexes, OPAREAs, and testing ranges. The selection of a home basing alternative different from that of the 2008 ROD would not change the type of training in the NWTT ranges. The Draft EIS/OEIS was released for public review in January 2014.

1.3.5 Related Planning Documents

The Air Installations Compatible Use Zones (AICUZ) Program was established by DoD to promote the health, safety, and welfare of persons in the vicinity of and on air installations by minimizing aircraft noise and safety impacts without degrading flight safety and mission requirements. As part of the AICUZ process, studies define noise zones, Accident Potential Zones (APZs), and recommendations to promote community development that is compatible with operations at an air station. As required by DoD Instruction (DoDI) 4165.57, AICUZ studies are based on reasonable projections of future operations and mission changes of an air station. These studies evaluate:

- A description of aircraft noise and aircraft accident potential environment around the air installation for existing operations;
- A description of the long-term (5- to 10-year) aircraft noise and accident potential environment for projected aircraft operations that is consistent with the planning horizon used by state, tribal, regional, and local planning bodies;
- Recommendations for achieving compatible land use development considering aircraft noise; accident potential; bird/wildlife aircraft strike hazard (BASH); electromagnetic interference; dust, steam, smoke, or light emissions; and heights of natural and man-made objects near the air installation that affect flight safety within the air installation's environs; and
- Identification of existing and potential incompatible land uses.

The original AICUZ study for NAS Jacksonville was prepared in 1978 and was last updated in 2006. The original AICUZ study for NAS Whidbey Island was prepared in 1977 and was last updated in 2005. The original AICUZ study for MCB Hawaii Kaneohe Bay was prepared in 1976 and was last updated in 2006. The original AICUZ study for NB Coronado (NAS North Island) was prepared in 1979 and was last updated in 2012.

The land use compatibility analysis in this SEIS is based on the compatibility recommendations provided in the AICUZ studies. The APZs used in this SEIS are from the most recent AICUZ study updates. Future updates to the respective AICUZ studies to account for changes in aircraft mix, tempo of aviation activity, and maintenance procedures would include P-8A operations, if they are not already considered.

1.4 Organization of SEIS

This SEIS addresses dual-site home basing alternatives, one of which is new and one of which was considered in the 2008 FEIS, as well as the alternative selected in the 2008 ROD, based on new information made available since the 2008 ROD. Subsequent chapters of this SEIS describe the environmental consequences of providing facilities and functions at two home basing locations needed to support the P-8A.

- **Chapter 2** describes the home basing alternatives being considered and new circumstances and information since the 2008 ROD.
- **Chapter 3** describes the existing environment at NAS Jacksonville.
- **Chapter 4** describes the potential environmental consequences at NAS Jacksonville.
- **Chapter 5** describes the existing environment at NAS Whidbey Island.
- **Chapter 6** describes potential environmental consequences at NAS Whidbey Island.
- **Chapter 7** describes the existing environment at MCB Hawaii Kaneohe Bay.
- **Chapter 8** describes potential environmental consequences at MCB Hawaii Kaneohe Bay.
- **Chapter 9** describes cumulative impacts at each of the installations.
- **Chapter 10** describes other considerations required by NEPA.
- **Chapter 11** contains references.
- **Chapter 12** lists the preparers of this document.

1.5 Definition of Baseline and End-State

The analysis in this SEIS compares the consequences, both beneficial and adverse, of the home basing alternatives considered in this SEIS to the existing conditions present at the time a new home basing decision is made, which is expected to be April 2014. As such, the baseline year for this SEIS analysis is 2014.

Baseline conditions at NAS Jacksonville account for squadron transitions that have already occurred in accordance with the 2008 ROD. At NAS Jacksonville, by April 2014 four of six squadrons will have transitioned from P-3C to P-8A, and the FRS will be a combination of P-3C and P-8A aircraft. The baseline number of aircraft, personnel, and air operations discussed in Chapter 2 for NAS Jacksonville reflects the P-8A transition through April 2014. No P-8A transitions or related facility improvements have occurred or are planned to occur at NAS Whidbey Island or MCB Hawaii Kaneohe Bay by 2014. P-3C aircraft will be present at NAS Whidbey Island and MCB Hawaii Kaneohe Bay in 2014 and are considered in the baseline conditions. Therefore, for the purposes of this analysis, the baseline condition for NAS Whidbey Island and MCB Hawaii Kaneohe Bay are considered zero for P-8A squadrons.

While it is assumed the transition of all P-3C squadrons to P-8A aircraft would be complete by 2020, Congressional appropriations will determine P-8A aircraft delivery schedules. Therefore, there is the potential for all personnel and infrastructure requirements to be in place and P-8A flight aircrews to be

flying the full number of projected flight events using a smaller complement of P-8A aircraft. This condition would continue until the full complement of P-8A aircraft would be delivered. Since it is the number of flight crews, rather than the number of aircraft, that determines training events, 2020 represents a reasonable timeframe for the full complement of training crews to be in place and achieving a steady-state of training events. Therefore, 2020 is the end-state for this analysis. End-state represents conditions when the transition of all fleet P-3C squadrons to the P-8A would be complete, all infrastructure and personnel would be in place, and aircrews would be flying the full number of required P-8A training operations.

1.6 Clarification and Changes to the SEIS

Several of the comments received during the Draft SEIS review period resulted in revisions to this Final SEIS. Revisions to the SEIS text include clarifications, enhancements, and the inclusion of updated information. These revisions improve the accuracy and thoroughness of the analysis presented in the Draft SEIS, but they do not alter any conclusions regarding the nature or magnitude of impacts on any resource. Notable modifications from the Draft SEIS to the Final SEIS include the following:

- A summary of the P-8A maritime patrol mission was added to Chapter 1.1.
- Table ES-3 of the Executive Summary was updated to show the correct number of EA-18G operations at NAS Whidbey Island under 2014 baseline conditions, as well as under Alternatives 1 and 2 (note: these numbers were shown correctly in Tables 2-7, 5-1, and 6-4 of the Draft SEIS).
- Chapters 4.2.4 and 6.2.4 were added to include a summary of studies related to nonauditory health effects.
- Chapters 5.2.4 and 6.2.6 were added to describe noise abatement measures at NAS Whidbey Island.
- Chapter 3.2.4 was added to provide a description of the noise complaint process at NAS Jacksonville, Chapter 5.2.5 was added to provide a description of the noise complaint process at NAS Whidbey Island, and Chapter 7.2 included the addition of the noise complaint process at MCB Hawaii Kaneohe Bay.
- Chapter 6.3.2 was updated to include information regarding aircraft fuel dumping and the use of lead in jet fuel.
- Chapters 5.8.4 and 6.8.4 were updated to include information and analysis on the streaked horned lark that was listed as threatened and the Taylor's checkerspot that was listed as endangered by USFWS on October 3, 2013.
- Chapter 6.9.1 was updated to include the results of ongoing consultation with the Washington State Historic Preservation Office.
- Chapters 8.9.1 and 8.9.2 were updated to include the results of a letter from the State of Hawaii Historic Preservation Division to MCB Hawaii Kaneohe Bay, dated September 13, 2013.
- Agency correspondence, received since publication of the Draft SEIS, was added to Appendix C.
- Appendix I (Public Meeting Summary Report) was added to provide a summary of the public meetings held for the Draft SEIS.
- Appendix J (Responses to Comments on the Draft SEIS) was added to provide responses to all comments received during the Draft SEIS public comment period.

2 Alternatives

This chapter describes the proposed action (Chapter 2.1), provides a summary of siting alternatives (Chapter 2.2), and lists the home basing alternatives (Chapter 2.3) considered in this SEIS. Also included is a description of siting alternatives (Chapter 2.4), a discussion of the alternatives considered but eliminated from further analysis (Chapter 2.5), a description of the preferred alternative (Chapter 2.6), and a summary comparison of the potential environmental consequences of the home basing alternatives (Chapter 2.7).

2.1 Description of Proposed Action

The proposed action is to provide facilities and functions to home base P-8A aircraft at two established maritime patrol home bases. The P-8A is a derivative of the Boeing 737-800 next-generation commercial aircraft and is equipped with upgraded systems capable of performing current and future maritime patrol force missions. The airframe design provides the Navy with enhanced warfighting capabilities while achieving efficiencies in operations and support.

Table 2-1 provides a comparison of the personnel and aircraft loading for P-3C and P-8A squadrons, and the change in personnel and aircraft loading for the P-8A squadrons. More detailed personnel loadings by installation and by alternative are provided in Chapter 2.4. In addition, this SEIS incorporates the latest P-8A program information and changes to circumstances at the home base locations. Based on the latest P-8A program information, it is anticipated each fleet squadron would consist of seven aircraft and 265 personnel (68 officers and 197 enlisted). This change represents an increase of one aircraft and 122 additional personnel per squadron. While the number of aircraft in the P-8A FRS would not change, the FRS would consist of 449 personnel (an increase of 32 personnel).

Table 2-1 Comparison of Navy Fleet P-3C and P-8A Squadron Composition

	P-3C	P-3C FRS	P-8A (FEIS)	P-8A FRS (FEIS)	P-8A (SEIS)	P-8A FRS (SEIS)
Aircraft Loading						
Total Number of Squadrons	12	1	12	1	12	1
Aircraft Authorized per Squadron	8	12	6	12	7	12
Number of Aircraft	96	12	72	12	84	12
Personnel Loading						
Personnel per Squadron	325	566	143	417	265	449
Total Squadron Personnel	3,900	566	2,616[1]	533[1]	3,180[2]	449[2]

Notes:
1 2008 FEIS squadron total includes contractor support personnel providing aircraft maintenance support.
2 SEIS squadron total does not include contractor support personnel; as discussed in Chapter 1.1, the P-8A program has adopted a traditional squadron maintenance concept.

Under both Alternatives 1 and 2, a presence in Hawaii would be maintained. A presence in Hawaii is defined as a permanent detachment of two P-8A aircraft and 102 personnel rotating to MCB Hawaii Kaneohe Bay. The detachments would support U.S. Pacific Command (PACOM) requirements.

Under all alternatives, including the No Action, temporary detachment operations would occur at NB Coronado to support training in the SOCAL range complex. Furthermore, the P-8A FRS would remain at NAS Jacksonville under all proposed alternatives.

The transition of all fleet squadrons from P-3C to P-8A aircraft is currently scheduled to be completed by 2020. The Navy timeline for P-3C retirement, including curtailing maintenance practices and support functions, is the primary driver for transition to the P-8A.

The proposed action, as described in the 2008 FEIS, was to provide facilities and functions that support the home basing of the P-8A at established maritime patrol home bases. In the 2008 ROD, the Navy determined that five fleet squadrons and the FRS would be home based at NAS Jacksonville, four fleet squadrons at NAS Whidbey Island, and three fleet squadrons at MCB Hawaii Kaneohe Bay, with periodic squadron detachments for training at NB Coronado (Alternative 5 in the 2008 FEIS). The 2008 FEIS assumed each fleet squadron would consist of six aircraft and 143 personnel, and the FRS would consist of 12 aircraft and 417 personnel. By April 2014, four of six squadrons at NAS Jacksonville will have transitioned from the P-3C to the P-8A, and the FRS will consist of a combination of P-3C and P-8A aircraft. No P-8A transitions or related facility improvements would have occurred at NAS Whidbey Island or MCB Hawaii Kaneohe Bay. Full operating capability would occur when the last P-3C fleet squadron is transitioned to P-8A aircraft at all home base locations. Under all alternatives, including the No Action, temporary detachment operations at NB Coronado would remain the same as described in the 2008 FEIS and 2008 ROD. Furthermore, the P-8A FRS would remain at NAS Jacksonville under all proposed alternatives, consistent with the 2008 ROD.

2.2 Summary of Siting Alternatives and the Preferred Alternative

In 2008, the Navy made a determination to home base 12 P-8A squadrons and the FRS at three installations (NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay) but is now proposing to home base at two installations (NAS Jacksonville and NAS Whidbey Island) based on the budgetary need to further minimize the cost of new construction and associated potential environmental impacts. Reuse of existing facilities minimizes new construction and environmental impacts. The following factors were considered in developing the alternatives:

- Supporting the strategic laydown as defined in the Quadrennial Defense Review of 2010, which identifies an increased emphasis on the Pacific theater;
- Maintaining existing operational requirements as supported through established east and west coast continental U.S. (CONUS) maritime patrol home base locations;
- Maximizing existing infrastructure and minimizing the need for new construction to the extent practicable;
- Maintaining a presence in Hawaii; and
- Continuing training support in the SOCAL range complex.

With the exception of the increased emphasis on the Pacific theater as outlined in the Quadrennial Defense Review of 2010, each of these factors was also considered in developing alternatives for the 2008 FEIS. In consideration of these factors, the Navy has concluded that home basing P-8A squadrons at two locations (rather than three) could provide potential cost savings while still meeting current strategic operational objectives. This document considers home basing P-8A fleet squadrons and the FRS at two locations in order to meet the current requirements of the Navy, maximize the efficiency of support facilities and simulation devices, and optimize the number of personnel required.

NAS Jacksonville has existing facilities appropriately sized to support five or six squadrons of P-8A aircraft plus the FRS. NAS Whidbey Island has existing facilities appropriately sized to support three P-3C squadrons. Since the P-3C aircraft is smaller and has different facility requirements than the P-8A, new facilities would need to be constructed to home base P-8A squadrons at NAS Whidbey Island. Home basing fewer than five squadrons and the FRS at NAS Jacksonville would result in additional construction and environmental impacts at NAS Whidbey Island. Siting anything fewer than five squadrons and the FRS at NAS Jacksonville also creates excess capacity (underutilized existing facilities and functions) at NAS Jacksonville. Accordingly, the process for developing home basing alternatives sought to ensure the efficient and economical transition to the P-8A at two locations.

This SEIS analyzes the following alternatives:

Alternative 1. Alternative 1 considers the environmental effects of home basing P-8A squadrons at two locations: six fleet squadrons and the FRS at NAS Jacksonville and six fleet squadrons at NAS Whidbey Island. Alternative 1 considers a permanent, rotating squadron detachment at MCB Hawaii Kaneohe Bay and periodic squadron detachments at NB Coronado.

Alternative 2. Alternative 2 considers the environmental effects of home basing P-8A squadrons at two locations: five fleet squadrons and the FRS at NAS Jacksonville and seven fleet squadrons at NAS Whidbey Island. Alternative 2 considers a permanent, rotating squadron detachment at MCB Hawaii Kaneohe Bay and periodic squadron detachments at NB Coronado.

No Action Alternative. The No Action Alternative represents current conditions in April 2014 to be used as a baseline of comparison against which environmental consequences can be measured. The No Action Alternative describes the conditions if no further implementation of the 2008 ROD were to occur. The No Action Alternative represents conditions at the time of a new home basing decision:

- At NAS Jacksonville, training facilities and hangars exist to support the P-8A transition. By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft.
- At NAS Whidbey and MCB Hawaii Kaneohe Bay, facilities and functions exist to continue supporting P-3C operations as the P-8A transition has not begun at these locations.

The No Action Alternative does not meet the purpose of and need for the proposed action to provide facilities and functions to home base at two locations; however, the No Action Alternative is carried forward for analysis as it represents a baseline condition against which environmental consequences can be measured.

Preferred Alternative. Alternative 1, home basing six fleet squadrons and the FRS at NAS Jacksonville and six fleet squadrons at NAS Whidbey Island, is the preferred alternative because it meets mission requirements, optimizes operational efficiencies related to training and logistics support functions, minimizes environmental impacts, and provides cost savings compared to Alternative 2. Alternative 1 presents the greatest re-use of existing facilities and optimizes manpower, simulators, and facilities at NAS Jacksonville and NAS Whidbey Island.

The alternatives being considered in this SEIS are summarized in Table 2-2. Further descriptions of both of the siting alternatives are provided in Chapter 2.4.1 (Aircraft Loading), 2.4.2 (Airfield Operations), 2.4.3 (Personnel Loading), and 2.4.4 (Facilities).

2.3 Home Basing Locations

P-3C patrol squadrons are home based at three locations: NAS Jacksonville[5], NAS Whidbey Island, and MCB Hawaii Kaneohe Bay, with periodic detachments at NB Coronado.

[5] Since the ROD, NAS Brunswick has closed in accordance with the Defense Base Closure and Realignment (BRAC) Act of 1990, as amended in 2005. All P-3C assets and supporting personnel have been transferred to NAS Jacksonville.

Table 2-2 Summary of Siting Alternatives[1]

SEIS Alternatives	P-8A Home Basing Locations			
	NAS Jacksonville	NAS Whidbey Island	MCB Hawaii Kaneohe Bay	NB Coronado
ALT 1	6 P-8A Fleet Squadrons and FRS	6 P-8A Fleet Squadrons	Permanent, Rotating P-8A Squadron Detachment	Periodic P-8A Squadron Detachments
ALT 2	5 P-8A Fleet Squadrons and FRS	7 P-8A Fleet Squadrons	Permanent, Rotating P-8A Squadron Detachment	Periodic P-8A Squadron Detachments
No Action Alternative[2]	4 P-8A Fleet Squadrons and FRS; 2 P-3C Fleet Squadrons	3 P-3C Fleet Squadrons	3 P-3C Fleet Squadrons	Periodic P-3C and P-8A Squadron Detachments

Notes:

[1] The No Action Alternative represents current conditions in April 2014 to be used as a baseline of comparison against which environmental consequences can be measured. The No Action Alternative describes the conditions if no further implementation of the 2008 ROD were to occur.

[2] Two P-3C squadrons at NAS Jacksonville and three P-3C squadrons at NAS Whidbey Island and MCB Hawaii Kaneohe Bay would continue to operate under the No Action Alternative. The No Action Alternative does not meet the purpose and need for the proposed action, but it is carried forward for analysis because it represents a baseline condition against which environmental consequences can be measured.

2.3.1 NAS Jacksonville

NAS Jacksonville occupies 3,896 acres in Jacksonville, Florida (Duval County), west of the St. Johns River and approximately 15 miles from the Atlantic Ocean (see Figure 2-1). Duval County lies along the northeast coast of Florida and is bordered by Nassau County to the north, Baker County to the west, Clay and St. Johns counties to the south, and the Atlantic Ocean to the east.

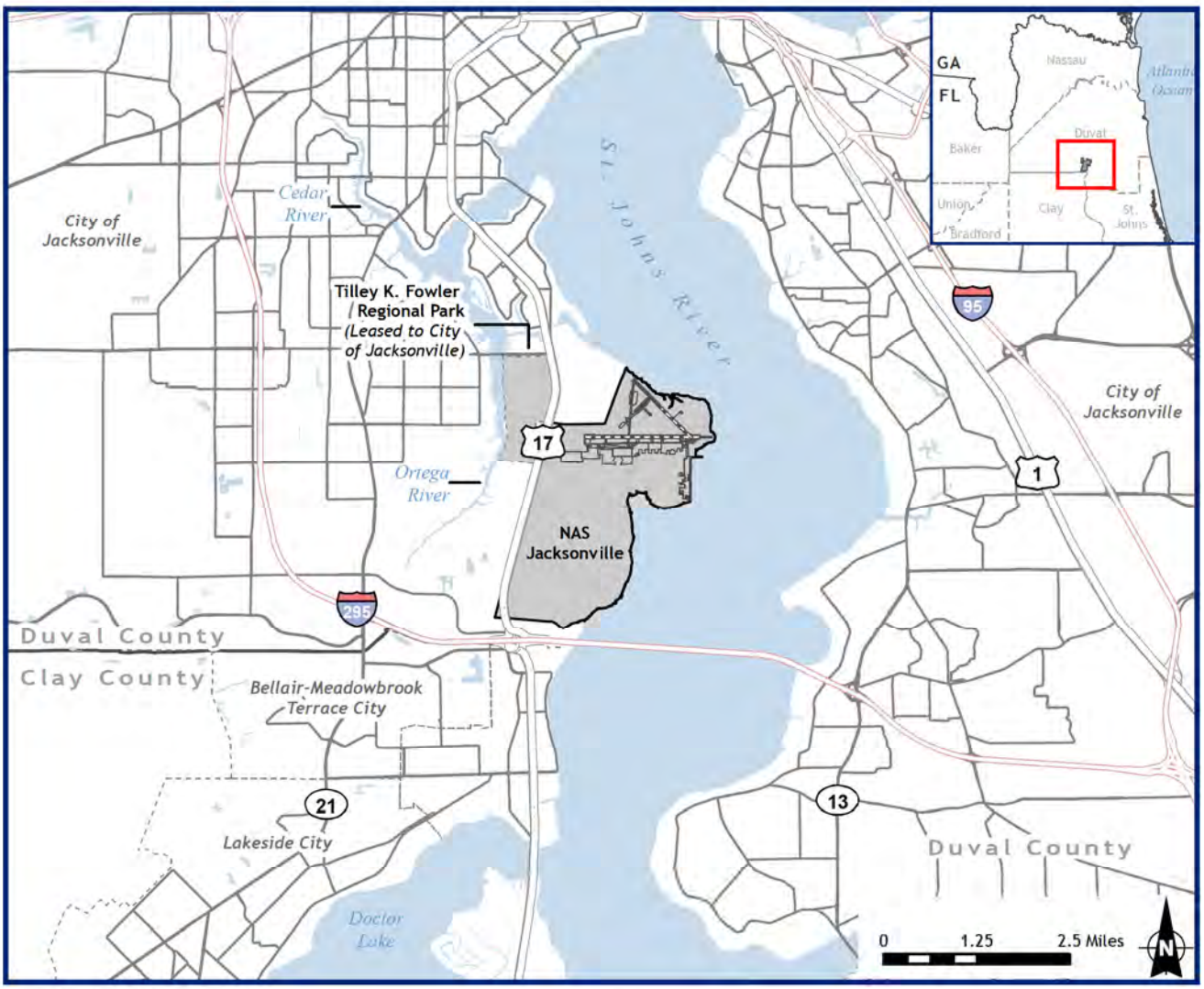
NAS Jacksonville serves as the host for the Commander Patrol and Reconnaissance Wing (CPRW) 11 and VP-30, which is the FRS for the P-3C and P-8A. NAS Jacksonville hosts six fleet squadrons of P-3C and P-8A aircraft (VP-8, VP-10, VP-26, VP-5, VP-16, and VP-45), one reserve squadron of P-3C aircraft (VP-62), one reserve logistics squadron of C-40 aircraft (VR-58), one reserve squadron of C-130 aircraft (VR-62), and six SH-60/HH-60/MH-60 helicopter squadrons.

The 2008 ROD directed home basing of five fleet squadrons and one FRS at NAS Jacksonville. Construction of facilities identified in the 2008 ROD to support P-8A home basing at NAS Jacksonville has been completed, and the transition to the P-8A is being implemented. By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft.

2.3.2 NAS Whidbey Island

NAS Whidbey Island is located in Oak Harbor, Washington (Island County), 50 miles north of Seattle (see Figure 2-2). Whidbey Island forms the northern boundary of Puget Sound and is located at the eastern end of the Strait of Juan de Fuca.

The air station is home to 17 active duty squadrons, two reserve squadrons, and numerous tenant commands. NAS Whidbey Island serves as the host for CPRW-10. NAS Whidbey Island is the home base for three fleet P-3C squadrons (VP-1, VP-40, and VP-46), one reserve squadron of P-3C aircraft (VP-69), and one EP-3 aircraft squadron (VQ-1). NAS Whidbey Island is also home to the VAQ community, which includes nine carrier air wing (CVW) VAQ fleet squadrons (EA-6B Prowler and EA-18G Growler aircraft), three Expeditionary VAQ squadrons, and the VAQ FRS, which support the CVW and expeditionary missions. The air station also supports a Navy Reserve C-9 squadron (VR-61) in addition to the station's MH-60 search-and-rescue helicopters.



Source: ESRI, 2012; UF Geoplan Center, 2007; NAS Jacksonville, 2012

Figure 2-1
General Location Map - NAS Jacksonville
Jacksonville, Florida

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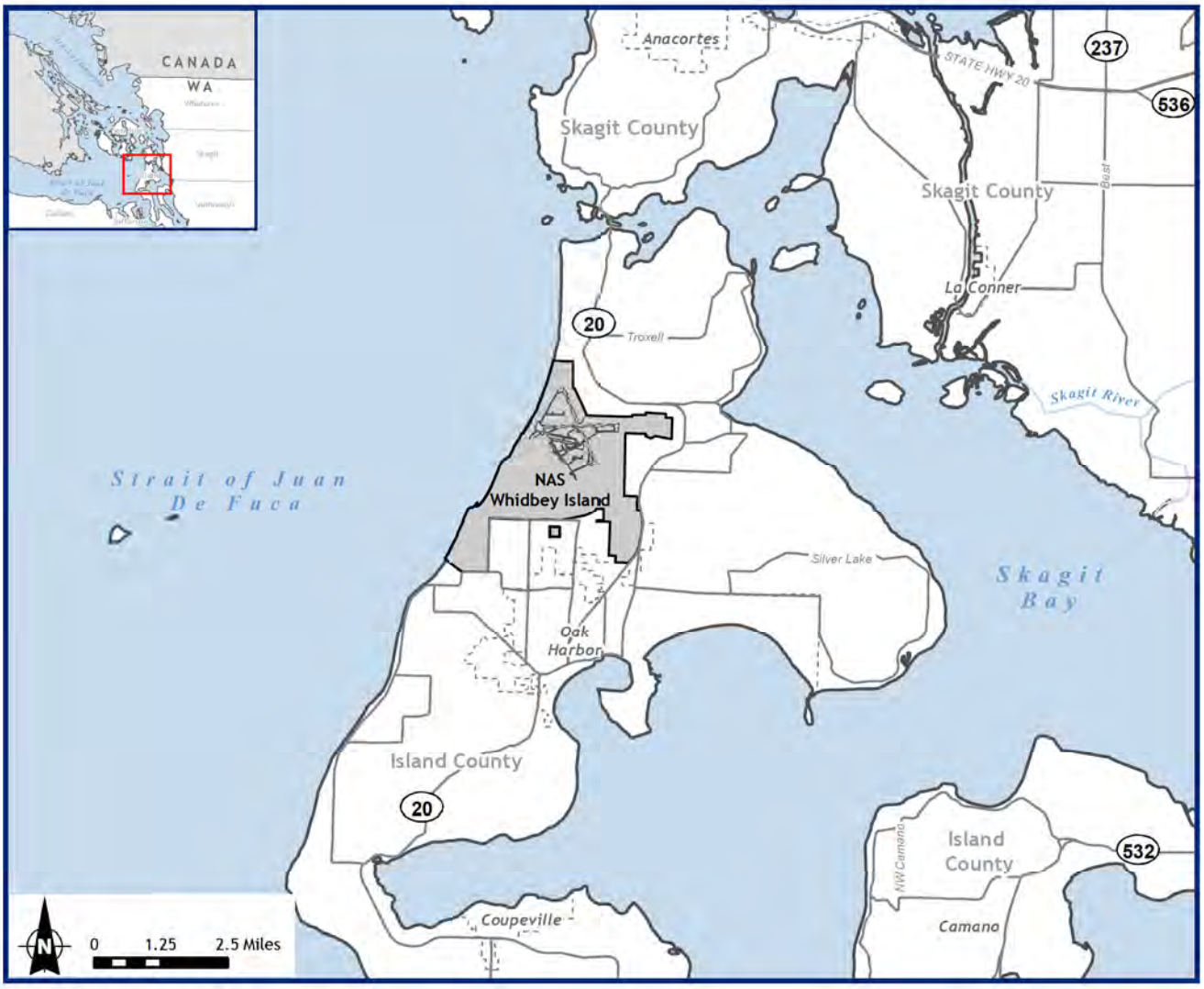

Source: ESRI, 2012; NAVFAC GeoRedness Center, 2006; NAS Whidbey Island, 2013

Figure 2-2
General Location Map - NAS Whidbey Island
Whidbey Island, Washington

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The air station would transition the Expeditionary VAQ squadrons from the retiring EA-6B Prowler to the EA-18G Growler in the 2012-2014 timeframe, including relocation of one reserve Expeditionary VAQ EA-6B (transitioning to EA-18G) squadron from Joint Base Andrews, and adding up to 11 EA-18G aircraft to the VAQ FRS. Since the 2008 ROD, the Navy has decided to disestablish the VQ-1 and VQ-2 squadrons at NAS Whidbey Island. This disestablishment was not known at the time of the 2008 ROD; therefore, VQ-1 and VQ-2 personnel and air operations were considered as part of the baseline and end-state in the analysis supporting the 2008 FEIS. At the time of the 2008 ROD, it was anticipated existing P-3C squadrons at NAS Whidbey Island would begin transitioning to P-8A aircraft in the 2016-2017 timeframe.

2.3.3 MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay is located on Mokapu Peninsula on the windward (east) side of Oahu, near the communities of Kaneohe and Kailua (see Figure 2-3). The base is approximately 12 miles northeast of Honolulu. MCB Hawaii Kaneohe Bay is one of several USMC properties managed by MCB Hawaii Kaneohe Bay on Oahu. The installation is home to the Third Marine Regiment, Marine Aircraft Group 24, and the Third Radio Battalion. MCB Hawaii Kaneohe Bay serves as the host for the CPRW-2. CPRW-2 provides expeditionary patrol and reconnaissance forces in support of the Third, Fifth, and Seventh fleet operations. MCB Hawaii Kaneohe Bay hosts three fleet squadrons of P-3C aircraft (VP-4, VP-9, and VP-47), one Special Projects Patrol P-3C unit (VPU-2), one reserve logistics squadron (VR-51), one squadron of H-60 helicopters (HSL-37), one squadron of CH-53 helicopters (HMH-463), and a squadron of AH-1 and UH-1 helicopters (HMLA-367).

Pursuant to the MV-22 EIS ROD (Navy 2012), two squadrons of MV-22 aircraft (VMM-268 and VMM-363) will be home based at MCB Hawaii Kaneohe Bay beginning in 2015. A squadron of unmanned aircraft (VMU-3) is planned to relocate to MCB Hawaii Kaneohe Bay beginning in 2014; although based at MCB Hawaii Kaneohe Bay, VMU-3 operations would initially be conducted at other military installations. Since the 2008 ROD, the Navy has decided to disestablish the VPU-2 squadron at MCBH Kaneohe Bay. This disestablishment was not known at the time of the 2008 ROD; therefore, VPU-2 personnel and air operations were considered as part of the baseline and end-state in the analysis supporting the 2008 FEIS. At the time of the 2008 ROD, it was anticipated that existing P-3C squadrons at MCB Hawaii Kaneohe Bay would begin transitioning to P-8A aircraft in the 2016 timeframe.

2.3.4 Periodic Training Detachments at Naval Base Coronado

No change is proposed to the temporary detachment operations at NB Coronado as authorized by the 2008 ROD; therefore, NB Coronado will not be discussed further or analyzed in this document. NB Coronado is the location for temporary detachment operations to support fleet training exercises in the SOCAL range complex. The number of air operations projected in the 2008 FEIS for NB Coronado will not change; the level of operations is based on fleet training exercises and not the number of squadrons at a certain location.

Historically, training detachments of P-3C aircraft have deployed temporarily to NB Coronado for training sorties. Detachments typically last 14 days; over the course of a year, detachments are present at NB Coronado approximately 180 days. Existing facilities would be sufficient for hosting temporary detachments of P-8A squadrons; no new construction would be required. Because of the short duration of detachment time, P-8A aircraft do not require their own hangar. The P-8A aircraft would be parked on the existing aircraft parking apron. Construction of training facilities and buildings to house aircraft simulators would not be required.

2.4 Description of Siting Alternatives

2.4.1 Aircraft Loading

The following provides the aircraft loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay for the 2014 baseline and both of the home basing alternatives specific to the P-3C and P-8A squadrons. As presented in Table 2-1, the authorized aircraft for each of the P-8A fleet squadrons has increased from six to seven aircraft per squadron to meet war-fighting requirements. The authorized aircraft for each of the P-3C squadrons is eight aircraft. However, based on the aging inventory of P-3C aircraft, some of the P-3C squadrons are operating with less than the full authorized aircraft per squadron; therefore, the assumption that the full complement of eight P-3C aircraft per squadron would be operating at each of the installations would be conservative.

2.4.1.1 NAS Jacksonville Aircraft Loading

The 2008 ROD authorized five P-8A fleet squadrons and the FRS to be home based at NAS Jacksonville (42 aircraft). Transition to the P-8A is underway at NAS Jacksonville based on the 2008 ROD. Under Alternative 1, NAS Jacksonville would home base six fleet squadrons and the FRS (54 P-8A aircraft). Under Alternative 2, NAS Jacksonville would home base five fleet squadrons and the FRS (47 P-8A aircraft). Table 2-3 provides a comparison of baseline and end-state P-3C and P-8A aircraft loading by alternative.

Table 2-3 Comparison of 2014 Baseline (No Action Alternative) and 2020 End-State P-3C and P-8A Aircraft Loading at NAS Jacksonville

	2014 Baseline (No Action Alternative)		2020 End-State (P-8A)	
	P-3C	P-8A[1]	ALT 1	ALT 2
Number of Fleet Squadrons	2	4	6	5
Aircraft Authorized per Squadron	8	7	7	7
Fleet Aircraft Authorized	16	28	42	35
FRS Aircraft Authorized	6	6	12	12
Total Aircraft Loading	22	13[1]	54	47

Note:

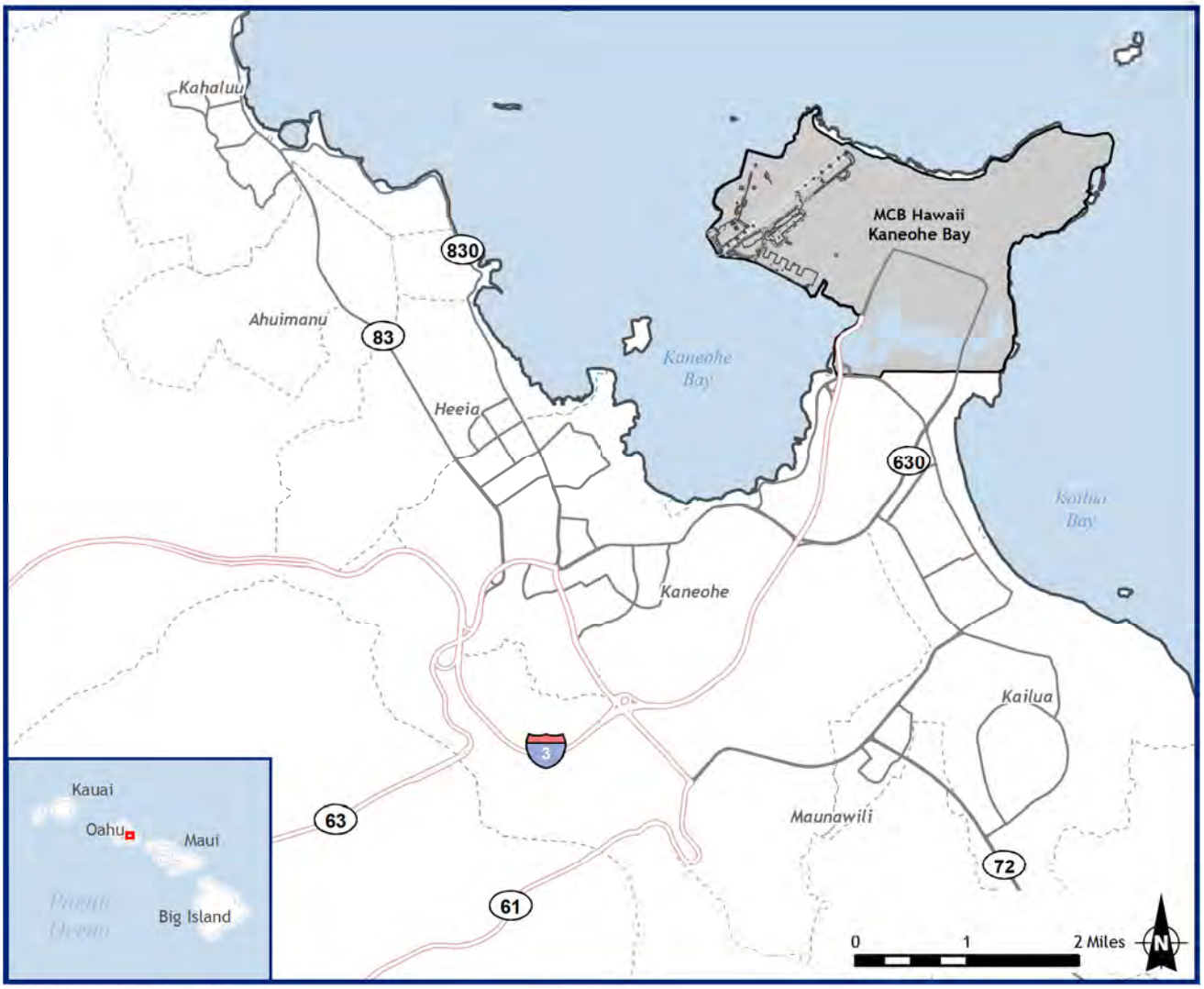
[1] By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft. In 2014, personnel and infrastructure requirements will be in place, and P-8A flight aircrews will be flying the full number of projected flight events using a smaller complement of P-8A aircraft. This condition would continue until the full complement of P-8A aircraft is delivered.

2.4.1.2 NAS Whidbey Island Aircraft Loading

The 2008 ROD authorized four P-8A fleet squadrons to be home based at NAS Whidbey Island (24 P-8A aircraft). Alternative 1 would home base six fleet squadrons (42 P-8A aircraft); Alternative 2 would home base seven P-8A fleet squadrons (49 P-8A aircraft). Table 2-4 provides a comparison of baseline and end-state P-3C and P-8A aircraft loading by alternative.

Table 2-4 Comparison of 2014 Baseline and 2020 End-State P-3C and P-8A Aircraft Loading at NAS Whidbey Island

	2014 Baseline (No Action Alternative)		2020 End-State (P-8A)	
	P-3C	P-8A	ALT 1	ALT 2
Number of Fleet Squadrons	3	0	6	7
Aircraft Authorized per Squadron	8	0	7	7
Number of Aircraft	24	0	42	49



Source: ESRI,2012; MCBH Kaneohe Bay, 2007

Figure 2-3
General Location Map - MCB Hawaii Kaneohe Bay
Oahu, Hawaii

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2.4.1.3 MCB Hawaii Kaneohe Bay Aircraft Loading

The 2008 ROD authorized three fleet squadrons to be home based at MCB Hawaii Kaneohe Bay (18 P-8A aircraft). Under Alternatives 1 and 2, no fleet squadrons would be home based at MCB Hawaii Kaneohe Bay; however, two P-8A aircraft would rotate on a permanent basis to support PACOM requirements. Table 2-5 provides a comparison of baseline and end-state P-3C and P-8A aircraft loading by alternative.

Table 2-5 Comparison of 2014 Baseline and 2020 End-State P-3C and P-8A Aircraft Loading at MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative)		2020 End-State (P-8A)
	P-3C	P-8A	ALTs 1 and 2[1]
Number of Fleet Squadrons	3	0	0
Aircraft Authorized per Squadron	8	0	0
Number of Aircraft	24	0	0
Detachment Aircraft[1]	0	0	2
Total Aircraft Loading	24	0	2

Note:
[1] Under Alternatives 1 and 2, P-8A aircraft are not assigned to MCB Hawaii Kaneohe Bay. PACOM requirements would be met by rotating detachments of two P-8A aircraft to MCB Hawaii Kaneohe Bay.

2.4.2 Airfield Operations

For this SEIS, the Navy used the Naval Aviation Simulation Model (NASMOD) as the best available tool for modeling airfield flight operations to support the noise assessment and other operational planning. NASMOD is a computer simulation model for analyzing a wide range of military aviation operational alternatives. The projected number of annual aircraft operations was derived using the updated Patrol Reconnaissance Group Project P-8A Syllabus. Air operations in the 2008 FEIS analysis were estimated based on a new and untested airframe and training simulator system. Since 2008, ongoing data analysis and evolving training requirements based on simulator fidelity have resulted in a decrease in the number of air operations expected. Additionally, the flight profiles are better understood with the completion of the flight test program. Currently, trained fleet (non-FRS) pilots would be expected to use a simulator for approximately 70 percent of their training requirements (unique to the P-8A program), with the remaining 30 percent of their training conducted in the air. Training requirements and the number of flights for FRS pilots have not changed.

P-3C and P-8A squadrons are not based aboard aircraft carriers; therefore, neither P-3C nor P-8A aircraft currently conduct field carrier landing practice (FCLP) operations at any of the home bases or related OLFs.

2.4.2.1 NAS Jacksonville Airfield Operations

The total number of P-8A operations at NAS Jacksonville at end-state year 2020 under Alternatives 1 and 2 would be up to 17 percent less than the 27,480 baseline P-3C/P-8A operations. Under Alternative 1, 24,000 P-8A operations would occur, a 13-percent decrease, and under Alternative 2, 22,821 operations would occur, a 17-percent decrease. Table 2-6 provides a comparison of baseline and end-state aircraft operations by alternative.

Table 2-6 Comparison of 2014 Baseline and 2020 End-State Airfield Operations at NAS Jacksonville

	2014 Baseline (No Action Alternative)	2020 End-State[1, 2]	
		ALT 1	ALT 2
P-3C[3]	13,596	0	0
P-8A[3]	13,884	24,000	22,821
C-130	446	446	446
H-60	8,732	8,732	8,732
C-40	852	852	852
E-2C	1,404	1,404	1,404
PA-42	259	259	259
Other Transient Aircraft	4,450	4,450	4,450
Total Airfield	**43,623**	**40,143**	**38,964**

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 The projected decrease in P-8A operations compared to baseline P-3C and P-8A operations is associated with an increased use of simulators for P-8A training, unique to the P-8A program, which offsets in-aircraft flights.

3 P-3C and P-8A squadrons are not based aboard aircraft carriers; therefore, neither P-3C nor P-8A aircraft currently conduct FCLP operations at NAS Jacksonville or OLF Whitehouse.

2.4.2.2 NAS Whidbey Island Airfield Operations

The total number of P-8A operations at NAS Whidbey Island at end-state year 2020 under Alternatives 1 and 2 would be up to 30 percent less than the baseline P-3C operations. Under Alternative 1, 10,290 P-8A operations would occur (a 30-percent decrease), and under Alternative 2, 11,618 operations would occur (a 21-percent decrease). Table 2-7 provides a comparison of baseline and end-state aircraft operations by alternative.

2.4.2.3 MCB Hawaii Kaneohe Bay Airfield Operations

The total number of Navy aircraft operations at MCB Hawaii Kaneohe Bay at end-state year 2020 under Alternatives 1 and 2 would be 99 percent less than the 20,189 baseline P-3C operations. Under Alternatives 1 and 2, 208 P-8A operations, a 99-percent decrease, would be projected to occur. Table 2-8 provides a comparison of baseline and end-state Navy aircraft operations by alternative.

Table 2-7 Comparison of 2014 Baseline and 2020 End-State Airfield Operations at NAS Whidbey Island

	2014 Baseline (No Action Alternative)	2020 End-State[1, 2, 3, 4, 5]	
		ALT 1	ALT 2
P-3C[7]	14,629	0	0
P-8A[7]	0	10,290	11,618
EA-18G[2, 3]	50,577	50,577	50,577
EP-3[6]	4,870	0	0
C-9A	874	0	0
C-40	0	2,277	2,277
Other Transient Aircraft	516	1,390	1,390
Total Airfield	**71,466**	**64,534**	**65,862**

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 The analysis assumes that all electronic attack operations in 2014 would be conducted by EA-18G aircraft. It is anticipated that one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014 and would contribute approximately 1,100 EA-6B operations, or about 2 percent of the total annual EA-18G operations, until fully transitioned to EA-18G aircraft.

3 EA-18G operations under Alternatives 1 and 2 do not include the addition of two new expeditionary VAQ squadrons at NAS Whidbey Island. The addition of new EA-18G aircraft at NAS Whidbey Island and related impacts to airfield operations are being evaluated in a separate EIS.

4 The projected decrease in P-8A operations compared to baseline P-3C operations is associated with an increased use of simulators for P-8A training, unique to the P-8A program, which offsets in-aircraft flights.

5 During the transition to the P-8A when both P-3Cs and P-8As are present, the combined number of P-3C and P-8A operations will not exceed the number of P-3C operations under baseline conditions.

6 The VQ-1 squadron (EP-3 aircraft) at NAS Whidbey Island will be disestablished by the end-state year of the proposed action, 2020.

7 P-3C and P-8A squadrons are not based aboard aircraft carriers; therefore, neither P-3C nor P-8A aircraft currently conduct FCLP operations at Ault Field or OLF Coupeville.

Table 2-8 Comparison of 2014 Baseline and 2020 End-State Navy Aircraft Operations at MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative)	2020 End-State[1]
		ALTs 1 and 2
P-3C[2]	20,189	0
P-8A[2]	0	208
Total Navy Aircraft Operations	**20,189**	**208**

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 P-3C and P-8A squadrons are not based aboard aircraft carriers; therefore, neither P-3C nor P-8A aircraft currently conduct FCLP operations at MCB Hawaii Kaneohe Bay.

2.4.3 Personnel Loading

The following provides the personnel loading at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay for the 2014 baseline and both of the home basing alternatives specific to the P-3C and P-8A squadrons.

2.4.3.1 NAS Jacksonville Personnel Loading

Table 2-9 provides a comparison of baseline and end-state P-3C and P-8A personnel loading, by alternative, for NAS Jacksonville. The total number of P-8A personnel at NAS Jacksonville at end-state year 2020 under Alternatives 1 and 2 would be up to 26 percent less than the baseline P-3C and P-8A personnel loading. The number of P-8A personnel under Alternative 1 would total 2,197, a 16-percent decrease compared to the baseline personnel numbers. Under Alternative 2, the number of P-8A personnel would total 1,932, a 26-percent decrease compared to baseline personnel numbers.

Table 2-9 Comparison of 2014 Baseline and 2020 End-State P-3C and P-8A Personnel Loading at NAS Jacksonville

	2014 Baseline P-3C/P-8A Personnel (No Action Alternative)[1]	ALT 1 (6 squadrons + FRS)		ALT 2 (5 squadrons + FRS)	
		P-8A Personnel (2020)	Change (+/-) from 2014	P-8A Personnel (2020)	Change (+/-) from 2014
Officers	615	574	-41	506	-109
Enlisted	2,004	1,623	-381	1,426	-578
Total	**2,619**	**2,197**	**-422**	**1,932**	**-687**

Note:
1 The 2014 baseline assumes four of six P-8A squadrons, two P-3C squadrons, and a combination P-3C/P-8A FRS.

2.4.3.2 NAS Whidbey Island Personnel Loading

Table 2-10 provides a comparison of baseline and end-state P-3C and P-8A personnel loading, by alternative, for NAS Whidbey Island. The total number of P-8A personnel at NAS Whidbey Island at end-state year 2020 under Alternatives 1 and 2 would either decrease by 5 percent or increase by 9 percent compared to baseline P-3C personnel. P-8A personnel under Alternative 1 would total 1,768 (a 5-percent decrease). Under Alternative 2, the number of P-8A personnel would total 2,033 (a 9-percent increase).

Table 2-10 Comparison of 2014 Baseline and 2020 End-State P-3C and P-8A Personnel Loading at NAS Whidbey Island

	2014 Baseline P-3C Personnel (No Action Alternative)[1]	ALT 1 (6 squadrons)		ALT 2 (7 squadrons)	
		P-8A Personnel (2020)	Change (+/-) from 2014	P-8A Personnel (2020)	Change (+/-) from 2014
Officers	487	488	+1	556	+69
Enlisted	1,371	1,280	-91	1,477	+106
Total	**1,858**	**1,768**	**-90[2]**	**2,033**	**+175[2]**

Notes:
1 The 2014 baseline assumes three P-3C squadrons and no P-8A squadrons.
2 The projected decrease in personnel at NAS Whidbey Island under Alternative 1 and slight increase under Alternative 2, despite an increase in aircraft loading under both alternatives, is the result of fewer personnel assigned to a P-8A squadron compared to a P-3C squadron.

2.4.3.3 MCB Hawaii Kaneohe Bay Personnel Loading

The total number of P-8A personnel at MCB Hawaii Kaneohe Bay at end-state year 2020 under Alternatives 1 and 2 would be 93 percent less than the baseline P-3C personnel loading. P-8A personnel under Alternatives 1 and 2 would total 102, a 93-percent decrease. Table 2-11 provides a comparison of baseline and end-state P-3C and P-8A personnel loading by alternative.

Table 2-11 Comparison of 2014 Baseline (No Action Alternative) and 2020 End-State P-3C and P-8A Personnel at MCB Hawaii Kaneohe Bay

		ALTs 1 and 2 (permanent squadron detachment)	
	P-3C Personnel (2014)[1]	P-8A Personnel (2020)	Change (+/-) from 2014
Officers	358	15	-343
Enlisted	1,085	87	-998
Total	**1,443**	**102**[2, 3]	**-1,341**

Notes:
[1] The 2014 baseline assumes three P-3C squadrons and no P-8A squadrons.
[2] The 102 P-8A personnel are transient and therefore not permanently assigned to MCB Hawaii Kaneohe Bay.
[3] There would be a loss of approximately 75 civilian/contract personnel at MCB Hawaii Kaneohe Bay. Approximately 85 civilians are currently employed in the maintenance of P-3C aircraft. The P-8A detachment under Alternatives 1 and 2 would only require 10 civilian/contract personnel.

2.4.4 Facilities

The Navy conducted facility assessments at each installation to determine new construction or renovation requirements and potential site locations at each alternative home base. Table 2-12 summarizes facility renovation square footage, new-construction-area acreage, new impervious surface acreage, and total construction costs associated with each alternative at the home base locations.

Sustainable design principles will be included in the design and construction of projects in accordance with applicable laws and executive orders (i.e., EO 13423 and EO 13514). Facilities will meet Leadership in Energy and Environmental Design (LEED) ratings and comply with the Energy Policy Act of 2005 and Energy Independence and Security Act of 2007. Low Impact Development (LID) will be included in the design and construction of the projects as appropriate.

Table 2-12 Facility Summary for All Installations

	ALT 1	ALT 2	No Action Alternative
NAS Jacksonville			
P-8A and P-3C Squadrons	6 P-8A Fleet Squadrons and FRS	5 P-8A Fleet Squadrons and FRS	4 P-8A Fleet Squadrons and FRS; 2 P-3C Fleet Squadrons
Facility Renovation (square feet)	2,723	2,723	0
New Construction Area (acres)	36.10	36.10	0
New Impervious Surface (acres)	12.89	12.89	0
Total Construction Costs	**$20,752,000**	**$20,752,000**	**$0**

Table 2-12 Facility Summary for All Installations

	ALT 1	ALT 2	No Action Alternative
NAS Whidbey Island			
P-8A and P-3C Squadrons	6 P-8A Fleet Squadrons	7 P-8A Fleet Squadrons	3 P-3C Fleet Squadrons
Facility Renovation (square feet)	96,125	96,125	0
New Construction Area (acres)	13.76	21.86	0
New Impervious Surface (acres)	9.16	15.76	0
Total Construction Costs	**$111,097,258**	**$180,200,104[2]**	**$0**
MCB Hawaii Kaneohe Bay			
P-8A and P-3C Squadrons	Permanent, Rotating P-8A Squadron Detachment	Permanent, Rotating P-8A Squadron Detachment	3 P-3C Fleet Squadrons
Facility Renovation (square feet)	26,490	26,490	0
New Construction Area (acres)	1.62	1.62	0
New Impervious Surface (acres)	1.1	1.1	0
Total Construction Costs[1]	**$11,260,000**	**$11,260,000**	**0**

Notes:

1 Total construction costs include all project costs associated with readying the installation for the P-8A aircraft. These costs can include new facility construction, renovation, and/or reconfiguration of existing facilities; mitigation actions; and remediation procedures. Construction costs vary between installations and under different alternatives based on an installation's unique set of needs and on the number of aircraft proposed under each alternative.

2 Alternative 2 would require two additional simulators at an approximate cost of $40M not already captured in the total construction costs presented above.

2.4.4.1 NAS Jacksonville Facilities

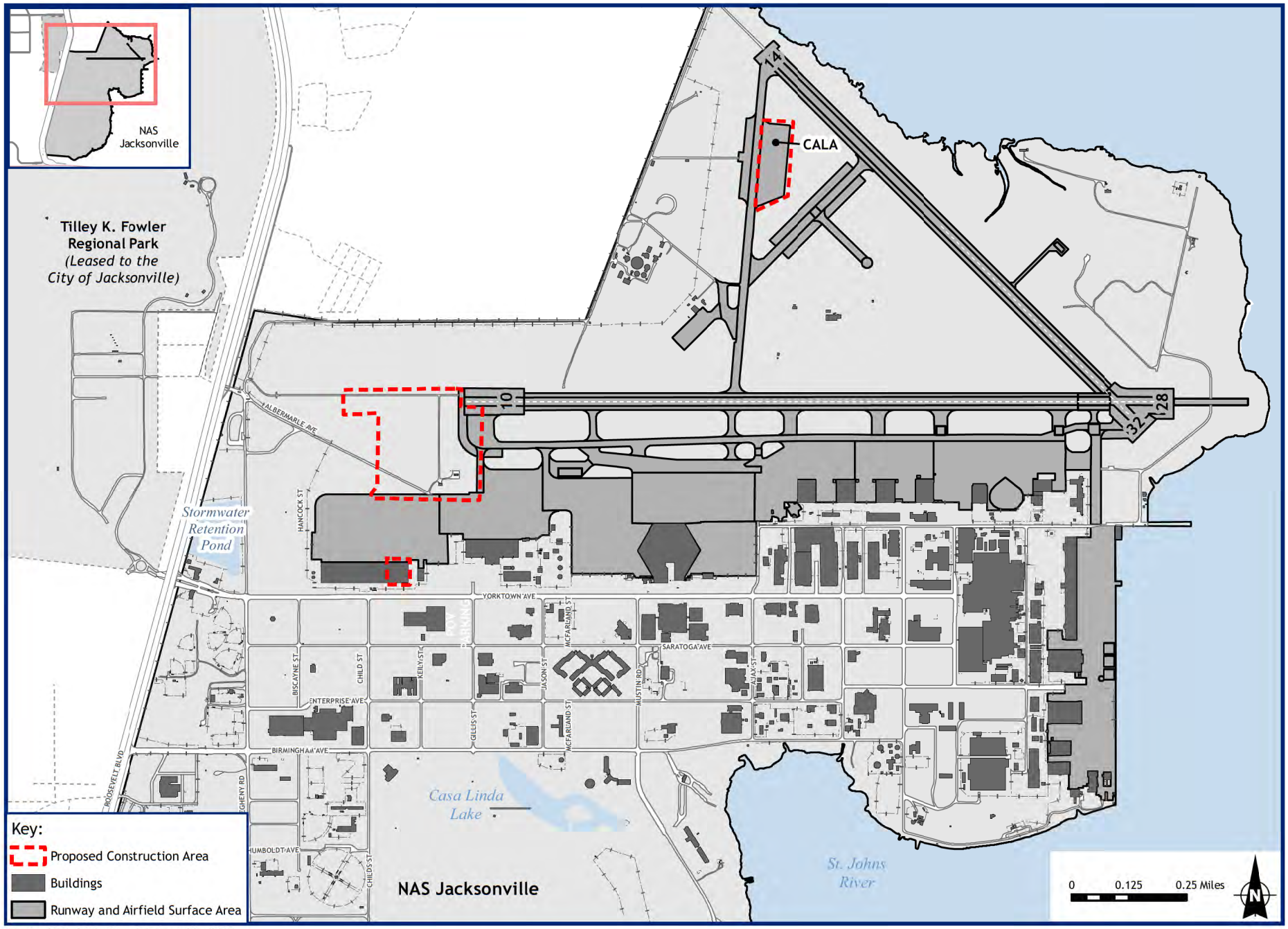
Alternatives 1 and 2 would require facility renovation and construction at NAS Jacksonville (see Figure 2-4 and 2-5 for an overview of the proposed construction projects). The proposed MILCON planning includes one project, in FY 2014.

Both siting alternatives would require the following:

- Construction of a 1,000-foot-long overrun to the approach end of Runway 10;
- Construction of a parallel taxiway and taxiway connectors for the overrun;
- Construction of a new, 400-foot-long asphalt blast pad at the west end of the overrun;
- Renovation of portions of Hangar 511; and
- Reconfiguration of the existing Combat Aircraft Loading Area (CALA) to accommodate two P-8A aircraft.

Site preparation for all facilities would include site clearing, excavation, and preparation for construction. Paving and site improvements include grading, construction of roadways, and landscaping.

Construction of the 1,000-foot overrun would include installation of runway edge lights, runway threshold lights, runway guard lights, runway centerline lights, and taxiway edge lights. The overrun is required to provide P-8A aircraft with sufficient safety margins when operating fully loaded in low air density conditions—i.e., on hot and humid days.



Source: ESRI, 2012; City of Jacksonville, 2007; NAS Jacksonville, 2012

Figure 2-4
Proposed Construction Areas - NAS Jacksonville
Jacksonville, Florida

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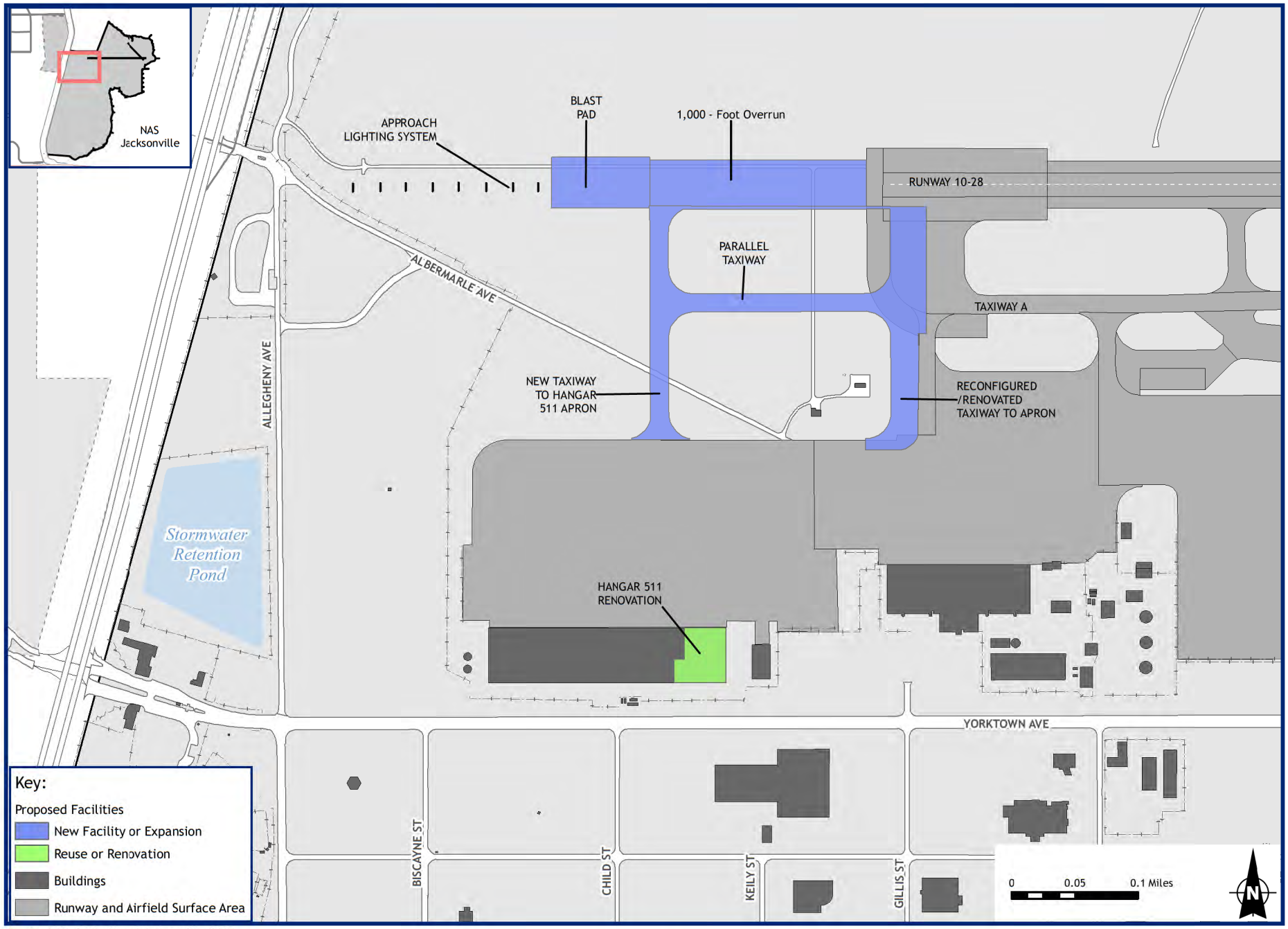

Source: ESRI, 2012; City of Jacksonville, 2007; NAS Jacksonville, 2012

Figure 2-5
Layout of Planned Facilities at NAS Jacksonville
Jacksonville, Florida

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Hangar 511 renovations would include interior alterations for a planned tug pull-through lane, changes in the interior adjoining shop space, reconfiguration of door controls, and reconfiguration of office and shop spaces.

Construction of the P-8A trainer facility and associated parking to support the P-8A at NAS Jacksonville was analyzed in the 2008 FEIS. Construction of these facilities is complete and is supporting the P-8A mission already underway at NAS Jacksonville. Additional P-8A aircraft would be accommodated by the Hangar 511. Sufficient space exists on the parking apron near the hangar.

2.4.4.2 NAS Whidbey Island Facilities

Alternatives 1 and 2 would require facility renovation and construction at NAS Whidbey Island (See Figures 2-6 and 2-7 for an overview of the proposed construction projects). The proposed MILCON planning includes two phases for Alternative 1: one in FY 14 and one in FY15. Alternative 2 would require three phases: one in FY14, one in FY15, and one in FY16.

Both siting alternatives would require the following:

- Demolition of existing Building 126 (housing P-3C simulator support equipment and personnel) and construction of a new two-story P-8A trainer facility (101,104 sq ft);
- Modification of 4,320 sq ft of Building 2738 for additional classroom and instructor office space for P-8A training;
- Demolition of existing Building 2704 (storage for deployable gear and equipment for home-ported Mobile Tactical Operations Center [MTOC] units) and renovation of Building 2771 (20,000 sq ft) for a MTOC;
- Construction of a new two-story Tactical Operations Center (TOC) (20,621 sq ft) adjacent to Building 2771, including space for Wing 10 administration;
- Expansion of Hangar 6 (14,059 sq ft) and hangar bay modification (20,059 sq ft);
- Temporary expansion of Hangar 9 (6,000 sq ft) to fully enclose P-3C aircraft during the construction period;
- Reuse and minor interior renovation to Hangar 7 (53,739 sq ft) to accommodate VQ-1 squadron relocation out of Hangar 6;
- Construction of a Sensitive Compartmented Information Facility adjacent to Hangar 7 (1,000 sq ft)];
- Modifications to Building 2740 for reuse as a Sensitive Compartmented Information Facility;
- Construction of a Ground Support Equipment Shop (3,500 sq ft) and Outdoor Storage Area (12,000 sq ft) adjacent to Hangar 6, to be surrounded by approximately 825 feet of chainlink fence; and
- Renovation and reuse of Building 219 as storage to house deployable gear and equipment for home-ported MTOC units.

Modifications to Hangar 6 involve cutting notches in the hangar structure above the centerline of the bay doors to allow ingress/egress of P-8A aircraft, and replacement of the existing hangar doors. In addition, the existing maintenance bays would be extended to provide required clearances between interior walls and aircraft.

Alternatives 1 and 2 would require expansion of the existing aircraft parking ramp and paving of additional area for aircraft parking. Approximately 400,000 sq ft would be required for Alternative 1 (six squadrons), while approximately 697,000 sq ft would be required for Alternative 2 (seven squadrons). Expansion of the apron requires demolition of Buildings 2707, 2666, 2786, 2621A, 2635, 2800, 2528, and 2621. Expansion of the existing apron would also require relocation of the existing aircraft rinse facility (6,300 sq ft) and relocation of the existing liquid oxygen (LOX) and sonobuoy storage facilities (16,203 sq ft).

Alternative 2 (seven squadrons) requires construction of a new two-bay P-8A hangar bay (83,087 sq ft) adjacent to Hangar 6 to house two additional P-8A aircraft. Construction of the new hangar would not be required under Alternative 1. The hangar would require demolition of Buildings 2888, 2889, and 2890 and would contain a high-bay space and crew and equipment space.

Alternatives 1 and 2 also require construction of new vehicle parking (8,810 sq ft) on the west side of Charles Porter Avenue to support the additional squadron personnel.

2.4.4.3 MCB Hawaii Kaneohe Bay Facilities

No new structures would be required to accommodate a permanent detachment under Alternatives 1 and 2. Modification of the interiors of the existing TOC (Building 6470) and Hangar 104 would accommodate P-8A detachment aircrews. Existing taxiway and shoulder at the aircraft parking apron would be expanded to accommodate a taxiway for the P-8A. The existing aircraft rinse facility would be expanded to accommodate the larger P-8A airframe. See Figures 2-8 and 2-9 for an overview of the proposed facilities.

2.4.5 Summary of Alternatives

Table 2-13 provides a summary of proposed aircraft loading, aircraft operations, personnel loading, and new construction at the home bases under each of the alternatives.

2.5 Alternatives Considered but Eliminated from Supplemental Analysis

Alternatives 1, 3, 4, 5, and 6 considered in the 2008 FEIS do not meet the supplemental purpose and need to support home basing at two locations; therefore, the alternatives for home basing at three locations were eliminated from further analysis.

2.6 Preferred Alternative

Alternative 1, home basing six fleet squadrons and the FRS at NAS Jacksonville and six fleet squadrons at NAS Whidbey Island, is the preferred alternative because it meets mission requirements, optimizes operational efficiencies related to training and logistics support functions, minimizes environmental impacts, and provides cost savings compared to Alternative 2. Alternative 1 presents the greatest re-use of existing facilities and optimizes manpower, simulators, and facilities at NAS Jacksonville and NAS Whidbey Island.

2.7 Comparison of Alternatives

Table 2-14 summarizes the environmental consequences, both beneficial and adverse, of each alternative. Potential impacts on individual resource areas are discussed in more detail in Chapter 4 (NAS Jacksonville); Chapter 6 (NAS Whidbey Island); and Chapter 8 (MCB Hawaii Kaneohe Bay). These chapters also describe proposed methods for avoiding, minimizing, and, where necessary, mitigating impacts.

Table 2-13 Summary of Proposed P-8A Home Basing Alternatives

	Aircraft Loading	Aircraft Operations[2]	Personnel Loading	New Construction
NAS Jacksonville				
2014 Baseline (No Action Alternative) (4 P-8A Fleet Squadrons and FRS; 2 P-3C Fleet Squadrons)	35[1]	27,480	2,619	$0
Alternative 1 (6 P-8A Fleet Squadrons and FRS) (net change)	54 (+19)	24,000 (-3,480)	2,197 (-422)	$20,752,000
Alternative 2 (5 P-8A Fleet Squadrons and FRS) (net change)	47 (+12)	22,821 (-4,659)	1,932 (-687)	$20,752,000
NAS Whidbey Island				
2014 Baseline (No Action Alternative) (3 P-3C Fleet Squadrons)	24	14,629	1,858	$0
Alternative 1 (6 P-8A Fleet Squadrons) (net change)	42 (+18)	10,290 (-4,339)	1,768 (-90)[3]	$111,097,258
Alternative 2 (7 P-8A Fleet Squadrons) (net change)	49 (+25)	11,618 (-3,011)	2,033 (+175)[3]	$180,200,104
MCB Hawaii Kaneohe Bay				
2014 Baseline (No Action Alternative) (3 P-3C Fleet Squadrons)	24	20,189	1,443	$0
Alternative 1 (Permanent Rotating Squadron Detachment) (net change)	2 (-22)	208 (-19,981)	102[4] (-1,341)	$11,260,000
Alternative 2 (Permanent Rotating Squadron Detachment) (net change)	2 (-22)	208 (-19,981)	102[4] (-1,341)	$11,260,000

Notes:

1 By April 2014, four of six squadrons will have transitioned from P-3C to P-8A aircraft, and the FRS will consist of a combination of P-3C and P-8A aircraft. In 2014, personnel and infrastructure requirements will be in place, and P-8A flight aircrews will be flying the full number of projected flight events using a smaller complement of P-8A aircraft. This condition would continue until the full complement of P-8A aircraft is delivered.

2 The projected decrease in P-8A operations compared to baseline P-3C operations is associated with an increased use of simulators for P-8A training, unique to the P-8A program, which offsets in-aircraft flights.

3 The projected decrease in personnel at NAS Whidbey Island under Alternative 1 and slight increase under Alternative 2, despite an increase in aircraft loading under both alternatives, is the result of fewer personnel assigned to a P-8A squadron compared to a P-3C squadron.

4 The 102 P-8A personnel are transient and therefore not permanently assigned to MCB Hawaii Kaneohe Bay.

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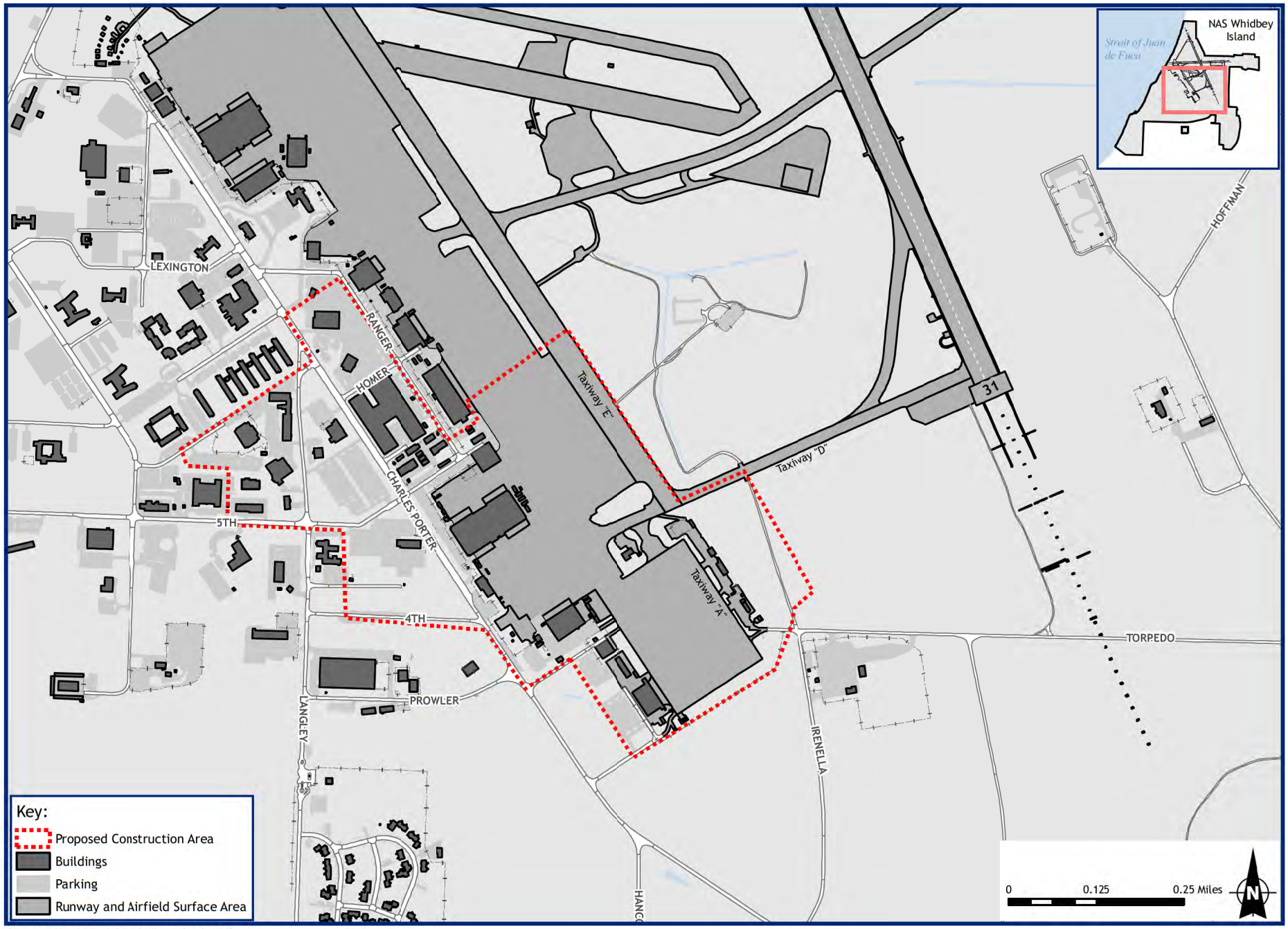

Source: ESRI, 2012; NAS Whidbey Island, 2013

Figure 2-6
Proposed Construction Area - NAS Whidbey Island
Whidbey Island, Washington

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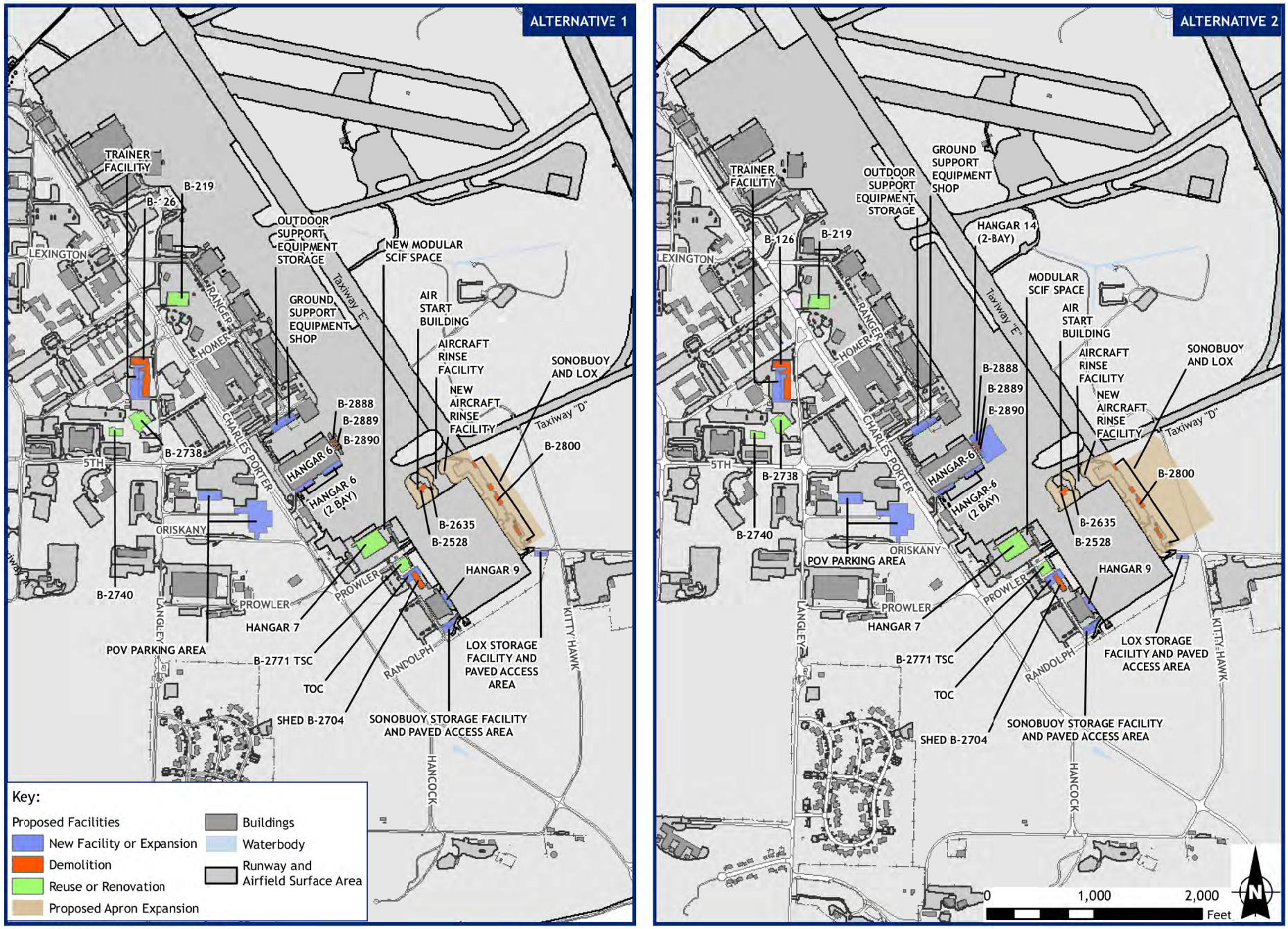

Source: ESRI, 2012; NAS Whidbey Island, 2013

Figure 2-7
Layout of Planned Facilities per Alternative at
NAS Whidbey Island, Whidbey Island, Washington

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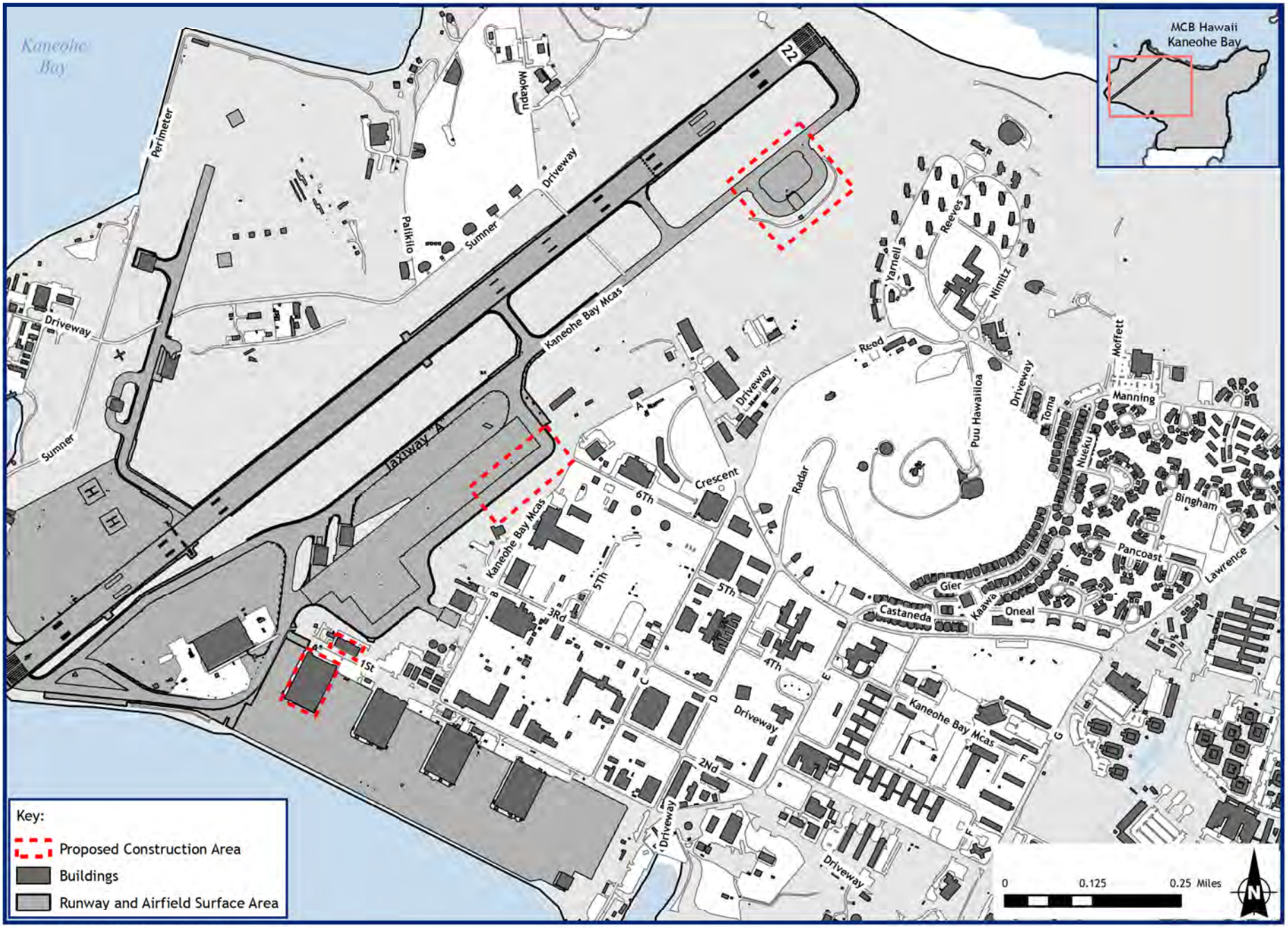

Source: ESRI, 2012; MCBH Kaneohe Bay, 2007.

Figure 2-8
Proposed Construction Areas - MCB Hawaii Kaneohe Bay
Oahu, Hawaii

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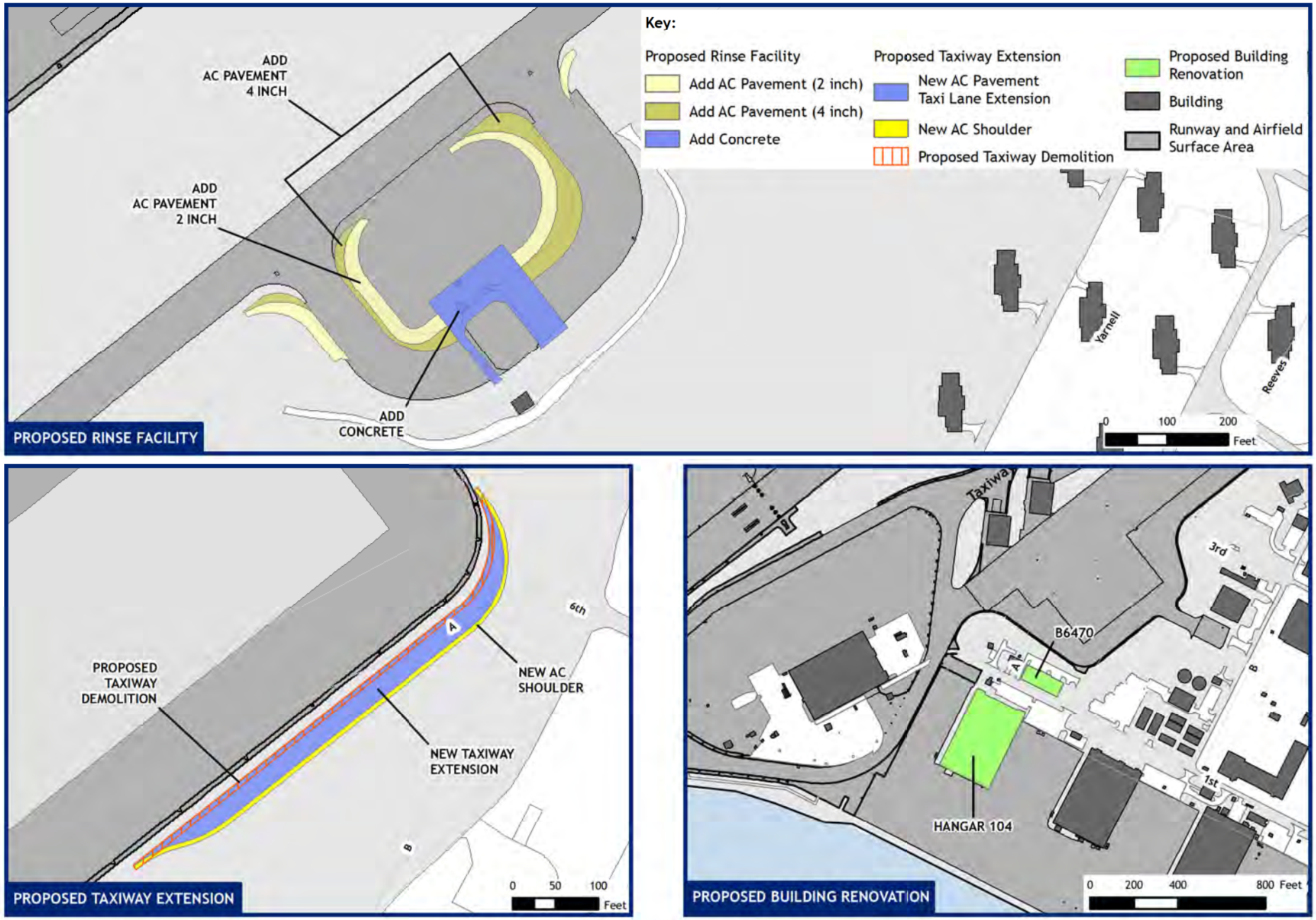

Source: ESRI, 2012; MCBH Kaneohe Bay, 2007; 2013.

Figure 2-9
Layout of Planned Facilities for
MCB Hawaii Kaneohe Bay, Oahu, Hawaii

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Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Airfield Operations	**NAS Jacksonville** No adverse impacts to airspace and airfield operations. 8% decrease in total airfield operations. **NAS Whidbey Island** No adverse impacts to airspace and airfield operations. 10% decrease in total airfield operations. **MCB Hawaii Kaneohe Bay** No adverse impacts to airspace or airfield operations. 99% decrease in Navy aircraft operations.	**NAS Jacksonville** No adverse impacts to airspace and airfield operations. 11% decrease in total airfield operations. **NAS Whidbey Island** No adverse impacts to airspace and airfield operations at NAS Whidbey. 8% decrease in total airfield operations. **MCB Hawaii Kaneohe Bay** No adverse impacts to airspace or airfield operations. 99% decrease in Navy aircraft operations.	No change in airfield operations at any home bases.
Noise	**NAS Jacksonville** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. 9% increase in off-station area and increase of 68 people within the greater than or equal to 65 dB DNL noise contour. No populations are considered at risk for potential hearing loss (PHL) as no populations are located within the 80 dB DNL or greater noise contour. **NAS Whidbey Island** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep	**NAS Jacksonville** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. 8% increase in off-station area and increase of 56 people within the greater than or equal to 65 dB DNL noise contour. No populations are considered at risk for PHL as no populations are located within the 80 dB DNL or greater noise contour. **NAS Whidbey Island** No significant operational or construction noise impacts. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep	No change in off-station area and population of 1,093 persons exposed to DNL greater than or equal to 65 dB at NAS Jacksonville. No change in off-station area and population of 11,636 persons exposed to DNL greater than or equal to 65 dB at NAS Whidbey Island. No change in off-station area and population exposed to DNL greater than or equal to 65 dB at MCB Hawaii Kaneohe Bay.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
	disturbance. Less than 1% increase in off-station area, 1 acre of additional residential land, and increase of 11 people within the greater than or equal to 65 dB DNL noise zone. No new populations would be at risk for PHL under Alternatives 1 or 2. **MCB Hawaii Kaneohe Bay** No significant operational or construction noise impacts. P-8A contribution to the overall noise environment at MCB Hawaii Kaneohe Bay would be negligible.	disturbance. Less than 1% increase in off-station area, 1 acre of additional residential land, and increase of 16 people within the greater than or equal to 65 dB DNL noise zone. No new populations would be at risk for PHL under Alternatives 1 or 2. **MCB Hawaii Kaneohe Bay** No significant operational or construction noise impacts. P-8A contribution to the overall noise environment at MCB Hawaii Kaneohe Bay would be negligible.	
Air Quality	**NAS Jacksonville** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary. **NAS Whidbey Island** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary. **MCB Hawaii Kaneohe Bay** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary.	**NAS Jacksonville** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary. **NAS Whidbey Island** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants, except for a slight increase in NO_X. Construction emissions would be temporary. **MCB Hawaii Kaneohe Bay** No adverse impacts to air quality. Projected decrease in operating emissions for all criteria pollutants. Construction emissions would be temporary.	No construction emissions or change in regional air quality at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Land Use	**NAS Jacksonville** No significant impacts to local and regional land use. 4 additional acres of residential land within greater than 65 dB DNL noise zone. **NAS Whidbey Island** No significant impacts to local and regional land use. 1 additional acre of residential land within greater than 65 dB DNL noise zone. **MCB Hawaii Kaneohe Bay** No significant impacts to local and regional land use. No off-station land use impacted by aircraft operations.	**NAS Jacksonville** No significant impacts to local and regional land use. 3 additional acres of residential land within greater than 65 dB DNL noise zone. **NAS Whidbey Island** No significant impacts to local and regional land use. 1 additional acre of residential land within greater than 65 dB DNL noise zone. **MCB Hawaii Kaneohe Bay** No significant impacts to local and regional land use. No off-station land use impacted by aircraft operations.	No change to local or regional land use at any home base.
Socioeconomics – Population and Housing	**NAS Jacksonville** No significant impacts to population and housing. 0.1% decrease in regional population. **NAS Whidbey Island** No significant impacts to population and housing. 0.2% decrease in regional population. **MCB Hawaii Kaneohe Bay** No significant impacts to population and housing. 0.3% decrease in regional population.	**NAS Jacksonville** No significant impacts to population and housing. 0.2% decrease in regional population. **NAS Whidbey Island** No significant impacts to population and housing. 0.5% increase in regional population. **MCB Hawaii Kaneohe Bay** No significant impacts to population and housing. 0.3% decrease in regional population.	No change in regional population in the vicinity of any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Socioeconomics – Regional Economy	**NAS Jacksonville** No significant impacts to regional economy. Increase of $20.8M in economic benefits generated by one-time construction expenditures and a decrease of $46.4M in total military employee annual earnings. **NAS Whidbey Island** No significant impacts to regional economy. Increase of $111.1M in economic benefits generated by one-time construction expenditures and a decrease of $8.4M in total military employee annual earnings. **MCB Hawaii Kaneohe Bay** Significant negative impacts to regional economy. Increase of $11.3M in economic benefits generated by one-time construction expenditures and a decrease of $211.8M in total annual earnings.	**NAS Jacksonville** No significant impacts to regional economy. Increase of $20.8M in economic benefits generated by one-time construction expenditures and a decrease of $81.0M in total military employee annual earnings. **NAS Whidbey Island** No significant impacts to regional economy. Increase of $180.2M in economic benefits generated by one-time construction expenditures and an increase of $25.2M in total military employee annual earnings. **MCB Hawaii Kaneohe Bay** Significant negative impacts to regional economy. Increase of $11.3M in economic benefits generated by one-time construction expenditures and a decrease of $211.8M in total annual earnings.	No change in military employee total annual earnings at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Socioeconomics – Education	**NAS Jacksonville** No significant impacts to Duval County School District. Less than 1% decrease in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **NAS Whidbey Island** No significant impacts to the Oak Harbor School District. 0.7% decrease in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **MCB Hawaii Kaneohe Bay** Potential significant negative fiscal implications for local schools. 17.4% decrease in total school district enrollment.	**NAS Jacksonville** No significant impacts to the Duval County School District. Less than 1% decrease in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **NAS Whidbey Island** No Significant impacts to the Oak Harbor School District. 1.8% increase in total school district enrollment. No change to classroom learning interference relative to 2014 baseline. **MCB Hawaii Kaneohe Bay** Potential significant negative fiscal implications for local schools. 17.4% decrease in total school district enrollment.	No change in school district enrollment in the vicinity of any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Socioeconomics – Environmental Justice	**NAS Jacksonville** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **NAS Whidbey Island** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **MCB Hawaii Kaneohe Bay** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children.	**NAS Jacksonville** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **NAS Whidbey Island** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children. **MCB Hawaii Kaneohe Bay** No disproportionately high and adverse human health and environmental effects on minority and low income populations. No environmental health or safety risks for children.	No disproportionately high and adverse human health and environmental effects on minority and low income populations, and no environmental health or safety risks for children at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Topography and Soils	**NAS Jacksonville** No significant impact to topography and soils from addition of 12.89 acres of new impervious surface. **NAS Whidbey Island** No significant impact to topography and soils from addition of fill material and 9.16 acres of new impervious surface. **MCB Hawaii Kaneohe Bay** No significant impact to topography and soils from addition of 1.1 acres of new impervious surface.	**NAS Jacksonville** No significant impact to topography and soils from addition of 12.89 acres of new impervious surface. **NAS Whidbey Island** No significant impact to topography and soils from addition of fill material and 15.76 acres of new impervious surface. **MCB Hawaii Kaneohe Bay** No significant impact to topography and soils from addition of 1.1 acres of new impervious surface.	No change to topography, and no impacts to soils at any home bases.
Water Resources (water quality, floodplains, groundwater)	**NAS Jacksonville** No significant impact to water resources at NAS Jacksonville with implementation of storm water control measures. **NAS Whidbey Island** No significant impact to water resources at NAS Whidbey Island with implementation of storm water control measures. **MCB Hawaii Kaneohe Bay** No significant impacts to water resources with implementation of storm water control measures.	**NAS Jacksonville** No significant impact to water resources at NAS Jacksonville with implementation of storm water control measures. **NAS Whidbey Island** No significant impact to water resources at NAS Whidbey Island with implementation of storm water control measures. **MCB Hawaii Kaneohe Bay** No significant impacts to water resources with implementation of storm water control measures.	No impact to water resources at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Water Resources (wetlands)	**NAS Jacksonville** No impact to wetlands. **NAS Whidbey Island** Approximately 0.8 acre of wetland fill. Wetlands removed to construct new facilities would be replaced at an approved mitigation site through the Clean Water Act Section 404 permitting process. **MCB Hawaii Kaneohe Bay** No impact to wetlands.	**NAS Jacksonville** No impact to wetlands. **NAS Whidbey Island** Approximately 2.44 acres of wetland fill. Wetlands removed to construct new facilities would be replaced at an approved mitigation site through the Clean Water Act Section 404 permitting process. **MCB Hawaii Kaneohe Bay** No impact to wetlands.	No impact to wetlands at any home bases.
Biological Resources (vegetation, wildlife, marine mammals)	**NAS Jacksonville** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 12.89 acres of herbaceous vegetation. **NAS Whidbey Island** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 9.16 acres of herbaceous vegetation. **MCB Hawaii Kaneohe Bay** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 1.1 acres of herbaceous vegetation	**NAS Jacksonville** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 12.89 acres of herbaceous vegetation. **NAS Whidbey Island** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 15.76 acres of herbaceous vegetation. **MCB Hawaii Kaneohe Bay** No significant impact to vegetation, wildlife, or marine mammals. Permanent loss of approximately 1.1 acres of herbaceous vegetation	No impact to vegetation, wildlife, or marine mammals at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Biological Resources (threatened and endangered species)	**NAS Jacksonville** No effect on piping plover, red-cockaded woodpecker, manatee, wood stork, Eastern indigo snake, frosted salamander, sea turtles, or shortnose sturgeon. **NAS Whidbey Island** No effect on golden paintbrush, streaked horned lark, Taylor's checkerspot, Steller sea lion, humpback whale, Southern resident killer whale, Puget Sound/Georgia Basin bocaccio, Puget Sound Chinook salmon, Puget Sound steelhead, canary rockfish, yelloweye rockfish, southern eulachon, and southern North American green sturgeon populations. May affect, not likely to adversely affect the marbled murrelet and Coastal Washington-Puget Sound bull trout. **MCB Hawaii Kaneohe Bay** No effect on the round-leaved chaff-flower, Puukaa, white hibiscus, yellow hibiscus, Loulu palm, Ohai, Hawaiian stilt, Hawaiian common moorhen, Hawaiian coot, Hawaiian duck, Newell's shearwater, Hawaiian hoary bat, Hawaiian monk seal, humpback whale, sperm whale, green sea turtle, and hawksbill sea turtle.	**NAS Jacksonville** No effect on piping plover, red-cockaded woodpecker, manatee, wood stork, Eastern indigo snake, frosted salamander, sea turtles, or shortnose sturgeon. **NAS Whidbey Island** No effect on golden paintbrush, streaked horned lark, Taylor's checkerspot, Steller sea lion, humpback whale, Southern resident killer whale, Puget Sound/Georgia Basin bocaccio, Puget Sound Chinook salmon, Puget Sound steelhead, canary rockfish, yelloweye rockfish, southern eulachon, and southern North American green sturgeon populations. May affect, not likely to adversely affect the marbled murrelet and Coastal Washington-Puget Sound bull trout. **MCB Hawaii Kaneohe Bay** No effect on the round-leaved chaff-flower, Puukaa, white hibiscus, yellow hibiscus, Loulu palm, Ohai, Hawaiian stilt, Hawaiian common moorhen, Hawaiian coot, Hawaiian duck, Newell's shearwater, Hawaiian hoary bat, Hawaiian monk seal, humpback whale, sperm whale, green sea turtle, and hawksbill sea turtle.	No effect on threatened or endangered species at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Cultural Resources	**NAS Jacksonville** No effects on historic properties or archaeological resources are expected. **NAS Whidbey Island** Adverse effect on Building 410 (Hangar 6), a property eligible for listing on the National Register of Historic Places (NRHP). No effects on archaeological resources would be expected. The Navy and the Washington SHPO executed a Memorandum of Agreement (MOA) for the adverse effect on Hangar 6. **MCB Hawaii Kaneohe Bay** No adverse effects on historic properties are expected. No impacts on archaeological resources are expected. The Hawaii SHPO has concurred with the no adverse effect finding.	**NAS Jacksonville** No effects on historic properties or archaeological resources are expected. **NAS Whidbey Island** Adverse effect on Building 410 (Hangar 6), a property eligible for listing on the NRHP. No effects on archaeological resources would be expected. The Navy and the Washington SHPO executed a MOA for the adverse effect on Hangar 6. **MCB Hawaii Kaneohe Bay** No adverse effects on historic properties are expected. No impacts on archaeological resources are expected. The Hawaii SHPO has concurred with the no adverse effect finding.	No effect on architectural or archaeological resources at any home bases.
Hazardous Materials and Waste	**NAS Jacksonville** No significant impacts to public health and safety from hazardous materials and waste. **NAS Whidbey Island** No significant impacts to public health and safety from hazardous materials and waste. **MCB Hawaii Kaneohe Bay** No significant impacts to public health and safety from hazardous materials and waste.	**NAS Jacksonville** No significant impacts to public health and safety from hazardous materials and waste. **NAS Whidbey Island** No significant impacts to public health and safety from hazardous materials and waste. **MCB Hawaii Kaneohe Bay** No significant impacts to public health and safety from hazardous materials and waste.	No impacts related to hazardous materials and waste at any home bases.

Table 2-14 Comparison of Environmental Impacts by Alternative

Resource	ALT 1	ALT 2	No Action Alternative
Safety	**NAS Jacksonville** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **NAS Whidbey Island** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **MCB Hawaii Kaneohe Bay** No increased safety risks or aircraft incidents due to net decrease in Navy aircraft operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error.	**NAS Jacksonville** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **NAS Whidbey Island** No increased safety risks or aircraft incidents due to net decrease in airfield operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error. **MCB Hawaii Kaneohe Bay** No increased safety risks or aircraft incidents due to net decrease in Navy aircraft operations. Extensive use of flight simulators would minimize risk associated with aircraft mishaps due to pilot error.	No impacts related to safety at any home bases. P-3C aircraft would continue to operate until they reach the end of their service life.

Note:
[1] Impacts presented in this table for the proposed action alternatives represent a comparison of the 2014 baseline conditions with the proposed 2020 end-state associated with the alternatives.

Key:
DNL = Day-Night Average Sound Level.
MCB = Marine Corps Base.
NAS = Naval Air Station.
NPDES = National Pollutant Discharge Elimination System.
SHPO = State Historic Preservation Office.

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3 NAS Jacksonville Existing Environment

This chapter provides a description of the existing environment that could be affected by the proposed action at NAS Jacksonville. As directed by NEPA, Navy procedures for implementing NEPA (32 CFR Part 775), and Navy environmental instructions, the description of the affected environment focuses on those resources potentially subject to impacts. Therefore, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. As discussed in Chapter 1.3.2, three resource areas (infrastructure and utilities, community services, and transportation) have not been discussed in this SEIS for NAS Jacksonville because the proposed action would not result in noticeable effects to these resources. Resources at and in the vicinity of NAS Jacksonville would be affected by changes to aircraft operations and number of personnel, and new development on the installation. Therefore, the analysis of the affected environment includes the following: airspace and airfield operations, noise, air quality, land use, socioeconomics, topography and soils, water resources and wetlands, biological resources, cultural resources, hazardous materials and waste management, and safety.

3.1 Airspace and Airfield Operations

This chapter describes the existing airfield operations at NAS Jacksonville and the airspace in which the P-8A aircraft operate. The study area for airspace is the NAS Jacksonville airfield and airspace surrounding the station. This chapter does not address the operations or airspace at the training ranges that NAS Jacksonville aircraft utilize because those training activities would not change as a result of the proposed action. As noted in Chapter 1.3.4, the AFTT EIS/OEIS analyzes existing P-3C and future P-8A training requirements in at-sea portions of existing range complexes, OPAREAs, and testing ranges. P-3C and P-8A aircraft at NAS Jacksonville do not conduct any training operations at OLF Whitehouse; therefore, this SEIS does not analyze training operations at OLF Whitehouse because those training activities would not change as a result of the proposed action.

3.1.1 Airspace

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. Navigable airspace is considered to be airspace above the minimum altitudes of flight prescribed by regulations under U.S.C. Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 U.S.C. § 40102). Congress has charged the Federal Aviation Administration (FAA) with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of the airspace (49 U.S.C. § 40103(b); FAA Order 7400.2 2004). The FAA considers multiple and sometimes competing demands for airspace in relation to civil, commercial, and military aviation. Specific rules and regulations concerning airspace designation and management are listed in FAA Order 7400.2.

Under the National Airspace System, the airspace above NAS Jacksonville John Towers Field is designated as Class D airspace. The Class D airspace is a cylinder-shaped airspace from the surface to 2,600 feet above mean sea level (msl) within a 5.3-nautical-mile (NM) radius of the airfield. Air traffic control services to all aircraft operating within it are provided by the NAS Jacksonville Control Tower, and private and commercial air traffic is active in the airspace near NAS Jacksonville. Jacksonville Terminal Radar Approach Control, located at Jacksonville International Airport, provides the connection between the en-route traffic control service and John Towers Field within the airspace delegated by the Jacksonville Air Route Traffic Control Center.

Aircraft flying patterns approaching or departing from John Towers Field normally fly specific routes, i.e., flight tracks. Flight tracks are represented as single lines on maps and depict the average route of the

aircraft over the ground. These routes were established on the basis of land use and obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current operational characteristics of the aircraft operating at NAS Jacksonville. These tracks are affected by aircraft performance, pilot technique, other air traffic, and weather conditions such that the actual flight path (or track) is an airway corridor up to 8 nautical miles wide rather than a single line as depicted on the maps. P-8A flight tracks associated with John Towers Field are illustrated in Figure 3-1.

3.1.2 Airfield Operations

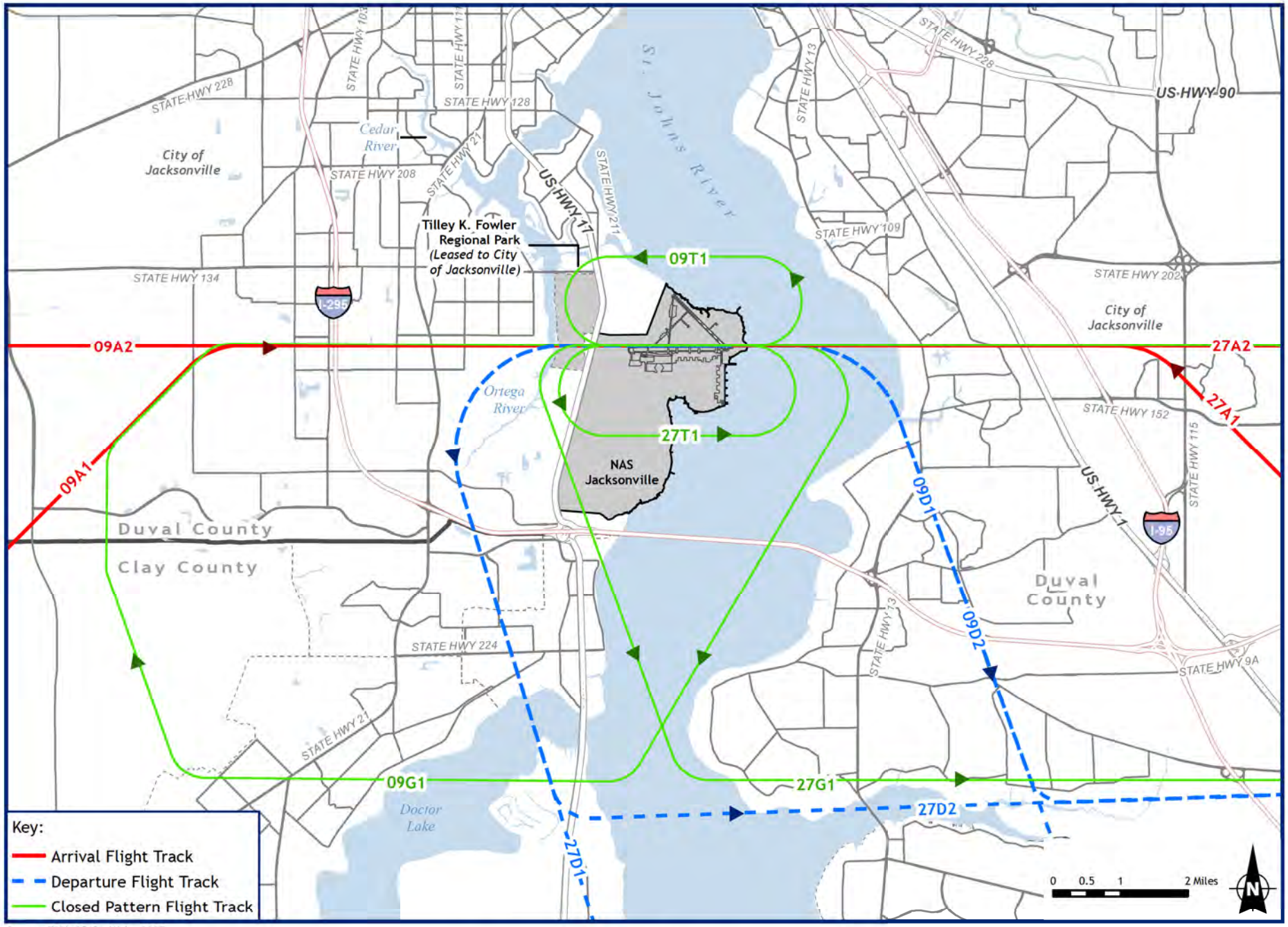
The airfield at NAS Jacksonville (John Towers Field) consists of two intersecting runways, Runway 10/28 and Runway 14/32. Runway 10/28 is a Class B Runway, 8,000 feet long, and is the primary runway for military fixed-wing aircraft. Runway 14/32 is a Class A runway, 5,977 feet long, and is frequently used for pattern work by helicopters. John Towers Field is open 7 days per week, 24 hours per day.

A flight operation refers to any takeoff or landing. The takeoff and landing may be part of a training maneuver (or pattern) associated with the air station runway or may be associated with a departure or arrival of an aircraft.

Basic flight operations at NAS Jacksonville are:

- **Departure.** An aircraft taking off to a local training area, a non-local training area, or as part of a training maneuver.
- **Straight-In/Full-Stop Arrival.** An aircraft lines up on the runway centerline, descends gradually, lands, comes to a full stop, and then taxis off the runway.
- **Instrument Arrival.** An aircraft approaches the runway 500 feet above the altitude of the landing pattern. Approximately halfway down the runway, the aircraft performs a 180-degree turn to enter the landing pattern. Once established in the pattern, the aircraft lowers landing gear and flaps and performs a 180-degree descending turn to land on the runway.
- **Ground-Controlled Approach Box.** A radar or "talk down" approach directed from the ground by Air Traffic Control (ATC) personnel. ATC personnel provide pilots with verbal course and glide-slope information, allowing them to make an instrument approach during inclement weather. The Ground Control Approach (GCA) Box is counted as two operations—the landing is counted as one operation, and the takeoff is counted as another.
- **Touch-and-Go Operation.** An aircraft lands and takes off on a runway without coming to a full stop. After touching down, the pilot immediately goes to full power and takes off again. The touch-and-go (T&G) is counted as two operations—the landing is counted as one operation, and the takeoff is counted as another.

For this SEIS, the Navy used the NASMOD as the best available tool for modeling airfield flight operations to support the noise assessment and other operational planning. The results of this analysis are presented in Table 3-1 as the 2014 baseline aircraft operations.



Source: ESRI, 2012; Wyle, 2007

Figure 3-1
P-3C and P-8A Flight Tracks at NAS Jacksonville
Jacksonville, Florida

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Under the 2014 baseline, pilots perform approximately 43,623 flight operations annually at John Towers Field (Wyle 2013). As shown on Table 3-1, airfield operations at John Towers Field are predominantly P-3C and P-8A operations, which each account for approximately 32 percent of the total airfield operations (Wyle 2013). About 8 percent (3,524 operations) of the total annual operations occur at night (see Appendix D for complete air operations data).

Table 3-1 Annual Modeled 2014 Baseline (No Action Alternative) Operations at NAS Jacksonville

Aircraft Type	Departure	Straight-in/ Full-Stop Arrival	Instrument Arrival	Touch-and-Go	GCA Box	Total
P-3C	2,042	1,707	336	7,264	2,247	**13,596**
P-8A	2,576	2,402	175	6,517	2,214	**13,884**
C-130	115	102	13	120	96	**446**
Cessna 210	125	112	13	0	12	**262**
MD-500	125	125	0	0	0	**250**
T-34	845	836	9	0	54	**1,744**
PA-42	124	113	12	0	10	**259**
BE-20	346	290	56	0	66	**758**
H-1	102	93	9	0	16	**220**
FA-18E/F[2]	364	300	64	0	94	**822**
C-5A	101	83	18	0	10	**212**
C-40	415	355	60	0	22	**852**
E-2C	667	606	61	0	70	**1,404**
MH-60R	3,810	3,810	0	476	636	**8,732**
Transient Aircraft	85	72	13	0	12	**182**
Total Airfield Operations[1]	**11,842**	**11,006**	**839**	**14,377**	**5,559**	**43,623**

Notes:
[1] Total air operations numbers may not sum exactly due to rounding.
[2] Some FA-18E/F operations include FA-18C/D aircraft but are modeled as the louder FA-18E/F aircraft.

3.2 Noise

Several metrics are available to quantify the physical characteristics of the sound produced by an activity and to relate these physical characteristics to the potential human responses to it. Two metrics are used in this SEIS to describe aircraft noise exposure: the Day Night Average Sound Level (DNL) and the Sound Exposure Level (SEL).

DNL is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. Aircraft noise events are associated with flight operations and ground engine-maintenance run ups. The DNL metric includes a 10-decibel (dB) penalty for nighttime operations (10:00 PM to 7:00 AM) because people are more sensitive to noise during normal sleeping hours, when ambient noise levels are lower. The DNL metric has been determined to be a reliable measure of long-term community reaction to transportation noise, especially aircraft noise, and has become the standard metric used by many federal and state governmental agencies and organizations in the United States, such as the EPA and the FAA, for assessing aircraft noise.

The DNL for the community is depicted as a series of contours that connect points of equal value, usually in 5-dB increments. It is calculated based on modeled aircraft noise events; calculated noise contours

therefore do not represent exact scientific measurements. The area between two specific contours is known as a noise zone.

The noise zones used in this study are:

- 65 to 70 dB DNL;
- 70 to 75 dB DNL; and
- Greater than 75 dB DNL.

The Navy has developed guidance for communities on the types of land uses that are compatible or not compatible within these noise zones. Navy guidance begins with the 65 to 70 dB DNL noise zone. DNL noise zones have historically been used as the noise metric for NAS Jacksonville. For a detailed discussion of noise and noise modeling, please refer to part one of Appendix D, Background Noise Information, and the Wyle Laboratories, Inc., Noise Report WR13-02.

SEL is a metric used for a single flight event. It is an integrated metric that represents both the intensity of a sound and its duration. Individual time-varying noise events, such as aircraft overflights, have two main characteristics: a sound level that changes throughout the event, and a period of time during which the event is heard. SEL provides a measure of the net exposure of the entire event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL would include both the maximum noise level and the lower noise levels produced during onset and recess periods of the overflight.

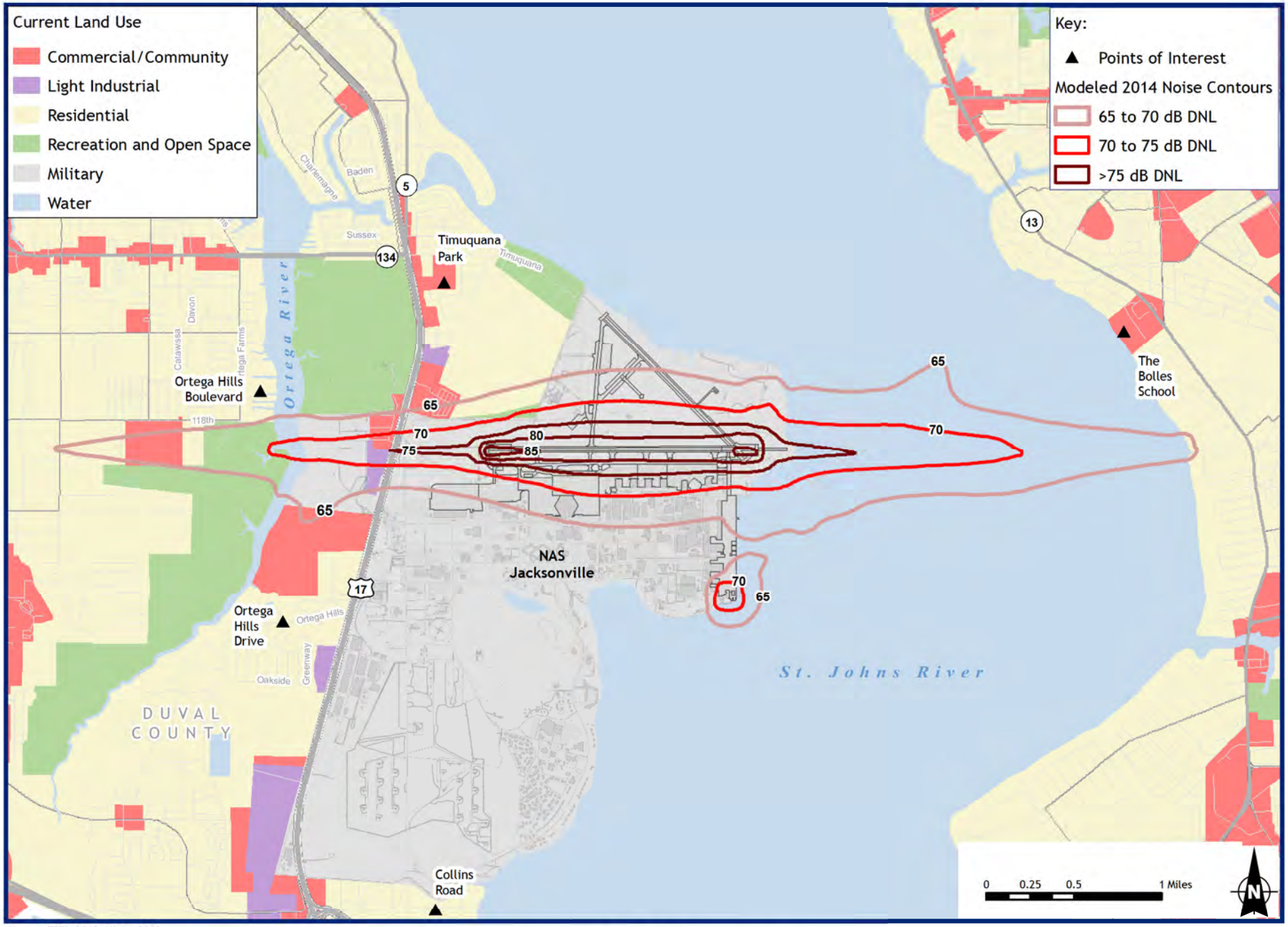
Flight operations are the primary source of noise generated at NAS Jacksonville. As shown in Table 3-1, flight operations are dominated by the P-8A, P-3C, and MH-60R aircraft. P-8A aircraft contribute approximately 49 percent of the acoustic energy to the noise environment at NAS Jacksonville, while transient FA-18E/F are the loudest aircraft operating at the station (Wyle 2013). Although the FA-18E/F aircraft operations are only a small portion of the overall operations, they affect the DNL contours because an FA-18EF operation is typically 5 to 20 dB louder than the same operation of another aircraft.

At NAS Jacksonville, ground engine-maintenance run ups are conducted in an enclosed structure, either in the engine test cell (Building 873) for out-of-frame testing or in the hush house (Building 777) for in-frame testing. P-3C and P-8A in-frame and P-3C out-of-frame engine testing is also conducted at test stands located on the northeast boundary of the station. Pre-flight engine run ups are generally not conducted for the types of aircraft stationed at NAS Jacksonville.

3.2.1 DNL Noise Zones and SEL Noise

The noise zones representing the 2014 baseline environment for NAS Jacksonville are shown on Figure 3-2; they were developed using the estimated annual airfield operations shown in Table 3-1 and average annual engine-maintenance run ups as detailed in Appendix D, Background Noise Information, and Wyle Laboratories, Inc., Noise Report WR13-02.

The 65 dB DNL noise contour extends approximately 2.5 miles east and 2.5 miles west of Runway 10/28, primarily due to transient military tactical jet aircraft (modeled as FA-18E/F) arrivals and FA-18E/F GCA pattern arrivals, respectively. The 65 dB DNL noise contour extends about 1 mile to the south and one-half mile to the north of Runway 10/28, attributable to FA-18E/F departures. The 75 dB and greater DNL noise zone is largely contained within the station boundaries. Although the FA-18E/F aircraft only accounts for 2 percent of the overall flight operations, it is 5 to 20 dB louder in SEL than other aircraft at NAS Jacksonville and is therefore responsible for a large portion of the DNL noise zones.



Source: ESRI, 2012; Wyle, 2013; City of Jacksonville 2012.

Figure 3-2
Modeled 2014 Baseline DNL Noise Contours at NAS Jacksonville
Jacksonville, Florida

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The off-station area and estimated 2014 population in the modeled baseline noise zones are provided in Table 3-2. The population shown is derived from the 2010 U.S. Census population data. Most of the off-station land within the existing 65 dB and greater DNL noise contour is located west of the installation and includes mixed uses such as residential, commercial, public facilities, and open space. However, 36 percent of the area within the existing 65 dB and greater noise contour is over open water. Land uses within the baseline noise zones are discussed further in Chapter 3.4.

Table 3-2 Off-Station Area and Estimated Population within Modeled 2014 Baseline (No Action Alternative) DNL Noise Zones for NAS Jacksonville

Noise Zone	2014 Baseline[1]	
	Area (acres)[2]	Population[3]
65 to 70 dB DNL	848	909
70 to 75 dB DNL	217	180
75 dB DNL or greater	10	4
Total	**1,075**	**1,093**

Source: Wyle 2013, U.S. Census Bureau 2010a.

Notes:

1 The 2014 baseline noise analysis in this SEIS models a similar number of FA-18E/F operations to the 2008 FEIS baseline scenario, but the mix of straight-in and overhead break arrivals differs. The 2008 FEIS modeled only 22 percent of arrivals as straight-in, while this SEIS models approximately 92 percent straight-in. The change is due to a revision of the P-8A flight training requirements. The increase in the modeled 2014 baseline noise zone "lobe" lengths to the west, east, and north of the airfield compared to the 2008 FEIS noise zones is primarily due to this change in the percentage of straight-in arrivals versus overhead break arrivals.

2 The area within the 65 dB and greater DNL noise zone does not include the area within the boundary of NAS Jacksonville.

3 2010 Census data are reported by blocks. The population shown is a proportion of the census block based on the geographic area of the noise zone. These data should be used for comparative purposes only and are not considered actual numbers within the noise zones.

Key:
dB = Decibel.
DNL = Day-night average sound level.

The DNL and SEL for the loudest flight operations for the P-3C, P-8A, and FA-18E/F aircraft were modeled for five selected locations in the vicinity of NAS Jacksonville (see Table 3-3 and Figure 3-2). The locations were selected based on comments received during the public comment period for the 2008 DEIS to represent points of interest (POIs) to the public in the vicinity of NAS Jacksonville. Both Ortega Hills Drive and Ortega Farms Boulevard experience the highest DNL of 60 dB. The remaining three locations are exposed to 55 dB DNL or less. Although specific flights would be noticeable at these two locations, the DNL indicates that periods would occur when aircraft overflights are not occurring.

Table 3-3 Outdoor SEL (dB) and DNL (dB) for Modeled 2014 Baseline (No Action Alternative) Aircraft Operations at Points of Interest near NAS Jacksonville[1]

Point of Interest	SEL P-3C	SEL P-8A	SEL FA-18E/F	DNL All Modeled Aircraft
Ortega Hills Drive	92	99	110	60
Collins Road	84	85	94	47
Timuquana Park	78	87	102	55
Ortega Farms Boulevard	87	90	108	60
The Bolles School	78	87	102	54

Source: Wyle 2013.

Note:
[1] The modeled sound is representative only for each individual location and does not provide a representative measure of the sound heard during aircraft overflights in other areas.

3.2.2 Supplemental Noise Analysis

Aircraft noise may interfere with a broad range of human activities, including speech; communication; listening to radio, television, or other audio equipment; studying; relaxation; and sleep. Community noise studies conducted in the U.S. since the early 1970s have indicated that adverse effects resulting from aircraft operations, such as annoyance, sleep interference, and speech interference, are generally associated with exposure to sound levels exceeding 65 dB DNL.

This SEIS examines the potential for sleep disturbance, speech interference, and classroom learning interference using metrics of Probability of Awakening (PA), Numbers of Events at or above a Selected Threshold (NA), and Equivalent Sound Level (L_{eq}). The methodologies for these three analyses are described in detail in Appendix D, Background Noise Information, and Wyle Laboratories, Inc., Noise Report WR13-02.

Common to all analyses is the determination of indoor sound levels. The noise models compute the outdoor noise levels that must be converted to interior noise levels. For the purpose of this analysis, typical Noise Level Reductions (NLR) of 15 dB and 25 dB were used to account for the effect on a typical home with windows open and windows closed, respectively (FICON 1992). The same NLR values were applied to schools.

All POIs are considered to be at or near residential areas and relevant to sleep disturbance and speech interference analyses. Only school POIs were relevant to the classroom learning interference analysis.

Sleep Disturbance

The analysis of sleep disturbance, PA, is a calculation of the probability of awakening from a single aircraft overflight. Thus, it is based on the outdoor SEL at each of the POIs, converted to an indoor SEL. Events that were considered are those that occur between 10:00 PM and 7:00 AM Table 3-4 presents the results of the sleep disturbance analysis for the five POIs. For the 2014 baseline (No Action Alternative), the PA ranges from 3 percent to 7 percent with windows open and ranges from 1 percent to 5 percent with windows closed. The P-8A T&G pattern operations are the primary contributor to the PA at all POIs.

Table 3-4 Analysis of Average Nightly (10:00 PM to 7:00 AM) Probability of Awakening for Representative Residential Receptors for the 2014 Baseline (No Action Alternative) Scenario

Point of Interest	Windows Open[1]	Windows Closed[1]
Ortega Hills Drive	6%	3%
Collins Road	3%	1%
Timuquana Park	5%	3%
Ortega Farms Boulevard	7%	5%
The Bolles School	5%	2%

Note:
[1] NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Indoor Speech Interference

The analysis of indoor speech interference is based on the number of noise events per daytime hour that are greater than the maximum sound level of 50 dB indoors. Table 3-5 presents the results of the speech interference analysis for the 2014 baseline scenario for the five POIs. For the 2014 baseline scenario, four of the five sites have more than one speech-interfering event per daytime hour with windows open, while Ortega Farms Boulevard has three events. None of the sites have more than one speech-interfering event per daytime hour when the analysis is run assuming the windows are closed. Both the P-3C and the P-8A T&G pattern operations account for the majority of the speech-interfering events at all POIs.

Table 3-5 Analysis of Average Daily Indoor Speech Interference for Representative Residential Receptors for the 2014 Baseline (No Action Alternative) Scenario

Point of Interest	Indoor Number of Events per Daytime Hour[1]	
	Windows Open[2]	Windows Closed[2]
Ortega Hills Drive	2	1
Collins Road	1	0
Timuquana Park	2	1
Ortega Farms Boulevard	3	1
The Bolles School	2	1
Number of Sites Exceeding 1 Intrusive Event per Hour	4	0
Minimum Number of Intrusive Events per Hour if Exceeding 1	2	0
Maximum Number of Intrusive Events per Hour if Exceeding 1	3	0

Notes:
[1] Number of Annual Average Daily DNL Daytime Events at or above an Indoor Maximum (Single-Event) Sound Level (L_{max}) of 50 dB;
[2] NLRs of 15 dB and 25 dB for windows open and closed, respectively

Classroom Learning Interference

To evaluate the potential for classroom learning interference, noise levels were calculated for each of the schools identified as a POI using the L_{eq} metric, which provides the average sound level generated by aircraft operations during an 8-hour school day (i.e., 8:00 AM to 4:00 PM). Also considered in the potential for classroom learning interference is a metric similar to the speech interference metric; that is, the number of noise events per daytime hour that are greater than the maximum sound level of 50 dB indoors but confined to only those events that occur during the 8-hour school day (i.e., 8:00 AM to 4:00 PM). Table 3-6 contains the results of the classroom learning interference analysis for the Bolles School.

For the 2014 baseline scenario, aircraft noise at the Bolles School exceeds the indoor $L_{eq(8h)}$ threshold of 35 dB for continuous noise by 5 dB with windows open, primarily due to the FA-18E/F arrival operations at Runway 28. The majority of speech-interfering events are due to the P-8A T&G patterns and the P-3C departures from Runway 10. The $L_{eq(8h)}$ criteria are not exceeded with windows closed. The interfering events are two and one per hour, respectively, for windows open and windows closed.

Table 3-6 Analysis of Average Daily (8:00 AM to 4:00 PM) Indoor Classroom Learning Interference for 2014 Baseline (No Action Alternative) Scenario

		Indoor			
		Windows Open[2]		Windows Closed[2]	
School Point Of Interest	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour[1]	$L_{eq(8h)}$ (dB)	Events per Hour[1]
The Bolles School	55	40	2	30	1

Notes:

1 Number of annual average busy day events per hour during 8-hour school day (8:00 AM to 4:00 PM) at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB;

2 NLRs of 15 dB and 25 dB for windows open and closed, respectively.

3.2.3 Potential Hearing Loss Analysis

People working or living in high-noise environments for extended periods of time can potentially experience hearing loss. Hearing loss can occur as a temporary or as a permanent "shift" in the threshold of hearing. The EPA has established 75 dB for an 8-hour exposure and 70 dB for a 24-hour exposure as the average noise level standard requisite to protect 96 percent of the population from greater than a 5-dB permanent threshold shift in sound perception (EPA 1978).

A 2009 DoD policy directive requires that hearing-loss risk be estimated for the at-risk population, which is defined as the population exposed to 80 dB DNL or greater (DoD 2009). Under baseline conditions, no homes or populations are located within the 80 dB DNL or greater noise contour. Therefore, under baseline conditions, no populations in the vicinity of NAS Jacksonville are considered at risk for PHL. For additional background on PHL, please see Appendix D.

3.2.4 Noise Complaint Process

NAS Jacksonville takes all noise complaints seriously. NAS Jacksonville has a published hotline and noise complaint email address (NASJAX_NOISE_COMPLAINTS@navy.mil). Phone calls may also be reported through the operations duty officer (904-542-2511). Pertinent information such as the location, time, and description of the noise-generating event, as well as the address and contact information for the complainant, are requested. The Operations Department reviews, notifies, and may provide copies of any complaints to several persons, including the commanding officers, executive officer, operations officer, public affairs officer, and community plans and liaison officer (CPLO) within one day of receiving the complaint. These persons may, when necessary, initiate an informal inquiry into the allegations of any complainant to determine the validity of those allegations. This inquiry will involve a follow-up call or email to the complainant from the operations officer. In addition, the public is made aware of operations or exercises that will increase operations at NAS Jacksonville or OLF Whitehouse via press releases, the NAS Jacksonville's CNIC website, and a Facebook page. In addition, the AICUZ noise contours and APZs are also published in the City of Jacksonville Comprehensive Plan and on the city's GIS website (http://maps.coj.net/website/DuvalMapsSQL/viewer.htm).

3.2.5 Noise Abatement Measures

NAS Jacksonville periodically reviews ongoing operational procedures to ensure noise impacts can be minimized whenever and wherever practicable while maintaining flight safety. Noise abatement procedures are contained in the current air operations manual for NAS Jacksonville. NAS Jacksonville's policy is to conduct required training and operational flights with a minimal impact on surrounding communities. All aircrews using NAS Jacksonville facilities are responsible for the safe conduct of their mission while complying with published course rules, noise abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of their aircraft and must be committed to minimizing noise impacts without compromising operational and safety requirements. Additionally, as noted in the Department of Navy's AICUZ Program Guidance (OPNAVINST 11010.36C), the Navy updates AICUZ studies to address noise-reduction strategies and can conduct interim noise studies. Such studies could include, as appropriate, monitoring and a review of operational procedures in response to changes in training requirements and/or changes in land uses in the vicinity of the installation. The Navy provides recommendations on land use compatibility in noise and safety zones; however, it is the local community's responsibility for ensuring compatible land uses within these zones.

3.3 Air Quality

3.3.1 Air Quality Regulations

National Ambient Air Quality Standards

The Clean Air Act (CAA) is the primary federal statute governing the control of air quality. The CAA designates pollutants as "criteria pollutants" for which NNAAQS have been established to protect public health and welfare. These include particulate matter less than 10 microns in diameter (PM_{10}) and less than 2.5 microns in diameter ($PM_{2.5}$), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and ozone (O_3) (see Table 3-7). O_3 is not an emission; it is created in the atmosphere primarily from the emissions of its precursors NO_2 and Volatile Organic Compounds (VOCs).

Areas that do not meet National Ambient Air Quality Standards (NAAQS) for criteria pollutants are designated "nonattainment areas" for that pollutant. Areas that achieve the air quality standard after being designated as nonattainment areas are re-designated as "attainment areas" following EPA approval of a maintenance plan. The CAA prohibits federal agencies from engaging in, supporting, providing financial assistance for licensing, permitting, or approving any activity that does not conform to an applicable State Implementation Plan (SIP). Federal agencies must determine that a federal action conforms to the SIP before proceeding with the action. This determination is conducted in accordance with the General Conformity Rule (40 CFR 93).

NAS Jacksonville is under the jurisdiction of the Jacksonville/Duval County local air quality program administered by the City of Jacksonville's Regulatory and Environmental Services Department. Duval County is designated as in attainment for all criteria pollutant standards (EPA 2013). Because the region is currently in attainment, the CAA General Conformity Rule does not apply, and a General Conformity Determination is not required.

Table 3-7 National Ambient Air Quality Standards

Pollutant [final rule citation]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3-month average	0.15 μg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution [78 FR 3086, January 15, 2013][(5)]	$PM_{2.5}$	primary	Annual	12 μg/m^3	annual mean, averaged over 3 years
		secondary	Annual	15 μg/m^3	annual mean, averaged over 3 years
			24-hour	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2013

Notes:

1 Final rule published November 12, 2008. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

2 The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here to allow comparison to the 1-hour standard.

3 Final rule published March 27, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

4 Final rule signed June 22, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

5 The EPA has revised the annual primary $PM_{2.5}$ standard by lowering the level to 12.0 micrograms per cubic meter (μg/m^3), and maintaining the 15.0 (μg/m^3) $PM_{2.5}$ standard as a secondary standard. The final rule is effective on March 18, 2013.

Key:

μg/m^3 = Micrograms per cubic meter.
mg/m^3 = Milligrams per cubic meter.
PM_{10} = Particulate matter less than 10 microns in diameter.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
ppb = Parts per billion.
ppm = Parts per million.

Hazardous Air Pollutants

In addition to the ambient air quality standards for criteria pollutants, national standards exist for hazardous air pollutants (HAPs), which are regulated under Section 112(b) of the 1990 CAA Amendments. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR Part 61). HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs). MSATs are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects (EPA 2013). In 2001, the EPA issued its first MSATs rule, which identified 21 compounds as being HAPs that required regulation. A subset of six of these MSAT compounds were identified as having the greatest influence on health and included benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. The EPA issued a second MSAT rule in February 2007, which generally supported the findings in the first rule and provided additional recommendations for compounds having the greatest impact on health. The rule also identified engine emission certification standards for automobiles, trucks, and off-road vehicles (40 CFR parts 59, 80, 85, and 86; FR 72 No. 37, pp. 8427-8570, 2007).

Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants in mobile sources are to reduce their content in fuel and alter the engine operating characteristics to reduce the volume of pollutants generated during combustion. Because there is a minimal change (or reduction) to all emissions from ground sources, and aircraft and HAPs represent a small percentage of combustion emissions, HAPs were not considered in the 2008 FEIS and are not further evaluated in this SEIS.

Greenhouse Gases

Greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe. Climate change refers to any significant change in measures of climate lasting for an extended period. Global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health (EPA 2013). Many scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere. Worldwide use of fossil fuels is the primary cause of that increase (EPA 2013).

EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule on September 22, 2009. GHGs covered under this rule are carbon dioxide (CO_2), methane, and nitrous oxide, and hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a Global Warming Potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, methane (CH_4) has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal mass basis. The equivalent CO_2 rate is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions as CO_2 equivalent (CO_2e) are required to submit annual reports to EPA.

On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and Executive Orders (EOs). Most recently, EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, were enacted to address GHGs, including GHG emissions inventory,

reduction, and reporting. GHG emissions occur locally, but GHG impacts are both global in impacts and scale and cumulative over time. Therefore, GHG emissions for the proposed action are discussed in Chapter 9, Cumulative Impacts.

3.3.2 Existing Emissions

Sources of air pollutants at NAS Jacksonville include mobile emissions from aircraft, ground service equipment and vehicles, private and government vehicles, and stationary source emissions from external combustion equipment, internal combustion engines, surface-coating operations, solvent use, fuel storage tanks, and other miscellaneous operations. Stationary sources are operated under a site-wide Title V permit. The primary sources of HAPs in the form of volatile organic compound emissions are from solvent use, plating operations, paint spray booths, and gasoline dispensing.

Existing P-3C and P-8A emissions under 2014 baseline conditions are summarized in Table 3-8. Emissions of criteria pollutants result from aircraft flight operations and maintenance run ups of the aircraft. Aircraft operational information was provided by station personnel as reported in the noise analysis and report (Wyle 2013; see Appendix D) and as discussed in Chapter 3.2.1. Emissions from P-3C flight operations and maintenance run ups are based on memorandum reports from the Navy's Aircraft Environmental Support Office (AESO) (AESO 2000). Time-in-mode assumptions for T&G and GCA box operations are adapted from P-3C time-in-mode assumptions from the AESO (AESO 2000). Emissions from P-8A T&G and GCA box operations and maintenance run ups are based upon emission indexes developed by the International Civil Aviation Organization (ICAO) for the CFM56-7B26 engine, which is used in the P-8A (International Civil Aviation Organization July 2007). Emissions from P-8A landing and takeoff operations (LTOs) are calculated using the FAA Emissions and Dispersion Modeling System (EDMS 5.1.3) (Federal Aviation Administration November 15, 2010). EDMS-derived P-8A emission indexes based on 737-800 aircraft time-in-mode estimates for NAS Whidbey Island are used for all locations because these emission indexes are slightly higher than those of NAS Jacksonville and MCB Hawaii Kaneohe Bay and therefore provide a reasonable, conservative estimate for all LTO operations. These references were used in this analysis to provide emission factors because P-8A data from AESO are not available.

Emissions also result from the operation of POVs used by station personnel to commute to work. Emissions from POVs were estimated based on 2014 baseline P-3C and P-8A personnel loading levels, assuming an average daily commute of 25 miles, completed 250 days per year. Vehicle Miles Traveled (VMT) emission factors were obtained from "Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks (EPA 420-F-08-024)" (EPA 2008a). Emission factors and calculations are detailed in Appendix E.

3.4 Land Use

The study area for land use includes NAS Jacksonville and portions of the City of Jacksonville. Land use designations encompass undeveloped and developed land in the study area. Developed land uses range from airfield operations and administrative areas on station to residential and commercial land off station. Undeveloped land is commonly classified as open space or natural areas.

Existing land use conditions, challenges, and recommendations are provided in the following documents: *Air Installations Compatible Use Zones Study Update for Naval Air Station Jacksonville* (Navy NAVFAC Southeast 2000), *NAS Jacksonville 2009 Master Plan* (EDAW, Inc. 2009), and the *City of Jacksonville Comprehensive Plan* (City of Jacksonville 2011). These and other land use planning documents are described in Chapter 3.4.3.

Table 3-8 2014 Baseline (No Action Alternative) P-3C and P-8A Emissions at NAS Jacksonville

Flight Operation/Activity[1]	No. of Operations[1]	Emissions (tpy)				
		CO	NO_x	VOC	SO_2	PM_{10}
P-3C Operations						
Straight-In Arrival LTOs	2,042	38.3	21.7	25.1	6.9	11.0
Touch-and-Go	3,632	1.4	10.3	0.3	2.2	4.4
GCA Pattern	1,124	0.6	4.9	0.1	1.1	2.1
Maintenance Run Ups		14.04	5.15	9.54	1.88	2.98
Total P-3C Emissions		**54.4**	**42.0**	**35.1**	**12.1**	**20.5**
P-8A Operations						
Straight-In Arrival LTOs	2,576	22.7	34.4	3.1	3.4	1.1
Touch-and-Go	3,259	0.3	10.3	0.0	1.0	0.3
GCA Pattern	1,107	0.2	5.5	0.0	0.5	0.1
Maintenance Run Ups		0.008	0.052	0.001	0.012	0.001
Total P-8A Emissions		**23.2**	**50.2**	**3.2**	**4.9**	**1.5**
Total 2014 Baseline P-3C and P-8A Emissions		**77.6**	**92.2**	**38.3**	**17.0**	**22.0**
P-3C and P-8A Personnel POV Emissions		**191.2**	**14.8**	**20.3**	**0.00**	**56.4**
Total 2014 Baseline P-3C and P-8A Annual Emissions		**268.8**	**107.0**	**58.6**	**17.0**	**78.3**

Note:
[1] Operational information from Wyle 2013. An LTO includes a departure and an arrival, and T&G and GCA patterns also include two operations; therefore, total operations listed in Chapter 2 and in the noise analysis will be double these air quality operation totals. Note that operations numbers may not sum to 100 percent due to rounding.

Key:
CO = Carbon monoxide.
GCA = Ground control approach pattern.
LTO = Landing and takeoff operation.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter less than 10 microns in diameter.
POV = Privately owned vehicle.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOC = Volatile Organic Compounds.

3.4.1 NAS Jacksonville Land Use

NAS Jacksonville occupies approximately 3,896 acres in the southeastern portion of Duval County, Florida, along the west bank of the St. Johns River and on the east and west sides of U.S. Highway 17 (see Figure 2-1 in Chapter 2, Alternatives). The station is 15 miles inland of the Atlantic Ocean and lies 3 miles north of the Duval and Clay County line. Approximately 3,312 acres (85 percent) of the station has been developed (EDAW, Inc. 2009). Aircraft operations areas include approximately 1,600 acres in the northern part of the station and consist of two intersecting runways, parking aprons, taxiways, and clear zones. Administrative and industrial facilities encompass approximately 350 acres immediately south of the aircraft operations area. The portion of the station west of U.S. Highway 17 and adjacent to the Ortega River is leased to the City of Jacksonville and is a public use area designated as the Tillie K. Fowler Regional Park. Part of the land was acquired by the federal government in 1976 to control development to be compatible with the NAS Jacksonville AICUZ guidelines. The Defense Reutilization Marketing Office (DRMO) is located west of U.S. Highway 17.

The southern part of NAS Jacksonville is more sparsely developed, with a mixture of land uses: administrative, residential and community facilities, ordnance storage, recreation, open space, and natural areas. Residential and community facilities include bachelor housing, family housing, and commercial, medical, and utility facilities. Ordnance storage is located near the southern boundary of the station to ensure compliance with all Explosive Safety Quantity Distance (ESQD) requirements. The approximately 584 acres of undeveloped land on the station are primarily natural forestlands and open space areas.

3.4.2 Regional Land Use

NAS Jacksonville is located in the suburban area of the City of Jacksonville. The central business district of Jacksonville is located approximately 9 miles north of the station.

Predominant land uses in the vicinity of NAS Jacksonville include:

- Residential development along the station's southern boundary. South of these residential uses, in northern Clay County, are a mix of residential, commercial/community, and light industrial land uses.
- Undeveloped land and a mixture of recreation, open space, light industrial, and commercial/community uses west of the station in the Yukon and Ortega Hills communities.
- Recreation and open space uses immediately northwest of the station. North and west of these land uses is a mixture of commercial and residential land.
- Residential development along the eastern shore of the St. Johns River.

3.4.3 Land Use Consistency with Local Plans, Programs, and Policies

Development within and around NAS Jacksonville is controlled, guided, or influenced by the following plans, programs, and policies:

- The 2000 NAS Jacksonville AICUZ Update;
- The 2003 Regional Shore Infrastructure Plan (RSIP) Overview for the Jacksonville Fleet Concentration Area (FCA);
- The NAS Jacksonville Integrated Natural Resources Management Plan (INRMP);
- The NAS Jacksonville 2009 Master Plan;
- The City of Jacksonville 2030 Comprehensive Plan; and
- The City of Jacksonville Zoning Code (as amended).

Refer to Chapter 10 for further information on the Coastal Zone Management Act (CZMA) and consistency with the Florida Coastal Management Program (FCMP).

2000 NAS Jacksonville AICUZ Update

The Navy's AICUZ Program is described in Chapter 1.3.5. The *Air Installations Compatible Use Zones Study Update for Naval Air Station Jacksonville* (Navy NAVFAC Southeast 2000) serves to balance the need for aircraft operations with community concerns over aircraft noise and accident potential. The AICUZ Program was developed in response to growing incompatible urban development around military airfields. The 2000 AICUZ update identifies noise zones and APZs. Land use compatibility within the noise zones around NAS Jacksonville is evaluated in Chapter 3.4.4.

APZs are areas where an aircraft mishap is most likely to occur, if an accident were to occur, and is delineated based on historical data and departure, arrival, and pattern flight tracks on and near airfield runways. The Navy makes recommendations to local planning agencies that developments concentrating large numbers of people, such as apartments, churches, and schools, be constructed outside of APZs.

APZ configurations and dimensions are derived from the AICUZ Instruction. APZs are, in part, based on the number of operations conducted at the airfield—more specifically, the number of operations conducted for specific flight tracks. The three APZs include:

- **Clear Zone.** The Clear Zone extends 3,000 feet beyond the end of the runway; it measures 1,500 feet wide at the end of the runway and 2,284 feet wide at its outer edge.
- **APZ I.** APZ I extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet at its outer edge. APZ I is typically rectangular, although it may curve to conform to the predominant flight track.
- **APZ II.** APZ II extends 7,000 feet beyond APZ I, with a width of 3,000 feet. This zone is typically rectangular, although it, too, may conform to the curve of the predominant flight track.

The NAS Jacksonville APZs are included in the 2000 AICUZ update and are shown on Figure 3-3. As shown, the majority of the clear zones for NAS Jacksonville are contained within the station boundaries. The boundaries of APZ I and APZ II extend off-station into the local community.

Regional Shore Infrastructure Plan Overview for the Jacksonville Fleet Concentration Area

The RSIP for the Jacksonville FCA was completed in February 2003. The Jacksonville FCA includes NAS Jacksonville and three other Navy and USMC installations in northern Florida and southern Georgia. The purpose of the RSIP is to provide long-range facilities and infrastructure planning on a regional level to reduce infrastructure costs and support efficient use of developable land and operation of mission and personnel support functions.

Current land uses at the installation generally are consistent with land use planning concepts identified in the RSIP, which include consolidating existing land use areas based on primary operational function, establishing compatible land use relationships, and accommodating existing land use patterns that are unlikely to change. According to the RSIP, new facilities should be located in compatible functional areas (i.e., areas with similar types of land uses).

Integrated Natural Resources Management Plan

In January 2006, the DoD, U.S. Fish and Wildlife Service (USFWS), and the Association of Fish and Wildlife Agencies (AFWA) entered into a Memorandum of Understanding for a cooperative program of INRMP development. Under this program the INRMP is updated on a continuous basis to achieve mutually agreed upon fish and wildlife conservation objectives in compliance with the Sikes Act. The Navy prepared an INRMP for the Jacksonville Complex, including NAS Jacksonville, in compliance with DoD Instruction 4715.3 and the Sikes Act (16 U.S.C. 670a, *et seq.*). The overall goal of the plan is to integrate management activities with all programs and mission requirements while sustaining, promoting, and restoring the health and integrity of NAS Jacksonville ecosystems. The INRMP identifies land, water, plant, fish, and wildlife resources on the installation. The document guides both short-term resource management activities and long-range planning.

NAS Jacksonville Master Plan

NAS Jacksonville's master plan was prepared in 2009 to be a guiding document for future land use and development on NAS Jacksonville over a 20-year planning period (EDAW, Inc. 2009). The master plan integrates multiple earlier installation plans.

The master plan describes how the station is organized into four major nodes, or activity centers. These areas are defined by a half-mile walking radius around a predominant land use and are connected to each other by green space or various modes of transportation. Within each node, the master plan seeks to minimize major land use changes, co-locate similar land uses, increase green space, improve connectivity, and increase transportation alternatives.

City of Jacksonville Comprehensive Plan

In accordance with State of Florida planning law (Chapter 163 [Part II], F.S. and Chapter 9J-5, F.A.C.), the City of Jacksonville adopted the 2030 Comprehensive Plan in 2010. The plan is primarily a policy document with generalized maps illustrating existing and future conditions.

The 2030 Comprehensive Plan recognizes the AICUZ concepts for NAS Jacksonville and accordingly recommends compatible development near the station in order to protect the safety and welfare of property owners, residents, and businesses in that area (City of Jacksonville 2011). Proposed future land uses in the immediate vicinity of NAS Jacksonville within the noise zones or APZs include a mixture of residential, recreational, light industrial, and business/office uses. These land uses are generally consistent with aircraft operations at NAS Jacksonville.

City of Jacksonville Zoning Ordinance

Zoning is the primary land use control used by the City of Jacksonville to control development. As a federal facility, NAS Jacksonville is exempt from municipal zoning regulations.

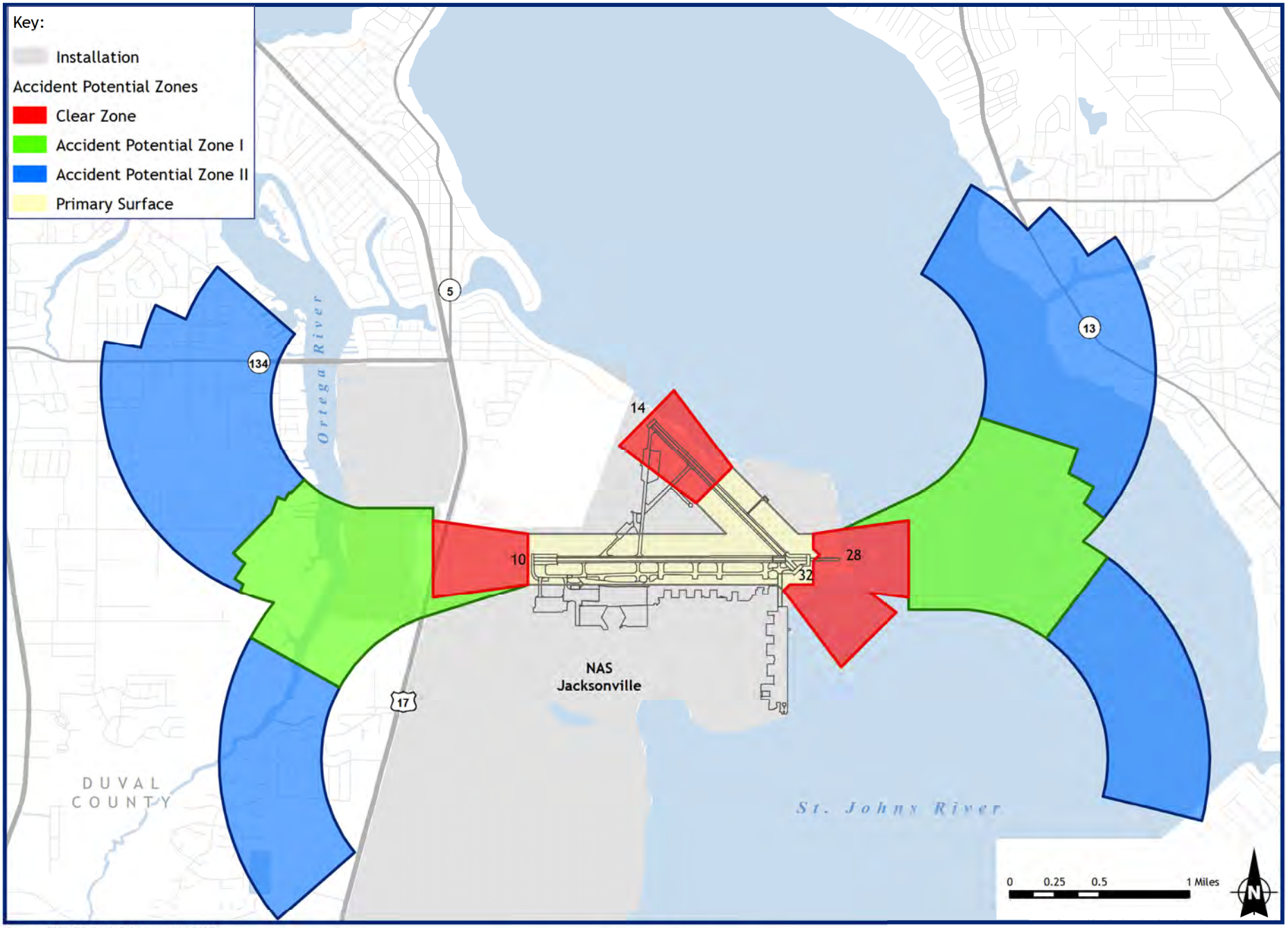
Part 10 of the City of Jacksonville Zoning Code (Regulations Related to Airports and Lands Adjacent Thereto) regulates land uses adjacent to military and civilian airports. The ordinance establishes noise zones and APZs that are intended to conform to the current noise zones and APZs developed by military installations within the city (City of Jacksonville 2013a). Consequently, the land uses around NAS Jacksonville generally are consistent with the compatibility guidance for noise zones and APZs identified by the NAS Jacksonville AICUZ Program.

All residential and non-residential sales and leases and new residential development in the city's greater than 65 dB DNL noise zone and the Airport Notice Zone 6 must include an executed statement, referred to as an Airport Notice Zone Acknowledgement, that such property "may be exposed to significant noise level and/or accident potentials or may be subject to special lighting regulations as a result of the airport operations" (City of Jacksonville 2013a).

3.4.4 Land Use Compatibility Assessment

To determine the compatibility of land uses with existing aircraft operations at NAS Jacksonville, the modeled 2014 baseline noise zone map was overlaid on the City of Jacksonville land use map, as included in the City of Jacksonville 2030 Comprehensive Plan (City of Jacksonville 2011) (see Figure 3-2). Land use designations on the City of Jacksonville land use map were compared with the Navy/USMC land use compatibility recommendations under its AICUZ Program (OPNAVINST 11010.36C; Appendix F).

[6] Noise Zone A is dB DNL values 75 or greater, Noise Zone B is 65-74.99 dB DNL range, and the Airport Notice Zone is 60 to 64.99 dB DNL range.



Source: ESRI, 2012; NAS Jacksonville 2007.

Figure 3-3
AICUZ APZs at NAS Jacksonville,
Jacksonville, Florida

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Table 3-9 provides the total area, by land use category, within the greater than 65 dB DNL noise zone at NAS Jacksonville. Most land use categories in the less than 65 dB DNL noise zone are considered to be compatible without restrictions, according to AICUZ guidelines.

Table 3-9 Existing Land Uses within the Greater than 65 dB DNL Noise Zone at NAS Jacksonville (2014 Baseline) [No Action Alternative]

Land Use	65 to 70 dB DNL	70 to 75 dB DNL	>75dB DNL	Total Area (acres)	Percent of Total Land Use
Residential[1]	86	3	0	89	4
Recreation/Open Space	91	8	0	99	4
Commercial/Community[2]	62	7	0	69	3
Light Industrial	8	9	0	17	1
Military	507	321	308	1,136	51
Water	600	191	10	801	36
Total[3]	**1,354**	**539**	**318**	**2,210**	**100%**

Notes:
1 Residential Land Use includes Low Density Residential and Rural Residential designations.
2 Commercial/Community Land Use includes Community/General Commercial, Business Park, and Public Buildings and Facilities designations.
3 Total land use percentage may not sum to 100 percent due to rounding.

Residential land use is incompatible in noise zones greater than 65 dB DNL (OPNAVINST 11010.36C). Under 2014 baseline conditions, a total of 89 acres of residential land as designated by the City of Jacksonville is within the greater than 65 dB DNL noise zone and is therefore incompatible with AICUZ Program guidelines. Most of this residential land use is within the 65 to 70 dB DNL noise zone; however, 3 acres are within the 70 to75 dB DNL noise zone.

3.5 Socioeconomics

The study area for socioeconomic resources includes NAS Jacksonville as well as the City of Jacksonville and Duval County, the two local municipalities with the strongest economic ties to NAS Jacksonville. This chapter on the affected socioeconomic environment presents population and housing in Chapter 3.5.1, economy in Chapter 3.5.2, taxes and revenues in Chapter 3.5.3, education in Chapter 3.5.4, and environmental justice in Chapter 3.5.5.

3.5.1 Population and Housing

3.5.1.1 Population

NAS Jacksonville

NAS Jacksonville is a master air and industrial base that is host to more than 110 tenant commands (NAS Jacksonville 2012). The number of personnel at NAS Jacksonville has varied over the years as the result of mission changes, base realignment and closure activities, and fluctuations in the number and type aircraft stationed at the base. Table 3-10 presents historical and current personnel loading for NAS Jacksonville. The number of personnel stationed or employed by the station decreased from 1988 to 1997 but has risen since. Total personnel numbers in 1988 are similar to those reported in 2012.

Table 3-10 Personnel Loading Summary for NAS Jacksonville

Personnel	1988	1997	2002	2012
Officer	1,223	1,220	1,420	NA
Enlisted	7,194	6,286	8,044	NA
Total Active Duty	8,417	7,506	9,464	9,995
Civilian	10,883	6,531	6,722	7,070
Contractor	NA	2,642	2,589	2,223
Total	**19,300**	**16,679**	**18,775**	**19,288**

Source: Mytych, L. 2007; Schellhorn 2013a, b.

NAS Jacksonville is currently in the process of transitioning from P-3C to P-8A aircraft. The first P-8A aircraft have been delivered to NAS Jacksonville, in accordance with the 2008 ROD. Full transition under the 2008 ROD is not expected to occur until 2019. This transition from P-3C aircraft to P-8A aircraft will lead to a gradual reduction in the number of personnel assigned to NAS Jacksonville.

During baseline year 2014, 2,619 P-3C and P-8A personnel are assigned at NAS Jacksonville, comprising 615 officers and 2,004 enlisted personnel. No civilians or contractors are assigned to the P-3C or the P-8A aircraft squadrons. In baseline year 2014, four of six P-8A squadrons, two P-3C squadrons, and a mixed P-3C/P-8A FRS are operating out of NAS Jacksonville.

City of Jacksonville and Region

The City of Jacksonville is divided into six planning districts, with NAS Jacksonville located in Southwest Planning District Number 4. The Southwest Planning District Number 4 is the third most populated district in the county. Table 3-11 presents the population for the Jacksonville Metropolitan Statistical Area (MSA), Duval County, the City of Jacksonville, and the Southwest Planning District Number 4 for 2000 and 2010. The entire region has experienced population growth over the past decade. Between 2000 and 2010, the total population increased in the Jacksonville MSA by 19.8 percent and in the Southwest Planning District Number 4 by 16.4 percent. During the same time period, Duval County and the City of Jacksonville experienced slightly more moderate growth, with increases in total population of 11.0 percent and 11.7 percent, respectively (see Table 3-11).

Table 3-11 Regional Population around NAS Jacksonville (2000 and 2010)

Jurisdiction	2000	2010	% Change from 2000 to 2010
Jacksonville MSA[1]	1,122,750	1,345,596	19.8
Duval County	778,879	864,263	11.0
City of Jacksonville[2]	735,617	821,784	11.7
Southwest Planning District Number 4	133,867	155,850	16.4

Sources: U.S. Census Bureau 2000a, 2000b, 2000c, 2000d, 2000e, 2000f, 2010a, 2010b and 2010c; City of Jacksonville n.d.; Florida Bureau of Economic and Business Research 2012.

Notes:
1 The Jacksonville MSA includes Baker, Clay, Duval, Nassau, and St. Johns counties.
2 The City of Jacksonville accounts for almost all of Duval County, both geographically and demographically. The exceptions are the Town of Baldwin and the communities of Jacksonville Beach, Atlantic Beach, and Neptune Beach, which have not been consolidated into the City of Jacksonville.

This population growth is expected to continue throughout the next decade. Total population in Duval County is projected to increase by 7.4 percent throughout the decade to reach a total of 928,100 residents

by 2020 (Florida Bureau of Economic and Business Research 2012). Population projections for the other geographical areas are currently unavailable.

3.5.1.2 Housing

NAS Jacksonville

The Navy provides housing to eligible military personnel stationed at NAS Jacksonville in either bachelor (officer and enlisted) quarters or family housing units. Military personnel stationed at NAS Jacksonville may be housed either in military-controlled bachelor/family housing units or in private housing within the local community. NAS Jacksonville uses the Office of the Secretary of Defense Housing Requirement Determination Process Policy Guidance in determining the on-station housing requirement. Under this guidance, the construction, operation, and maintenance of government housing is considered only if the private sector is not capable of providing military members with acceptable housing. In accordance with Department of Defense Manual: DoD Housing Management (Number 4165.63-M), factors utilized to determine whether a housing unit in the local community is acceptable include its affordability, location, features, and physical condition.

In FY 2011, 2,825 unaccompanied (bachelor) personnel were stationed at NAS Jacksonville, with 935 of these personnel living in military-controlled housing. The remaining personnel lived in the local community, with approximately 78 percent residing in rental accommodations and 22 percent purchasing homes. In FY 2011, there was a shortfall of 259 acceptable housing units for unaccompanied personnel in the local region (Robert D. Niehaus, Inc. 2012).

According to the NAS Jacksonville Community Planning and Liaison Officer, 5,683 military families that required family housing units were stationed at NAS Jacksonville in FY 2012. During that time, a total of 5,212 adequate housing units were available to military families stationed at NAS Jacksonville, including 428 family housing units under military control and 4,784 acceptable private housing units in the community. Consequently, there was an effective housing deficit of 471 acceptable family units in FY 2012 (Schellhorn 2013b).

The total number of families requiring housing at NAS Jacksonville is expected to decline over the next five years. By FY 2017, it is projected that the total family housing requirement at the station will decline to 4,751 units. However, during the same time period, the total number of adequate housing units is also projected to decline, to 4,662 units. Military-controlled family housing units are expected to be reduced to a total of 302 units by 2017, and only 4,360 acceptable private housing units are expected to be available by that time. By FY 2017, the effective family housing deficit is projected to be 89 units (Schellhorn 2013b).

City of Jacksonville and Region

The housing market in the Jacksonville region has experienced rapid growth over the past decade. The number of owner-occupied, renter-occupied, and vacant housing units increased in the region between 2000 and 2010. The largest proportion of occupied (i.e., not vacant) housing units in all three areas was accounted for by owner-occupied units, ranging from 67.5 percent in the Jacksonville MSA in 2000 to 61.6 percent in Duval County in 2010. The proportion of occupied housing units declined slightly in all three areas between 2000 and 2010. Between 2000 and 2010, the total number of vacant housing units increased by 75 percent in the Jacksonville MSA, or from 42,416 vacant units in 2000 to 74,344 vacant units in 2010. A similar increase in the number of vacant units in Duval County and the City of Jacksonville occurred during the same time period. Between 2000 and 2010, the total number of vacant housing units in Duval County increased from 26,031 units in 2000 to 46,036 units in 2010, and the total number of vacant housing units in the City of Jacksonville increased from 24,327 units in 2000 to 43,167 units in 2010. In 2010, vacancy rates reached 12.4 percent and 11.9 percent of the total housing stock in the Jacksonville MSA and Duval County, respectively (see Table 3-12).

Table 3-12 Regional Housing Availability around NAS Jacksonville (2000 and 2010)

	Housing Units						
	Owner-Occupied	Renter-Occupied	Vacant	Total	Percent Owner-Occupied[1]	Percent Renter-Occupied[2]	Percent Vacancy Rate[3]
2000							
Jacksonville MSA	292,183	140,444	42,416	475,043	67.5	32.5	8.9
Duval County	191,734	112,013	26,031	329,778	63.1	36.9	7.9
City of Jacksonville	179,729	104,770	24,327	308,826	63.2	36.8	7.9
2010							
Jacksonville MSA	350,768	173,378	74,344	598,490	66.9	33.1	12.4
Duval County	211,077	131,373	46,036	388,486	61.6	38.4	11.9
City of Jacksonville	199,378	123,728	43,167	366,273	61.7	38.3	11.8

Sources: U.S. Census Bureau 2000a, 200b, 2000c, 2000d, 2000e, 2000f, 2010a, 2010b and 2010c.

Notes:

1 Percent Owner Occupied is calculated as the number of owner-occupied housing units divided by the sum of owner-occupied and renter-occupied housing units.

2 Percent Renter-Occupied is calculated as the number of renter-occupied housing units divided by the sum of the owner-occupied and renter-occupied housing units.

3 Percent Vacancy Rate is defined as the number of vacant housing units divided by total housing units.

The rate of construction of new homes in the city gradually increased from 2000, peaked around 2004-2005, and has slowed in recent years. In 2000, building permits were issued for 5,204 new residential units in the City of Jacksonville, and 780 building permits were issued for new residential units in Planning District Number 4. In 2005, a total of 13,839 building permits were issued for new residential units in the City of Jacksonville. By 2010, only 1,576 building permits were issued for new residential units in the City of Jacksonville, and only 319 building permits were issued for new residential units in Planning District Number 4, indicating a slowdown in the pace of housing development (City of Jacksonville n.d.).

3.5.2 Economy

3.5.2.1 NAS Jacksonville

The Navy has a strong presence in the Jacksonville area and an equally strong regional economic impact. The military installations in the Jacksonville area, which include Naval Station (NS) Mayport, Kings Bay NB, Camp Blanding Joint Training Center, Naval Aviation Depot Jacksonville, and Marine Corps Blount Island Command in addition to NAS Jacksonville, provide employment for over 50,000 active and reserve military personnel and civilians (City of Jacksonville 2013a).

The Navy and NAS Jacksonville in particular, is a major contributor to the economy of the City of Jacksonville and the surrounding region. In FY 2008, defense spending in Duval County amounted to almost $2.4 billion (City of Jacksonville, 2013a). In 2012, NAS Jacksonville had a payroll of approximately $1.28 billion and employed 9,995 active duty personnel, 2,553 reserve personnel, 6,153 appropriate fund (APF) civilians, 917 non-APF civilians, and 2,223 contractors (NAS Jacksonville 2012). In 2011, the military accounted for 2.8 percent of total employment in Duval County (see Table 3-13). Over the past decade, the importance of military employment in the county has declined as the number of

military personnel assigned to NAS Jacksonville and other installations has declined and the regional economy has expanded and diversified (see Table 3-13).

Table 3-13 Duval County Employment: 2001, 2005, and 2011

Year	Total Employment	Military Employment	Non-Military Employment	% Employed by Military
2001	572,687	23,943	548,744	4.2
2005	620,337	23,633	596,704	3.8
2011	619,621	17,301	602,320	2.8

Sources: U.S. Department of Commerce, 2013a, 2013b and 2013c.

The military personnel, civilians, and contractors employed at NAS Jacksonville live in the community, spend money in the local economy, and use local amenities and resources, and the station also spends money on goods and services purchased in the local community. Thus, the payroll and expenditures of NAS Jacksonville have a compounding, or multiplier, impact in the local economy.

The *2013 Florida Defense Industry Economic Impact Analysis*, conducted by the University of West Florida on behalf of the Florida Defense Alliance, estimated that the DoD contributed $2.9 billion in expenditures in Duval County in 2011 through salaries ($827.6 million), the purchase of goods and services ($791.8 million), and $1,242.2 million in transfer payments including entitlement payments for military and civilian retirees and veterans. The DoD's direct expenditures were compounded or multiplied in Duval County's economy as the money expended circulated and created further economic activity. Taking this further economic impact into account, the DoD's expenditures directly and indirectly contributed $11.9 billion to the county's gross regional product (i.e., the final value of all goods and services produced in the county in 2011), which is equivalent to 19.2 percent of the county's gross regional product. The analysis predicted that DoD's contribution to the county's gross regional product would fall to $11.1 billion by 2015 (University of West Florida 2013).

3.5.2.2 City of Jacksonville and Region

Service industries, particularly health-related services, and retail trade are important economic drivers in the City of Jacksonville. In 2011, the largest single industrial sector in the city was the education, health, and social services sector, which employed an estimated 19.5 percent of the employed civilian labor force. Other major employment sectors included the retail trade sector, which employed 12.2 percent of the employed civilian labor force; the professional, scientific, and management services sector, which employed 11.7 percent of the employed civilian labor force; and the finance, insurance, and real estate sector and the arts, entertainment, recreation, accommodation, and food service sector, which each employed 11.5 percent of the employed civilian labor force (see Table 3-14).

The importance of the Navy to the regional economy, as well as the civilian economy's emphasis on health-service-related industries, can also be seen in Table 3-15, which lists the top ten private and government employers in the City of Jacksonville. As shown on the table, NAS Jacksonville is the city's top employer.

Table 3-14 2011 Percent of Total Civilian Employment by Industrial Sector for the City of Jacksonville, Duval County, and the State of Florida

Sector	City of Jacksonville (%)	Duval County (%)	Florida (%)
Agricultural, forestry, fishing, and mining	0.5	0.5	1.2
Construction	5.5	5.3	6.3
Manufacturing	6.3	6.2	5.3
Wholesale Trade	2.9	2.9	3.0
Retail Trade	12.2	12.2	13.4
Transportation and Warehousing	6.8	7.0	5.2
Information	1.2	1.3	2.0
Finance, Insurance, and Real Estate	11.5	11.6	7.5
Professional, Scientific, and Management Services	11.7	11.9	12.4
Education, Health, and Social Services	19.5	19.5	21.4
Arts, Entertainment, Recreation and Accommodations and Food Service	11.5	11.5	12.2
Other Services	4.7	4.5	5.4
Public Administration	5.8	5.6	4.9

Source: U.S. Census Bureau 2012

Note: Totals may not add to 100 percent due to rounding.

Table 3-15 2010 Top Private and Government Employers in the City of Jacksonville

Sector	Employer	Sector	Employees
Government	NAS Jacksonville[1]	U.S. Atlantic Fleet	17,521[1]
Government	Duval County Public Schools	Public Education	14,059
Government	NS Mayport	U.S. Atlantic Fleet	10,424
Private	Baptist Health	Health Care	8,276
Government	City of Jacksonville	Public Safety, Public Works, Social Services, Administration	7,953
Private	Wal-Mart Stores, Inc.	Discount Retailer	7,760
Private	Publix Super Markets	Grocery, Retail	7,215
Private	Blue Cross and Blue Shield of Florida	Mutual Insurance Company	6,000
Private	Winn-Dixie Stores, Inc.	Supermarket Chain	6,000
Private	Mayo Clinic	Multi-Specialty Health Care	4,978

Source: City of Jacksonville n.d.; Schellhorn 2013a, b.

Note:
[1] This figure represents 2012 NAS Jacksonville personnel loading numbers.

Table 3-16 shows total employment and the unemployment rates in the City of Jacksonville, Duval County, and the State of Florida from 2010 to 2012. As shown, employment has been gradually increasing and unemployment rates have been falling since 2010 in all three areas. In 2012, the unemployment rates in the State of Florida, Duval County, and the City of Jacksonville ranged from 8.7 percent in the state to 8.9 percent in Duval County (see Table 3-16), and all were above the national average monthly unemployment rate of 8.1 percent (U.S. Department of Labor 2013h).

Table 3-16 Total Employment and Unemployment Rate in the State of Florida, Duval County, and the City of Jacksonville (2010-2012)

Jurisdiction	2010 Employment	2010 Unemployment Rate (%)	2011 Employment	2011 Unemployment Rate (%)	2012[1] Employment	2012[1] Unemployment Rate (%)
City of Jacksonville	369,362	11.2	376,764	10.4	384,470	8.8
Duval County	391,817	11.5	399,669	10.6	407,843	8.9
State of Florida	8,102,324	11.3	8,278,141	10.5	8,481,808	8.7

Source: US Department of Labor, 2013a, 2013b.

Note:
[1] Employment totals and the unemployment rates were calculated using data that did not include December (for which data were unavailable at the time of publication) and which included provisional data for November.

In 2011, the City of Jacksonville had an estimated median household income level of $44,802, a median family income of $56,290, and a per capita income of $24,510. These household and family income levels were slightly higher than the average levels for the State of Florida as a whole, but the per capita income level was slightly lower than the statewide level (see Table 3-17).

Table 3-17 2011 Income Levels for the City of Jacksonville, Duval County, and the State of Florida

Income	City of Jacksonville	Duval County	State of Florida
Median Household Income	$44,802	$45,958	$44,299
Median Family Income	$56,290	$53,958	$53,958
Per Capita Income	$24,510	$24,905	$24,905

Source: U.S. Census Bureau 2012

3.5.3 Taxes and Revenues

Jacksonville is a consolidated city/county political entity that extends geographically throughout Duval County, with the only exceptions being the Town of Baldwin and the communities of Jacksonville Beach, Atlantic Beach, and Neptune Beach. Therefore, community services and facilities are provided by the city to properties adjacent to and near to NAS Jacksonville. These properties fall under the city's fiscal jurisdiction, although the properties may also fall under other additional independent taxing authorities (e.g., school board districts or fire districts).

In FY 2011, the City of Jacksonville's total revenues were $1.54 billion, and its total expenditures were $1.55 billion. Between FY 2010 and 2011, revenues fell by 7.7 percent and expenditures increased by 2.1 percent. The three largest sources of revenue for the City of Jacksonville were property taxes (32.3 percent of revenues), fines and charges for services (15.1 percent of revenues), and sales and tourist taxes (11.2 percent of revenues). The three largest expenditure items were public safety (36.0 percent of expenditures), economic and physical environment[7] (15.7 percent of expenditures), and general government (11.0 percent of expenditures). Based on a 2011 population of 865,000, per capita city revenues were $1,784, and per capita city expenditures were $1,795 (City of Jacksonville 2012).

[7] Economic environment includes veteran and disabled services, the Metropolitan Planning Organization, Northeast Florida Regional Council, and the Jacksonville Economic Development Commission. Physical environment includes environmental quality, solid waste, public works, cooperative extension service, and water and sewer expansion authority (City of Jacksonville 2013b).

3.5.4 Education

The Duval County Public School System is the twenty-first-largest school district in the United States. The system has 183 schools throughout the Jacksonville metropolitan area, serving a projected total student population of approximately 127,000 in the 2012-13 school year. The system includes 104 elementary schools, two grade K-8 schools, 24 middle schools, two grade 6-12 schools, and 19 high schools. In addition, the school system administers three ESE (exceptional student education) schools, eight special schools (inclusive of a virtual school and seven alternative schools), and 21 charter schools. In 2012, the system employed 7,946 teachers among a total of 13,267 school district employees (Duval County Public Schools 2012). During the 2012-2013 school year, 275 children (69 officers' children and 206 enlisted personnel's children) resided in on-base family housing at NAS Jacksonville and attended Duval County Public Schools (Schellhorn 2013a).

Students living near NAS Jacksonville would most likely attend Venetia Elementary School, John Stockton Elementary School, or Timucuan Elementary School; J.E.B Stuart Middle School; and Robert E. Lee High School or Nathan B. Forest High School (Davis Demographics 2013).

As of June 2012, all six of these schools were operating below capacity. Venetia Elementary School had a total capacity of 468 students and a total enrollment of 416 students; John Stockton Elementary School had a total capacity of 529 students and a total enrollment of 516 students; Timucuan Elementary School had a total capacity of 705 students and a total enrollment of 646 students; J.E.B. Stuart Middle School has a total capacity of 1,008 students and a total enrollment of 877 students; the Robert E. Lee High School had a total capacity of 1,946 students and a total enrollment of 1,610 students; and the Nathan Forrest High School has a total capacity of 1,809 students and a total enrollment of 1,119 students (Florida Department of Education 2013; Duval County Public Schools 2013a; 2013b; 2013c; 2013d; 2013e; 2013f).

3.5.5 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations. In addition, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, issued in 1997, directs federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children.

In this analysis, minority and low-income populations and children were defined as follows:

- **Minority.** Individuals who are Black or African American, American Indian and Alaska Native, Asian[8], Native Hawaiian and other Pacific Islander[9], or persons of two or more races (a separate distinction has been made for people of Hispanic or Latino[10] origin).
- **Low-Income.** Individuals living below the poverty line as defined by the U.S. Census Bureau.
- **Children.** Individuals under the age of 18.

[8] Asian includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, and Other Asian alone, or two or more Asian categories.

[9] Native Hawaiian and other Pacific Islander includes Native Hawaiian, Guamanian or Chamorro, Samoan and other Pacific Islander alone or two or more Native Hawaiian and other Pacific Islander categories.

[10] Hispanic or Latino (of any race) includes Mexican, Puerto Rican, Cuban, and other Hispanic or Latino composed of people whose origins are from the Dominican Republic, Spain, and Spanish-speaking Central or South American countries.

Statistics pertinent to the State of Florida, the Jacksonville MSA, Duval County, and the City of Jacksonville are summarized in Table 3-18 below.

Table 3-18 Environmental Justice Statistics for NAS Jacksonville (2010)

Jurisdiction	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Low-Income	Percent Children
State of Florida	18,801,310	25.0	22.5	14.7	21.3
Jacksonville MSA	1,345,596	30.1	6.9	13.1	23.8
Duval County	864,263	39.1	7.6	14.9	23.5
City of Jacksonville	821,784	40.6	7.7	15.2	23.9

Source: U.S. Census Bureau 2010a, 2010b, 2010c, 2010d, 2013a, 2013b, 2013c, and 2013d.

As shown on Table 3-18, approximately 40.6 percent of the total population in the City of Jacksonville is minority, while 7.7 percent is considered Hispanic/Latino. The minority population in the City of Jacksonville is greater than that found in the Jacksonville MSA or the State of Florida as a whole. However, the Hispanic/Latino population is much smaller in the city than in the state as a whole (see Table 3-18).

Approximately 15.2 percent of the residents of the City of Jacksonville had 2010 incomes below the U.S. Census-defined poverty level. This level was slightly greater than the 14.9 percent in Duval County and the 14.7 percent in the State of Florida. In 2010, the City of Jacksonville also had a slightly greater percentage of children, at 23.9 percent, than did Duval County or the State of Florida. The City of Jacksonville and the Jacksonville MSA had nearly the same percentage of children (see Table 3-18).

Table 3-19 lists the census block groups and census tracts near NAS Jacksonville within the modeled 2014 baseline greater than 65 dB DNL noise zone. These tables also provide information on the minority and Hispanic/Latino populations, the percentage of children that reside within the census block groups, and the percentage of low-income residents within these census tracts. Census tracts near NAS Jacksonville within the modeled 2014 baseline greater than 65 dB DNL noise zone are shown on Figure 3-4.

Table 3-19 Environmental Justice Statistics for Census Block Groups within the Modeled 2014 Baseline (No Action Alternative) Noise Zones[1] at NAS Jacksonville

Census Tract	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Low-Income[2]	Percent Children
Block Group 1, Census Tract 131	1,373	25.4	7.5	14.4	22.7
Block Group 1, Census Tract 132	2,311	28.5	16.4	18.5	17.1
Block Group 2, Census Tract 133	3,915	38.1	7.9	15.1	24.2
Block Group 4, Census Tract 134.02	1,360	27.6	9.3	28.2	24.5
Block Group 1, Census Tract 135.22	3,414	50.7	16.6	16.5	27.2
Block Group 4, Census Tract 165	919	9.0	5.5	2.9	21.7
Block Group 5, Census Tract 165	1,418	4.7	2.3	2.9	20.7

Source: U.S. Census Bureau, 2010a, 2010c

Notes:

[1] Noise zones represented in this table are for the greater than 65 dB DNL noise zone.
[2] Percent low-income is based on census tract level data.

3.6 Topography and Soils

NAS Jacksonville comprises the study area for topography and soils. The following discussion describes station-wide topography and soils for context as well as occurrence of these resources within the proposed construction areas. As described in Chapter 2.4.4.1 and shown on Figure 2-4, proposed construction areas include a 1,000-foot-long overrun to the approach end of Runway 10; a parallel taxiway and taxiway connectors for the overrun; and a new 400-foot-long asphalt blast pad at the west end of the overrun.

NAS Jacksonville lies in the Atlantic Coast Flatwoods, a physiographic region characterized by generally flat, low-lying terrain with undulating series of ancient dune ridges. The station is situated on a gentle rise between the St. Johns River to the east and the Ortega River on the west. Elevations range from sea level along the rivers to approximately 27 feet above msl inland. Much of the airfield and its adjacent developed area has been graded and is nearly level at 15 feet above msl. The highest elevation occurs in the southern portion of the station. The proposed construction area associated with the Runway 10 overrun is at approximately 19 feet above msl and has a gradual north-to-south slope.

Nineteen soil types are mapped within the boundaries of NAS Jacksonville (NRCS 2013). Common soils mapped by the Natural Resources Conservation Service (NRCS) in and around the proposed construction areas include Urban land; Albany fine sands, 0 to 5 percent slopes; Arents, nearly level; Arents, sanitary landfill; Pottsburg fine sand, high, 0 to 3 percent slopes; and Sapelo fine sand, 0 to 2 percent slopes (NRCS 2013). These soils are typically a dark color and are identified as very deep and poorly drained, with moderate permeability. However, because each of the three construction areas has been previously disturbed, it is likely that most of the original soils have either been removed or are covered with fill materials.

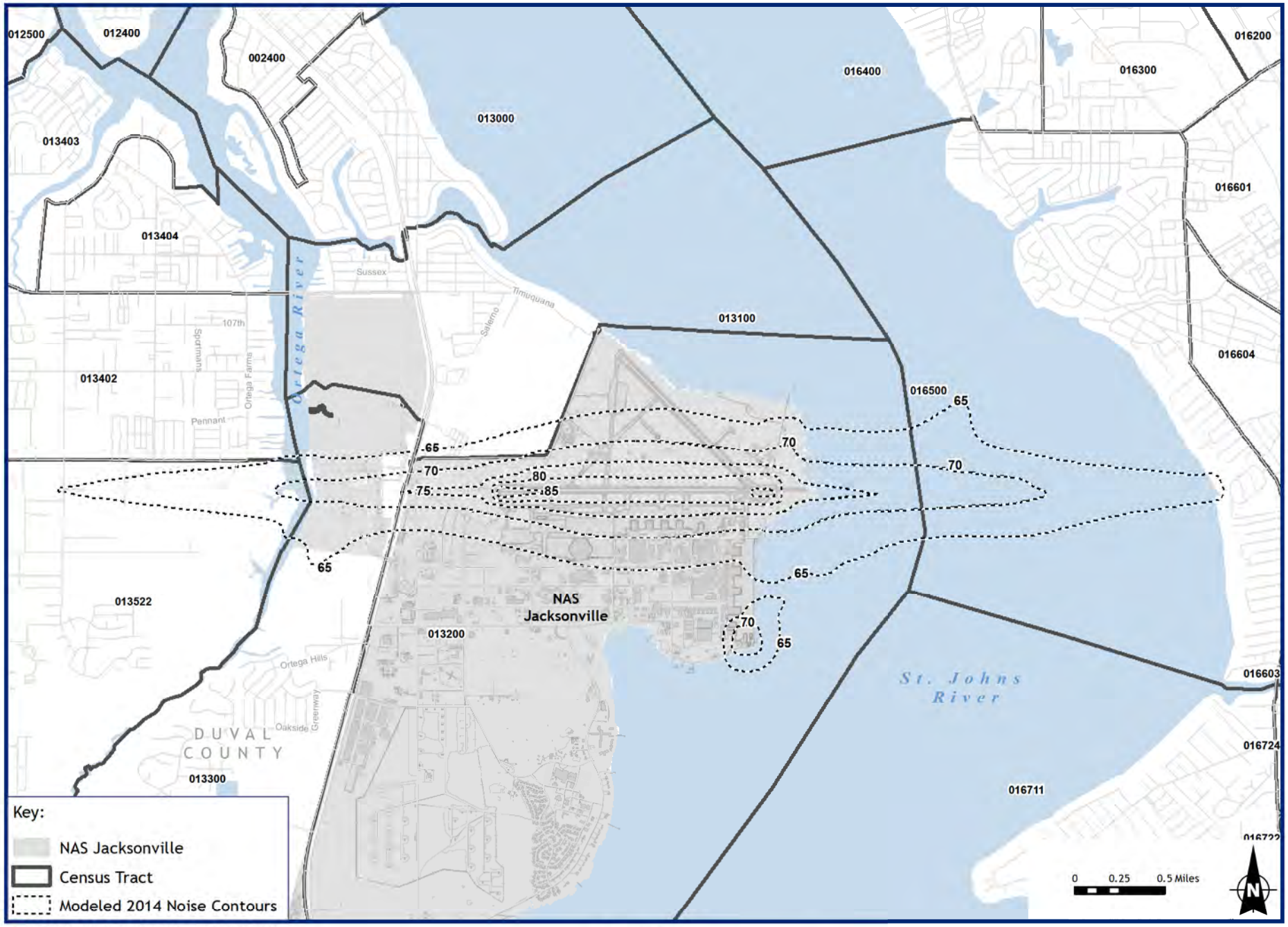
3.7 Water Resources and Wetlands

NAS Jacksonville is the study area for water resources and wetlands. The following discussion describes station-wide water resources and wetlands for context as well as occurrence of these resources within the proposed construction areas.

The Federal Water Pollution Control Act, as amended by the Clean Water Act (CWA), restores and maintains the chemical, physical, and biological integrity of the nation's waters. The CWA regulates the discharge of pollutants from point sources into waters of the U.S. The CWA, as amended in 1987, requires each state to establish water quality standards for its surface waters derived from the amount of pollutants that can be assimilated by a body of water without deterioration of a designated use. The CWA prohibits spills, leaks, or other discharges of oil or hazardous substances into the waters of the U.S. in quantities that may be harmful. The CWA limits any discharge of pollutants to a level sufficient to ensure compliance with the state water quality standards. Direct discharges of effluents are regulated under the National Pollutant Discharge Elimination System (NPDES) permits issued by the EPA or under state NPDES programs approved by EPA.

3.7.1 Surface Water

NAS Jacksonville is located on a peninsula between the St. Johns River to the east and the Ortega River to the west (see Figure 3-5). The St. Johns River in the vicinity of the station is a tidal estuary with a slow-moving northward current. The river empties into the Atlantic Ocean approximately 24 miles northeast of the station. The Ortega River is also a northward-flowing water body and enters the St. Johns River approximately 3 miles north of the station.



Source: ESRI 2010; Wyle 2013; US Census Bureau 2010.

Figure 3-4
2010 Census Tracts Wholly or Partially within Modeled 2014 Baseline
DNL Noise Contours at NAS Jacksonville
Jacksonville, Florida

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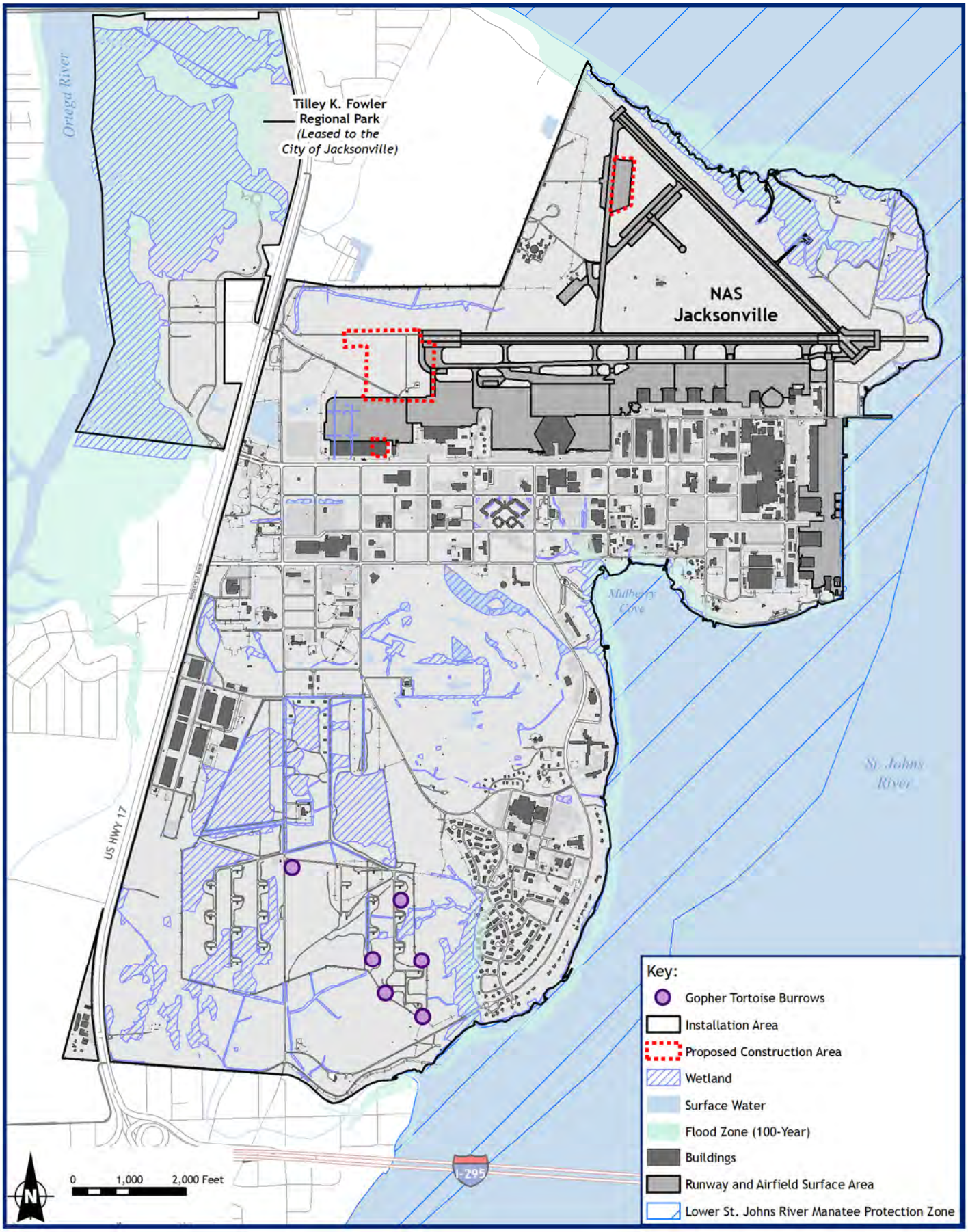

Source: ESRI, 2010; City of Jacksonville, 2007; NAS Jacksonville, 2006, 2013.

Figure 3-5
Natural Resources
NAS Jacksonville, Jacksonville, Florida

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Primary surface water bodies at NAS Jacksonville include an unnamed tributary to the St. Johns River, three unnamed tributaries to the Ortega River, and three dredged lakes (Casa Linda Lake, Lake Scotlis, and Turtle Pond). Casa Linda Lake is located adjacent to the golf course in the northernmost corner of the property and is approximately 10 acres. Lake Scotlis is approximately three acres and is located at the center of the installation. Turtle Pond is a very small pond located on the installation golf course. A detention pond is located at the western edge of the installation adjacent to Highway 17. No surface water bodies occur within or immediately adjacent to any of the proposed construction areas.

3.7.2 Water Quality

The St. Johns River and its tributaries are the main sources of surface water in the region. Surface runoff from NAS Jacksonville flows eastward to the St. Johns River or westward to the Ortega River. An extensive storm water network consisting of concrete piping, natural ditches, and box culverts conveys surface runoff from these basins to the St. Johns and Ortega rivers.

The State of Florida classifies surface waters according to their beneficial uses. These classifications are Class I (potable water supplies); Class II (shellfish propagation or harvesting); Class III (recreation and fish and wildlife propagation); Class IV (agricultural water supplies); and Class V (navigation, utility, and industrial use). The St. Johns River, its tributaries, and lakes within the lower St. Johns River basin are designated as Class III (Florida Department of Environmental Protection 2010).

The St. Johns River has a relatively flat drainage basin, multiple associated draining water bodies, and a slow flow rate. These characteristics limit assimilation capabilities and contribute to pollution levels.

Impervious surfaces cover approximately 35 percent of the land area at NAS Jacksonville; therefore, discharge of storm water from various industrial facilities located at the station is regulated under a NPDES permit. In compliance with the permit, NAS Jacksonville has prepared a Storm Water Management Plan (SWMP) and a Storm Water Pollution Prevention Plan (SWPPP) to control storm water discharges from the station that may adversely affect water quality in the lower St. Johns River basin. These plans include a description of the existing drainage conditions for each drainage basin on the station and basin-specific recommendations for storm-water-management facilities. Storm water controls implemented at the station are based primarily on the St. Johns River Water Management District regulations for storm water management. The following structural best management practices (BMPs) have been installed in the developed areas of the station to improve the quality of storm water runoff:

- Stabilized drainage channels designed to dissipate water during storm events;
- Wet and dry detention/retention ponds; and
- Grass swales and exfiltration devices.

Structural BMPs are also employed in areas such as vehicle or aircraft maintenance, wash-down, and fueling areas; outdoor material storage, loading, and unloading areas; and waste disposal areas that are exposed to storm water. Structural BMPs include skimmer dams, spill-control gates, oil/water separators, and roof and canopy structures over solid/hazardous waste storage areas.

The three proposed construction areas at NAS Jacksonville are located within the northern portion of Drainage Basin 17. This basin covers approximately 350 acres and includes a mixture of vegetated and impervious surfaces. NAS Jacksonville operates under a station-wide Section 402 NPDES Permit (Number FLR05A829MSGP, expiration date October 6, 2016) for storm water.

3.7.3 Floodplains

EO 11988, Floodplain Management, requires federal agencies to identify and consider practicable alternatives for locating incompatible facilities in areas identified as floodplains. The EO defines the term "floodplain" as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a 1-percent or greater chance of flooding in any given year." This zone of a 1-percent or greater chance of flooding in any given year is also commonly referred to as the 100-year floodplain because flooding is expected to occur once every 100 years, on average. Where practicable alternatives to siting federal facilities in the 100-year floodplain are not available, the facilities must be constructed in accordance with and be consistent with the intent of the standards and criteria of the National Flood Insurance Program.

Most of NAS Jacksonville is located outside the 100-year floodplain. Narrow floodplains associated with the St. Johns River occur along the northern and eastern boundaries of the station, while the majority of the station property west of U.S. Highway 17 is within the Ortega River floodplain. No 100-year floodplains are mapped within or adjacent to any of the proposed construction areas at NAS Jacksonville.

3.7.4 Groundwater

Water beneath NAS Jacksonville is present in three main groundwater systems: a surficial aquifer; the Hawthorne aquifer; and the Floridan aquifer. The surficial aquifer is present on the station from land surface to approximately 15 to 35 feet below ground surface (bgs). Groundwater in this aquifer flows from high to low topography and toward surface water bodies. Many ditches and the unnamed streams on the station drain groundwater from the surficial aquifer to the St. Johns and Ortega rivers. Groundwater in this aquifer is not a water supply for NAS Jacksonville or surrounding areas (ATSDR 2005).

The Hawthorne aquifer ranges from about 35 to 400 feet bgs. The aquifer is approximately 10 to 75 feet below sea level and ranges from 250 to 500 feet in thickness throughout Duval County. While some private wells near NAS Jacksonville are located within the Hawthorne aquifer, NAS Jacksonville does not use this aquifer as a water supply (ATSDR 2005).

The Floridan aquifer begins about 400 feet bgs at NAS Jacksonville and extends more than 1,000 feet bgs. Groundwater in the aquifer flows east-northeast. The Floridan aquifer is the principal source of potable water in northeast Florida, including NAS Jacksonville. NAS Jacksonville draws water from two active wells within this aquifer (ATSDR 2005); however, most of the potable water used by the station is purchased from the Jacksonville Electric Authority.

Groundwater within the surficial aquifer and top layer of the Hawthorne aquifer beneath NAS Jacksonville has been contaminated with solvents, pesticides, herbicides, semi-volatile organic compounds, metals, radionuclides, and cyanide. No contaminants have been detected in groundwater at more than 60 feet bgs. Because of the artesian nature of the Floridan aquifer, groundwater movement is likely upward toward the surficial aquifer rather than downward from the surficial aquifer. Consequently, no groundwater used by NAS Jacksonville residents and personnel drawn from the Floridan aquifer has been or would be exposed to contaminants. NAS Jacksonville also regularly monitors areas on-station to ensure that contaminated groundwater is not migrating off-site (ATSDR 2005).

3.7.5 Wetlands

Executive Order 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

Field delineations of jurisdictional wetland boundaries at NAS Jacksonville were completed most recently in 2009. These surveys show approximately 627 acres of jurisdictional wetlands within the boundaries of the station. The wetland communities on NAS Jacksonville are predominantly freshwater marshes and floodplain swamp, bottomland forest, estuarine tidal marsh, dome swamp, and depression marsh, all associated with the St. Johns River and Ortega River (NAS Jacksonville 2004). No wetlands were mapped within or directly adjacent to the proposed construction area at the station at the time of the 2003 survey. Based on the results of that survey and discussions with NAS Jacksonville natural resources personnel (NAS Jacksonville 2013), no wetlands are present within the proposed construction areas.

3.8 Biological Resources

NAS Jacksonville and the surrounding land and water area that provides habitat for wildlife comprise the study area for biological resources.

3.8.1 Vegetation

Natural vegetative communities cover approximately 1,120 acres (29 percent) of NAS Jacksonville. These communities are primarily confined to the southern end of the station around the ordnance storage area and to the northwest section of the station west of U.S. Highway 17. The remainder of the installation has been developed, and vegetation in these areas is limited to managed communities, including lawns, a golf course, ornamental trees and shrubs, and fragmented forest stands.

The two primary natural vegetative communities at NAS Jacksonville are mesic flatwoods and floodplain swamp. Mesic flatwoods, along with wet and scrubby flatwoods, cover approximately 500 acres of NAS Jacksonville. The canopy of flatwoods is dominated by slash pine (*Pinus elliottii)* with occasional longleaf pine (*P. palustris*). Laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), southern magnolia (*Magnolia grandiflora*), and tupelo gum (*Nyssa biflora*) occasionally are present. The shrub stratum is dominated by saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), and staggerbush (*Lyonia fruticosa*). The sparse groundcover is primarily bracken fern (*Pteridium aquilinum*) with occasional clumps of wiregrass (*Aristida stricta*) (NAS Jacksonville 2004).

Other natural communities include dome swamp, estuarine tidal marsh, floodplain marsh, scrubby flatwoods, and upland mixed forest (NAS Jacksonville 2004). Vegetation in the proposed construction area of the Runway 10 overrun is dominated by Bahia grass (*Paspalum notatum*) (NAS Jacksonville 2013). The vegetation in this area is regularly mowed as part of the airfield clear zone management program.

3.8.2 Wildlife

NAS Jacksonville is located within an area historically dominated by pine flatwood habitats. A broad assemblage of wildlife species may be found within these communities, but very few of these species are restricted to these habitats. Vegetative communities do not support a wide variety of wildlife because of urban development surrounding the installation and the presence of a fence line surrounding the property. NAS Jacksonville wildlife habitat is restricted to small mammals, such as the gray squirrel (*Sciurus carlinensis*), raccoon (*Procyon lotor*), rabbits, skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), and occasionally red (*Vulpes vulpes*) and gray fox (*Urocyon cinereoargenteus*), as well as small amphibians and reptiles including salamanders, lizards, frogs, toads, snakes, and turtles. Terrestrial bird species include the pine warbler (*Dendroica pinus*), woodpeckers, tufted titmouse (*Baeolophus bicolor*), brown-headed nuthatch (*Sitta pusilla*), vultures, hawks, wrens, and swallows.

3.8.3 Migratory Birds

The Migratory Bird Treaty Act (MBTA) is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits taking, killing, or possessing migratory birds unless permitted by regulation. Migratory bird conservation in relation to the proposed action is addressed in a Memorandum of Understanding developed in accordance with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds,* signed January 10, 2001. This memorandum between DoD and the USFWS outlines the responsibility of federal agencies to protect migratory birds and how to incorporate conservation efforts into their routine operations and construction activities; the memorandum was recently re-signed to cover DoD activities through 2013.

A study of migratory birds at NAS Jacksonville was conducted between 1997 and 2004 (NAS Jacksonville 2004). The study identified more than 50 species of neotropical migratory bird species on the station. The most common species on the installation covered by the MBTA included the eastern towhee (*Pipilo erythrophthalmus*), red-winged blackbird (*Agelaius phoeniceus*), northern cardinal (*Cardinalis cardinalis*), blue jay (*Cyanocitta cristata*), and Carolina wren *(Thryothorus ludovicianus*). Migratory waterfowl species observed within the vicinity of NAS Jacksonville include the pintail (*Anas acuta*), geese, northern shoveler (*A. clypeata*), gadwall (*A. strepera*), redhead duck (*Aythya americana*), and ring-necked duck (*A. collaris*).

3.8.4 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants and the habitats in which they are found. The Navy ensures that consultations are conducted as required under Section 7 of the ESA for any action that "may affect" a federally listed threatened or endangered species. Although protection of species listed at the state level as threatened or endangered is not legally mandated for federal agencies, the Navy encourages cooperation with states to protect such species when such protection is consistent with an installation's mission.

Information on the potential occurrence of federally listed threatened and endangered species within and in the vicinity of NAS Jacksonville was obtained from the Florida Natural Areas Inventory (FNAI), USFWS North Florida Field Office, and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) Southeast Regional Office. In 1997, FNAI conducted a survey for endangered, threatened, and rare plant and animal species occurring on NAS Jacksonville and other Navy properties in the region (FNAI 1997). Additionally, FNAI submitted a final report in 2004 on field surveys conducted on selected rare species found at NAS Jacksonville and supporting installations.

NMFS and the USFWS share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous species[11]. Each of these agencies maintains databases to track the occurrence of threatened and endangered species: the USFWS provides species occurrences on a county level (USFWS 2013); the NMFS provides species occurrences by marine and estuarine water bodies (NMFS 2013a). For this SEIS, USFWS and NMFS databases, along with the NAS Jacksonville INRMP, were searched to identify the potential occurrences of federally listed threatened and endangered species within Duval County, on NAS Jacksonville, and in the waters surrounding NAS Jacksonville.

A total of 12 ESA-listed species were identified as occurring within the vicinity of NAS Jacksonville, of which eleven are managed by the USFWS and one by NMFS. Threatened and endangered species managed by USFWS within the vicinity of NAS Jacksonville include the piping plover (*Charadrius*

[11] Migratory fishes that spend most of their lives in the sea and migrate to freshwater to breed.

melodus), red-cockaded woodpecker (*Picoides borealis*), wood stork (*Mycteria americana),* eastern indigo snake (*Drymarchon corais couperi*), frosted salamander (*Ambystoma cingulatum*), West Indian (Florida) manatee (*Trichechus manatus latirostris*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*). The ESA-listed species managed by the NMFS is the shortnose sturgeon (*Acipenser brevirostrum*). The current federal protection status and presence of each of these species within the vicinity of NAS Jacksonville are indicated in Table 3-20.

Table 3-20 Federally Protected Species that May Occur at or in the Vicinity of NAS Jacksonville

Common Name	Scientific Name	ESA Listing	Presence in the Study Area
Birds			
Piping Plover	*Charadrius melodus*	Threatened	No suitable habitat at or adjacent to NAS Jacksonville
Red-cockaded Woodpecker	*Picoides borealis*	Endangered	No sightings at or adjacent to NAS Jacksonville.
Wood Stork	*Mycteria americana*	Endangered	Transient occurrences of wood stork recorded at the station. No nesting activity documented on or adjacent to the station.
Reptiles			
Eastern Indigo Snake	*Drymarchon corais couperi*	Threatened	Closely associated with the gopher tortoise. Gopher tortoise burrows are present in the southern portion of the station within the weapons compound.
Green Sea Turtle	*Chelonia mydas*	Endangered	No suitable nesting habitat at or adjacent to NAS Jacksonville.
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	No suitable nesting habitat at or adjacent to NAS Jacksonville.
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered	No suitable nesting habitat at or adjacent to NAS Jacksonville.
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	No suitable nesting habitat at or adjacent to NAS Jacksonville.
Loggerhead Sea Turtle	*Caretta caretta*	Threatened	No suitable nesting habitat at or adjacent to NAS Jacksonville.
Amphibians			
Frosted Salamander	*Ambystoma cingulatum*	Threatened	Occupies slash and longleaf pine flatwoods. Not observed on NAS Jacksonville.
Fish			
Shortnose Sturgeon	*Acipenser brevirostrum*	Endangered	Very rare in St. Johns River. Observed approximately 40 miles upstream from NAS Jacksonville.
Mammals			
West Indian (Florida) Manatee	*Trichechus manatus latirostris*	Endangered/ Critical Habitat	The reach of the St. Johns River adjacent to NAS Jacksonville is part of the Lower St. Johns River Manatee Refuge.

Source: NAS Jacksonville 2004; U.S. Fish and Wildlife Service 2013a; NMFS 2013a, 2013b

3.8.4.1 USFWS-Managed Species

Piping Plover and Red-Cockaded Woodpecker

The Piping plover is a small, migratory shorebird found on sandy beaches occurring along the Atlantic Ocean (USFWS 2013). Due to its inland location, no plovers have been recorded on or adjacent to NAS Jacksonville.

The red-cockaded woodpecker is endemic to the southeastern United States (USFWS 2008). A year-round resident, it inhabits mature pine forest and is seen near sunrise and sunset, as it leaves for or returns from foraging. There have been no sightings of this species at NAS Jacksonville.

Wood Stork

Wood storks use a variety of freshwater and estuarine wetlands for nesting and feeding. Preferred nest sites are medium to tall trees either in water or on islands surrounded by large open water areas. Storks normally use the same nest sites every year, provided the sites remain undisturbed and sufficient forage habitat remains available in adjacent wetlands. Typical forage areas include freshwater marshes, narrow tidal creeks, shallow tidal pools, agricultural or roadside drainage ditches, and managed impoundments. Most foraging occurs within 13 miles of nesting colonies, although wood storks have been observed to travel up to 60 miles from nest sites to forage (USFWS 1997b). Approximately 50 wood stork nesting colonies are documented in north Florida, two of which have been confirmed in Duval County (NAS Jacksonville 2004).

In 2004, the FNAI surveyed potential wood stork nesting habitat on NAS Jacksonville. Transect surveys were completed through forested wetlands along the Ortega River to determine the presence or absence of wood stork nesting. No sign of wood storks or other colonial nesting birds was observed. The swamp along the Ortega River was determined to be not typical of wood stork nesting habitat, and the area is not likely to attract wood storks in search of new nesting areas (FNAI 2004).

The closest wood stork nesting colony to NAS Jacksonville is located approximately 10 miles north of the station within the St. Johns River floodplain (USFWS 2013). From 1997 to 2003, one wood stork was detected at the main station (NAS Jacksonville 2004).

Wood storks have recently been observed at NAS Jacksonville at Tillie Fowler Park (Navy-owned land across Roosevelt Boulevard), on the station golf course, and in trees near Turtle Pond. None of these observations have been associated with nesting colonies.

Eastern Indigo Snake

The eastern indigo snake most commonly inhabits sites with dry, well-drained sandy soils. The indigo snake is closely associated with the gopher tortoise when in this habitat and uses gopher tortoise burrows as dens and for egg-laying (USFWS 2008b). Gopher tortoise burrows are present in the southern portion of the station within the weapons compound (NAS Jacksonville 2004).

Frosted Salamander

The medium-sized (up to 5 inches) frosted salamander inhabits slash and longleaf pine flatwoods that have a wiregrass floor and scattered wetlands. This species has not been observed at NAS Jacksonville.

Manatee

Florida manatees, a native subspecies of the West Indian manatee, inhabit freshwater, brackish, and marine habitats in coastal and inland areas of the southeastern U.S. Shallow grass beds located near deep channels are preferred manatee feeding areas in these habitats (USFWS 2001). The FNAI recorded 82

manatees along the immediate coastline of NAS Jacksonville during the 1996 survey (FNAI 1997). During the summer, manatees regularly feed along the station shoreline in Mulberry Cove (see Figure 3-5).

The stretch of the St. Johns River adjacent to NAS Jacksonville is part of the Lower St. Johns River Manatee Refuge (see Figure 3-5). The refuge was established to prevent the taking of manatees from collisions with watercraft. In the portion of the refuge adjacent to the station, watercraft are required to travel at slow speeds within the manatee protection zone and no more than 25 miles per hour (mph) while in the channel (NAS Jacksonville 2004, USFWS 2013). In addition to protection under the ESA, the manatee is also protected under the Marine Mammal Protection Act (MMPA) (see Chapter 3.8.7).

Sea Turtles

There are no known sea turtle nesting beaches at or adjacent to NAS Jacksonville, and these species have not been recorded in the St. Johns River adjacent to NAS Jacksonville.

3.8.4.2 NMFS-Managed Species

Shortnose Sturgeon

The shortnose sturgeon is a semi-anadromous species, inhabiting the lower estuarine portions of rivers and traveling upstream to spawn (NMFS 2010). Breeding normally occurs over rocky or gravelly substrate or limestone outcroppings.

Fish sample collection was conducted in 2002 and 2003 by the Florida Fish and Wildlife Conservation Commission (FFWCC) to determine population levels of the shortnose sturgeon in the lower St. Johns River (FFWCC 2013b). Only one shortnose sturgeon was collected during 820 hours of sampling. The sturgeon was collected approximately 40 miles upstream of NAS Jacksonville, near an area known for historical shortnose sturgeon catches.

3.8.5 Bald and Golden Eagles

The bald eagle (*Haliaeetus leucocephalus*) was delisted under ESA, effective August 8, 2007, because of its reproductive success throughout the U.S. However, taking of bald eagles is still prohibited under the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as amended in 1978, as well as the MBTA. The BGEPA prohibits "taking" bald or golden eagles, including their parts, eggs, or nests, without a permit issued by the Secretary of the Interior. It defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (16 U.S.C. 668-668d). "Disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior" (50 CFR Part 22). Inactive eagle nests, which may become active again, are also protected under the act.

FFWCC conducted an aerial survey of known eagle nesting territories from 2008 to 2012 (FFWCC 2013a). This survey identified three active bald eagle nests within approximately 3 miles of NAS Jacksonville:

- A bald eagle nest that was confirmed active in 2012 is located approximately 1.4 miles west of the station at Ringhaver Park.
- A bald eagle nest that was confirmed active in 2012 is located on NAS Jacksonville, south of the installation's golf course.

- A bald eagle nest that was confirmed active in 2012 is located on the eastern shore of the St. Johns River, approximately 2.5 miles east of the station.

3.8.6 Other Species of Concern

Other species of concern evaluated in this SEIS include candidate species proposed for listing under the ESA. Other species of concern identified with potential to occur on or in the immediate vicinity of NAS Jacksonville include the gopher tortoise (*Gopherus polyphemus*) and the striped newt (*Notophthalmus perstriatus*) (USFWS 2013).

Gopher tortoises inhabit well-drained sandy areas and are commonly found in sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hummock, pine mixed hardwoods, and coastal dunes (FFWCC 2013). Suitable gopher tortoise habitat exists primarily in the southern portion of the station in the vicinity of the weapons bunkers and weapons compound. Six active and two abandoned gopher tortoise burrows were found in the southeast corner of the weapons compound during field surveys completed in 2005 (NAS Jacksonville 2006).

USFWS, along with branches of the DoD including NAS Jacksonville; the fish and wildlife agencies of Florida, Georgia, Alabama, and South Carolina; and related non-profit organizations, drafted and executed a Candidate Conservation Agreement for the gopher tortoise. This agreement develops a range-wide approach to gopher tortoise management and conservation in its eastern range. In addition to signing this agreement, the Navy prepared a Gopher Tortoise Management Plan for the station to address maintenance in the weapons area and because the tortoise is a keystone species whose removal from the station would impact other species, possibly including federally listed species (NAS Jacksonville 2006). The plan provides actions for habitat improvements, habitat protection, and tortoise relocations when necessary for safety or mission-related development (NAS Jacksonville 2006). Based on discussions with NAS Jacksonville natural resources personnel, no gopher tortoise burrows are present within the proposed construction areas.

The striped newt occupies shallow, unpolluted water, usually with some kind of vegetation. Temporary ponds or bays are more preferred because they lack fish, among other predators, which increases larval survival. No suitable habitat for this species has been identified at NAS Jacksonville.

3.8.7 Marine Mammals

The MMPA is administered by the USFWS and NMFS to protect and manage marine mammals. No marine mammals other than the West Indian (Florida) manatee have been documented in the waters adjacent NAS Jacksonville (NAS Jacksonville 2004).

3.9 Cultural Resources

Under NEPA, cultural resources include archaeological resources, architectural or built resources, and Native American resources. Under Section 106 of the National Historic Preservation Act of 1966 (NHPA) and its implementing regulations at 36 CFR Part 800, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking must identify historic properties within a proposed project's area of potential effect (APE) and consider the effects of the proposed undertaking on these properties.

Implementing regulations for Section 106 at 36 CFR Part 800 define historic properties as any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP, including the artifacts, records, and remains that are related to and located within such properties and including properties of traditional religious and cultural importance to a federally recognized Indian tribe. Such properties must meet the NRHP criteria for eligibility (36 CFR Part 60). Eligibility determinations

are based on NRHP (Table 3-21) and National Park Service (NPS) criteria (Table 3-22) for architectural integrity.

Table 3-21 National Register of Historic Places Criteria for Historic Significance

36 CFR 60.4, Part I
The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and: A. That are associated with events that have made a significant contribution to the broad patterns of our history; or B. That are associated with the lives of persons significant in our past; or C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or D. That have yielded, or may be likely to yield, information important in prehistory or history.
36 CFR 60.4, Part II
Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories: A. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or C A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or D A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or F. A property primarily commemorative in intent if design, age, traditions, or symbolic value has invested it with its own exceptional significance; or G. A property achieving significance within the past 50 years if it is of exceptional importance.

Source: U.S. Department of the Interior, National Park Service 1995.

Table 3-22 National Park Service Criteria for Architectural Integrity

Criteria	Definition of Architectural Integrity
Location	Must not have been moved.
Design	Must retain historic elements that create the form, plan, space, structure, and style of the property.
Setting	Setting must retain its historic character.
Materials	Must retain the key exterior materials dating from the period of its historic significance.
Workmanship	Methods of construction from its time of significance must be evident.
Feeling	Physical features must convey its historic character.
Association	Must be the actual place where a historic event or activity occurred and must be sufficiently intact to convey that relationship to an observer.

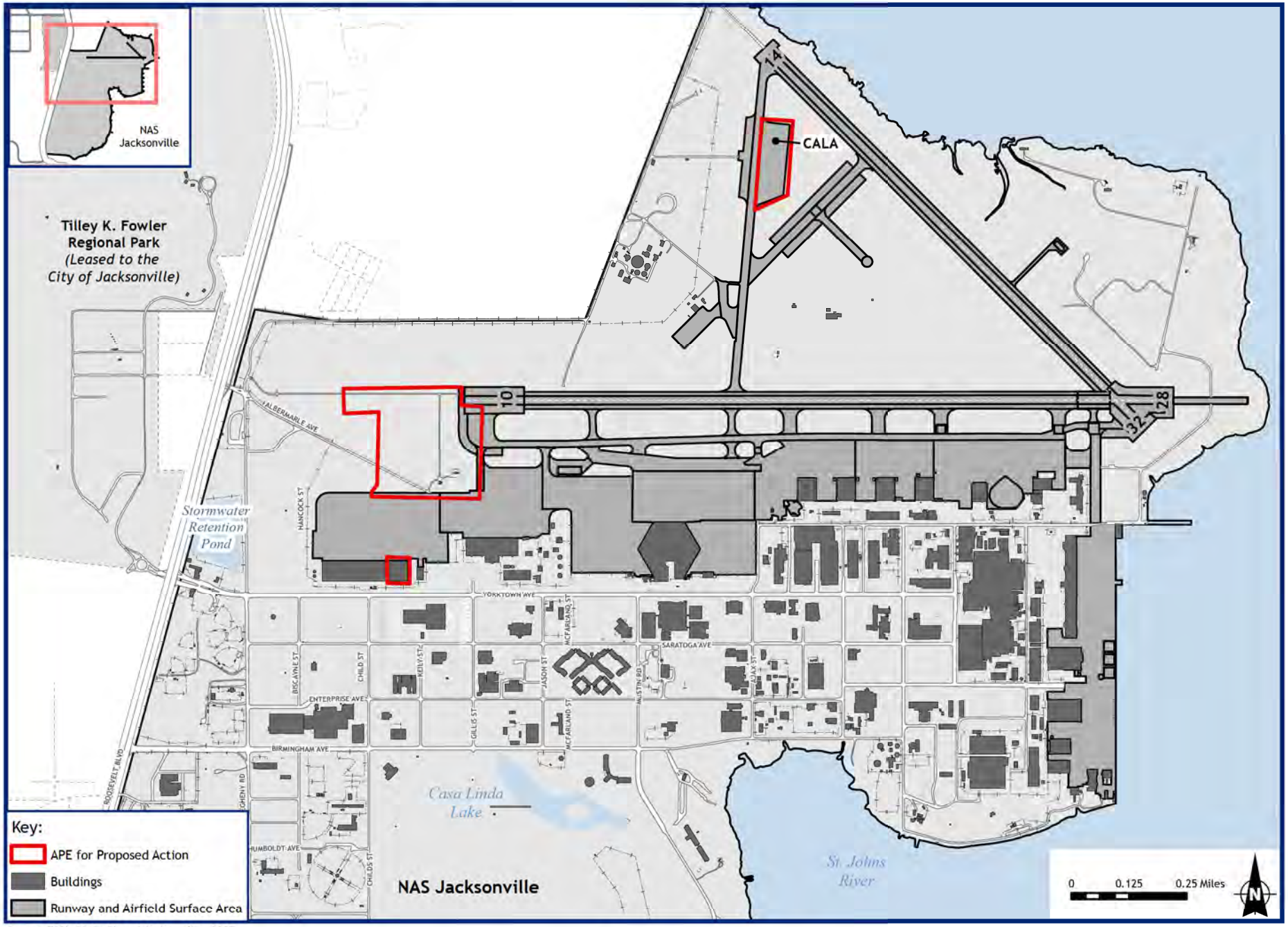
Source: U.S. Department of the Interior, National Park Service 1995.

Native American resources are cultural resources of interest or importance to federally recognized Indian tribes and may be archaeological, architectural, geographical, or biological. Such resources may also be considered historic properties or tangible or physical properties of traditional religious and cultural importance to an Indian tribe that meet the NRHP criteria (ACHP 2004, Parker and King 1990). Such resources may also include Traditional Cultural Properties (TCPs): properties that are eligible for inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continued cultural identity of the community (Parker and King 1990). Additionally, Native American resources may include culturally sensitive locations, such as sacred sites, or cultural items that are offered protection under the American Indian Religious Freedom Act (AIRFA), EO 13007, the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), and other federal legislation and regulations, as described in the Integrated Cultural Resources Management Plan (ICRMP) for NAS Jacksonville (SEARCH 2010).

For the purposes of the identification and evaluation of cultural resources, the project area for the proposed action is considered the same as the APE. Implementing regulations for Section 106 define the APE for an undertaking as the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. For the purposes of compliance with Section 106, the APE for the proposed action is the footprint within which existing or new facilities are or would be located at NAS Jacksonville (see Figure 3-6).

3.9.1 Architectural Resources

Two architectural or built resources are associated with the APE for the proposed action at NAS Jacksonville: Hangar 511 and the CALA. The Navy defines buildings and structures according to the definitions provided in *National Register Bulletin 16A: How to Complete the National Register Registration Form*. A building is a construction "...created principally to shelter any form of human activity." Structures are "...those functional constructions made usually for purposes other than creating human shelter" (NAVFAC 2013). According to these definitions, Hangar 511 and the CALA are both considered structures.



Source: ESRI, 2012; City of Jacksonville, 2007; NAS Jacksonville, 2012

Figure 3-6
Area of Potential Effects at NAS Jacksonville
Jacksonville, Florida

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The 2010 ICRMP for NAS Jacksonville indicated that neither of the two architectural or built resources within the APE has been evaluated for NRHP-eligibility (SEARCH 2010). Hangar 511 is an existing structure that was built in 2009 and would not be NRHP-eligible due to its age (four years old). The CALA is also an existing structure (a paved area with markings, lighting, and tie-downs). Its location along the eastern side of Taxiway Charlie suggests that it may be associated with the taxiway. Taxiway Charlie was built in 1941 and has been recommended as needing evaluation to determine its NRHP-eligibility (SEARCH 2010).

3.9.2 Archaeological Resources

An intensive archaeological site assessment survey and inventory was conducted at NAS Jacksonville in 1997, which included the APE for the proposed action. No archaeological resources were identified within the APE at NAS Jacksonville (Johnson 1997, as cited in SEARCH 2010).

3.9.3 Native American Resources

No previously identified Native American resources are present within the APE at NAS Jacksonville (SEARCH 2010).

3.10 Hazardous Materials and Waste Management

Hazardous materials are used at NAS Jacksonville for airfield operations and industrial support activities, including petroleum, oils, and lubricants; solvents and thinners; caustic cleaning compounds and surfactants; cooling fluids (antifreeze); adhesives; acids and corrosives; paints; and herbicides, pesticides, and fungicides. Hazardous materials are used for aircraft and vehicle repair and maintenance at NAS Jacksonville. Activities at NAS Jacksonville that generate hazardous wastes include painting, using solvents for cleaning and degreasing, mechanical and chemical paint and corrosion removal, fluids change-out, electroplating, metal casting, machining, and welding or soldering. The Navy monitors its operations to minimize the use of hazardous materials and reduce the generation of hazardous wastes. If not consumed during use, these materials and possibly their containers eventually may be disposed of as a solid or hazardous waste.

NAS Jacksonville is classified as a large-quantity hazardous waste generator, as defined by the Resource Conservation and Recovery Act (RCRA), because it has the potential to generate more than 2,200 pounds of hazardous waste every month. Hazardous wastes are accumulated at less-than-90-day accumulation points throughout the station before being transferred to permitted storage facilities and then collected and stored on site in accordance with NAS Jacksonville's RCRA Part B operating permit. Collection, transportation, and disposal of wastes at NAS Jacksonville are conducted through the Public Works Department (EDAW, Inc. 2009). Paint waste, rags with paint thinner, and electroplating waste make up the largest components of the hazardous waste stream generated at NAS Jacksonville (EDAW, Inc. 2009).

Environmental Restoration Program Sites

Hazardous waste disposal sites at NAS Jacksonville have been investigated under the DoD's Environmental Restoration Program (ERP), comprised of both the Installation Restoration Program and Munitions Response Program, in compliance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act for former waste sites and with RCRA for sites associated with continuing operations. Restoration processes have been in place at NAS Jacksonville since 1985, when site assessments were initiated. The purpose of the ERP is to identify, assess, characterize, and clean up or control contamination caused by past hazardous waste disposal practices and hazardous material spills at Navy facilities. Past hazardous material use, and methods of disposal, although acceptable at the time, resulted in pollutants being released into soil and groundwater. The Navy has taken an aggressive and proactive approach to cleaning up its hazardous waste sites through the ERP.

Sites designated as potential sources of contamination (PSC) at NAS Jacksonville are in various stages of investigation and remediation under either the ERP or have been transferred to the Petroleum Program. NAS Jacksonville has entered into a Memorandum of Agreement with the EPA and the Florida Department of Environmental Protection regarding long-term land use controls for these sites and to ensure final remedies remain in place (EDAW, Inc. 2009).

One PSC is located in proximity to the proposed construction area, PSC 4, Pine Tree Planting Area. This approximately 70-acre site, adjacent to the proposed construction area to the north, was used formerly as a disposal site for wastewater treatment plant sludge, asbestos, oil, and other petroleum products. Remedial investigations, including groundwater and surface water testing and sediment sampling, were conducted between 1985 and 1992. Due to concentrations of metals (chromium, cadmium, mercury, and silver) detected at the site, sludge piles and soil surrounding one sludge sampling location were removed in January 1997. The remedial investigation was completed in January 1998. A Record of Decision was signed on October 20, 1998, recommending no further action planned with implementation of land use controls.

3.11 Safety

Safety is a priority for the Navy. The Navy practices operational risk management as outlined in the Office of the Chief of Naval Operations Instruction 3500.9 A. Requirements outlined in this document provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. The primary safety issues include flight safety (Chapter 3.11.1) and BASH (Chapter 3.11.2).

3.11.1 Flight Safety

The FAA is responsible for ensuring the safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. In addition, the Navy has developed guidance on airfield safety zones, flight rules, ATC procedures, and safety procedures.

To complement flight training, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risks associated with mishaps due to pilot error. Additionally, highly trained maintenance crews routinely inspect each aircraft in accordance with Navy regulations, and maintenance activities are monitored by senior technicians to ensure aircraft are equipped to withstand the rigors of operational and training events safely.

The primary safety concern with regard to military aircraft training operations is the potential for aircraft mishaps to occur. Aircraft mishaps could be caused by mid-air collisions with other aircraft or objects, weather, mechanical failures, pilot error, or BASH (See Chapter 3.11.2). Aircraft mishaps are classified as Class A, B, or C according to the severity of injury to individuals and total property damage, with the most severe being a Class A Mishap ($2 million or more in property damage, aircraft destroyed, or fatality or permanent total disability) and the least severe a Class C Mishap ($50,000 to $500,000 in property damage and/or nonfatal injury) (Naval Safety Center 2012).

NAS Jacksonville maintains emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-station. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation.

3.11.2 Bird/Wildlife Aircraft Strike Hazards

The presence of resident and migratory birds creates a potential BASH risk at NAS Jacksonville. The airfield's proximity to a major river, several large hangars, and expanses of grass and emergent wetlands adjacent to the airfield increase the potential BASH risk. NAS Jacksonville has prepared and implemented a BASH plan, inclusive of wildlife hazard assessment surveys, to reduce the potential for collisions between aircraft and birds or other animals. The BASH plan prescribes an ongoing process that involves the distribution of information and active and passive measures to control how birds use the critical areas around the airfield. Methods outlined in the plan to reduce BASH risk at the airfield include habitat management, bird dispersal, depredation, and bird avoidance.

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4 NAS Jacksonville Environmental Consequences

Chapter 4 presents the affected environment and analysis of the potential direct and indirect effects of each alternative for each resource area described in Chapter 3. Chapter 9 presents the analysis of the potential cumulative effects of each alternative for each resource area. The level of significance is assessed according to NEPA implementing regulations in 40 CFR 1508.27, which requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Intensity refers to the severity of an impact.

As defined in Chapter 1.5, the baseline for this SEIS analysis is the existing conditions present at the time a new home basing decision is made, which is expected to be April 2014. The Year 2020 is the end-state year used in this analysis, which represents a reasonable timeframe for the full complement of training crews to be in place and achieving a steady state of training events.

Tables 4-1 and 4-2 are provided to guide the evaluation of proposed environmental impacts. Table 4-3 lists the areas of impact from new construction at NAS Jacksonville.

Table 4-1 2014 Baseline (No Action Alternative) and 2020 End-State P-3C and P-8A Personnel Loading at NAS Jacksonville

Activity	2014 Baseline (No Action Alternative)	ALT 1	ALT 2
P-8A/P-3C Personnel	2,619	2,197	1,932
Net Change	**0**	**- 422**	**- 687**

Table 4-2 2014 Baseline (No Action Alternative) and 2020 End-State P-3C and P-8A Aircraft at NAS Jacksonville

	2014 Baseline (No Action Alternative)		2020 End-State (P-8A)	
	P-3C	P-8A	ALT 1	ALT 2
Fleet Squadrons	2	4	6	5
Authorized Aircraft per Squadron	8	7	7	7
Total Fleet Authorized Aircraft	16	28	42	35
Total FRS Aircraft	6	6	12	12
Total	**22**	**13**[1]	**54**	**47**

Note:

[1] By April 2014, four of six squadrons will have transitioned from the P-3C to the P-8A, and the FRS will consist of a combination of P-3C and P-8A aircraft. In 2014, personnel and infrastructure requirements will be in place, and P-8A flight aircrews will be flying the full number of projected flight events using a smaller complement of P-8A aircraft. This condition would continue until the full complement of P-8A aircraft is delivered.

Table 4-3 Areas of Impact from New Construction at NAS Jacksonville

	2014 Baseline (No Action Alternative)	ALTs 1 and 2
Facility Renovation (square feet)	0	2,723
New Construction (acres)	0	36.10
New Impervious Surface (acres)	0	12.89

4.1 Airspace and Airfield Operations

This assessment examines how the proposed action would affect airspace (Chapter 4.1.1) and airfield operations (Chapter 4.1.2). Airspace within the vicinity of NAS Jacksonville is assessed for changes in management or structure. Airspace is also assessed for impacts from changes to the number of annual operations that would occur from the continued transition of P-3C to P-8A aircraft, as well as the potential effects to civil aviation.

The airfield at NAS Jacksonville is assessed for impacts from changes to the number of annual operations that would occur from the continued transition of P-3C to P-8A aircraft.

4.1.1 Airspace

Neither of the action alternatives would require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures. The proposed action would not affect local Jacksonville area civil and commercial aviation airspace use because the P-8A operates within the same flight parameters currently used for NAS Jacksonville airspace. Additionally, the proposed action would not have an adverse impact on civil aviation transiting airspace under NAS Jacksonville ATC control. Neither of the action alternatives would have an adverse impact to civil aviation transiting airspace under NAS Jacksonville ATC control. As described in Chapter 4.1.2, while the number of aircraft home based at NAS Jacksonville would increase, overall aircraft operations would decrease under Alternatives 1 and 2 compared to baseline operations. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced.

The No Action Alternative would not impact airspace because no changes would occur to current airspace or operational procedures, and overall aircraft operations would not change.

4.1.2 Airfield Operations

The projected number of annual P-8A aircraft operations for Alternatives 1 and 2 was calculated using the Patrol Reconnaissance Group Projected P-8A Syllabus Flight Operations. Based on this analysis, the number of annual operations at NAS Jacksonville would decrease under both of the action alternatives. The 43,623 total annual airfield operations occurring under the 2014 baseline would decrease by 8 percent under Alternative 1 and by 11 percent under Alternative 2 (see Tables 4-4 and 4-5). The 27,480 baseline P-3C and P-8A operations would decrease to 24,000 P-8A operations under Alternative 1, a 13-percent reduction, and decrease to 22,821 P-8A operations under Alternative 2, a 17-percent reduction. The projected decrease in P-8A airfield operations is associated with an increased use of simulators for P-8A training operations. P-8A simulators offset the need to conduct flight operations and thereby decrease air emissions and enhance safety by allowing personnel to practice emergency procedures without putting pilot and aircraft at risk.

Alternatives 1 and 2 both would require airfield improvements as detailed in Chapter 2.4.4.1 to meet P-8A operating requirements. Construction of the 1,000-foot overrun would be required to provide P-8A aircraft with sufficient safety margins when operating fully loaded in low air-density conditions—i.e., on hot and humid days. The overrun would not otherwise alter established P-8A flight tracks or flight operations and would not change the airfield's accident potential zones.

No change is proposed to existing types of flight operations or flight tracks to support continued home basing of P-8A aircraft. Projected operations would include arrivals, departures, T&Gs, and GCA patterns. NAS Jacksonville meets all the operational requirements under routine operating conditions to support the airfield operations of the P-8A squadrons. Based on the decrease in P-8A operations when compared to baseline P-3C/P-8A operations, airfield operations at NAS Jacksonville would not be adversely impacted under either of the proposed action alternatives.

Table 4-4 Comparison of Modeled 2014 Baseline (No Action Alternative) and Alternative 1 (2020 End-State) Aircraft Operations at NAS Jacksonville

Aircraft Type	ALT 1[1] Departure	Straight-in/ Full-Stop Arrival	Instrument Arrival	Touch-and-Go	GCA Box	Total[3]	2014 Baseline Total[2] (No Action Alternative)
P-3C	0	0	0	0	0	**0**	**13,596**
P-8A	4,357	4,077	280	11,640	3,646	**24,000**	**13,884**
C-130	115	102	13	120	96	**446**	**446**
Cessna 210	125	112	13	0	12	**262**	**262**
MD-500	125	125	0	0	0	**250**	**250**
T-34	845	836	9	0	54	**1,744**	**1,744**
PA-42	124	113	12	0	10	**259**	**259**
BE-20	346	290	56	0	66	**758**	**758**
H-1	102	93	9	0	16	**220**	**220**
FA-18E/F[2]	364	300	64	0	94	**822**	**822**
C-5A	101	83	18	0	10	**212**	**212**
C-40	415	355	60	0	22	**852**	**852**
E-2C	667	606	61	0	70	**1,404**	**1,404**
MH-60R	3,810	3,810	0	476	636	**8,732**	**8,732**
Other Transient Jets	85	72	13	0	12	**182**	**182**
Total Aircraft Operations[3]						**40,143**	**43,623**
Total Aircraft Operations Change						**- 3,480 (-8%)**	

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 Some FA-18E/F operations include FA-18C/D aircraft but are modeled as the louder FA-18E/F aircraft.

3 Total air operations numbers may not sum exactly due to rounding.

Table 4-5 Comparison of Modeled 2014 Baseline (No Action Alternative) and Alternative 2 (2020 End-State) Aircraft Operations at NAS Jacksonville

	ALT 2[1]						
Aircraft Type	Departure	Straight-in/ Full-Stop Arrival	Instrument Arrival	Touch-and-Go	GCA Box	Total[2]	2014 Baseline Total[2] (No Action Alternative)
P-3C	0	0	0	0	0	**0**	**13,596**
P-8A	4,080	3,827	252	11,242	3,420	**22,821**	**13,884**
C-130	115	92	23	120	96	**446**	**446**
Cessna 210	125	112	13	0	12	**262**	**262**
MD-500	125	125	0	0	0	**250**	**250**
T-34	845	836	9	0	50	**1,744**	**1,744**
PA-42	124	113	12	0	8	**259**	**259**
BE-20	346	290	56	0	56	**758**	**758**
H-1	102	93	9	0	12	**220**	**220**
FA-18E/F[3]	364	300	64	0	94	**822**	**822**
C-5A	101	83	18	0	10	**212**	**212**
C-40	415	355	60	0	22	**852**	**852**
E-2C	667	606	61	0	70	**1,404**	**1,404**
MH-60R	3,810	3,810	0	476	636	**8,732**	**8,732**
Other Transient Jets	85	72	13	0	12	**182**	**182**
Total Aircraft Operations[1]						**38,964**	**43,623**
Total Aircraft Operations Change						**- 4,659 (-11%)**	

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 Total air operations numbers may not sum exactly due to rounding.

3 Some FA-18E/F operations include FA-18C/D aircraft but are modeled as the louder FA-18E/F aircraft.

The No Action Alternative would not impact airfield operations because overall aircraft operations would not change.

Conclusion

Overall, the action alternatives would not result in adverse impacts to airspace and airfield operations at NAS Jacksonville from the continued transition of P-3C to P-8A aircraft. The same training regime as currently used by P-3C and P-8A aircraft would continue. P-8A operations would decrease under both action alternatives when compared to baseline P-3C/P-8A operations. The opportunity for civil aviation to transit existing airspace would not be reduced.

4.2 Noise

The noise analysis in this chapter is presented in five parts. Chapter 4.2.1 provides an assessment of the changes to the DNL noise zones for NAS Jacksonville attributable to the continued home basing of P-8A aircraft under each of the alternatives, as well as an analysis of the SEL for single-event aircraft overflights. Chapter 4.2.2 presents an analysis of noise impacts using the supplemental noise metrics (see Chapter 3.2.2 and Appendix D, Background Noise Information and Wyle Laboratories, Inc., Noise Report WR13-02 for a description of supplemental noise metrics). Chapter 4.2.3 includes a discussion of potential hearing loss, and Chapter 4.2.4 addresses other noise-related health impacts. Chapter 4.2.5 addresses potential impacts related to construction noise. A full discussion on noise modeling and the background data for this analysis are included in Appendix D, Background Noise Information and Wyle Laboratories, Inc., Noise Report WR13-02.

The No Action Alternative would not impact the noise environment at NAS Jacksonville because the 2014 baseline aircraft operations would not change.

4.2.1 DNL Noise Zones and SEL Noise

The projected noise zones for NAS Jacksonville under Alternatives 1 and 2 are shown on Figures 4-1 and 4-2, respectively. Similar to the modeled 2014 baseline noise zones, the 65 dB DNL noise contour under Alternatives 1 and 2 would extend approximately 2.5 miles east and 2.5 miles west of Runway 10/28 primarily due to transient military tactical jet aircraft (FA-18E/F) arrival operations and FA-18E/F GCA pattern arrivals, respectively. The 65 dB DNL noise contour would extend about 1 mile to the south and approximately 0.75 mile to the north of Runway 10/28 due to FA-18E/F departures. Although the FA-18E/F would only account for 2 percent of the overall flight operations, its SEL is 5 to 20 dB greater than other aircraft at NAS Jacksonville; therefore, the FA-18E/F would remain the dominant aircraft noise source for DNL. The extent of the 65 dB DNL noise contour to the east and west would increase less than 50 feet compared to the 2014 baseline noise contour because the effects of the P-3C and P-8A operational changes would be masked by the FA-18E/F operations. The small noise contour lobe to the southwest of the station would reduce in length by approximately 500 feet due to the reduction in T&G pattern events by the P-3C for Alternative 1. Although additional P-8A T&G operations would occur under Alternatives 1 and 2, most of the additional operations would be conducted during the DNL daytime and have minimal effect. The 75 dB DNL or greater noise zone for Alternatives 1 and 2 would be similar to baseline conditions.

The off-station area and estimated population within projected DNL noise zones at NAS Jacksonville for both of the alternatives are shown in Table 4-6. Both alternatives result in a slight increase in the off-station area and number of people within the modeled noise zones. Alternative 1 results in an increase of 96 acres within the modeled noise zones, of which 83 acres are over water. Alternative 1 also results in an increase of approximately 68 people within the modeled noise zones for NAS Jacksonville. Thus, Alternative 1 results in a 9-percent increase in the off-station area and a 6-percent increase in the

population compared to the modeled 2014 baseline noise zones. Alternative 2 would result in an increase of 83 acres within the modeled noise zones, of which 71 acres are over water. Alternative 2 also results in an increase of approximately 56 people within the modeled noise zones for NAS Jacksonville. Thus Alternative 2 results in an 8-percent increase in the off-station area and a 5-percent increase in the population compared to the modeled 2014 baseline noise zones. Further discussion of the compatibility of land uses within the projected noise zones for each alternative is included in Chapter 4.4.4.

Table 4-7 shows the comparative difference in SEL noise values for the P-3C and the P-8A aircraft. Noise values for the FA-18E/F aircraft are also shown in Table 4-7 because of its influence on the noise environment at NAS Jacksonville.

Table 4-6 Off-Station Area (Acres) and Projected Population[1] within Modeled 2020 DNL Noise Zones for NAS Jacksonville

Noise Zone	2014 Baseline (No Action Alternative)		ALT 1 (2020 End-State)		ALT 2 (2020 End-State)	
	Area (acres)	Pop.[1]	Area (acres)	Pop.[1]	Area (acres)	Pop.[1]
65 to 70 dB DNL	848	909	931	970	919	959
70 to 75 dB DNL	217	180	228	186	227	185
75 dB DNL or greater	10	4	12	5	12	5
Total	**1,075**	**1,093**	**1,171**	**1,161**	**1,158**	**1,149**
Net Change			**96 (9%)**	**68 (6%)**	**83 (8%)**	**56 (5%)**

Source: Wyle 2013; U.S. Census Bureau 2010a, 2010c.

Note:
[1] Population totals are based on 2010 U.S. Census data.

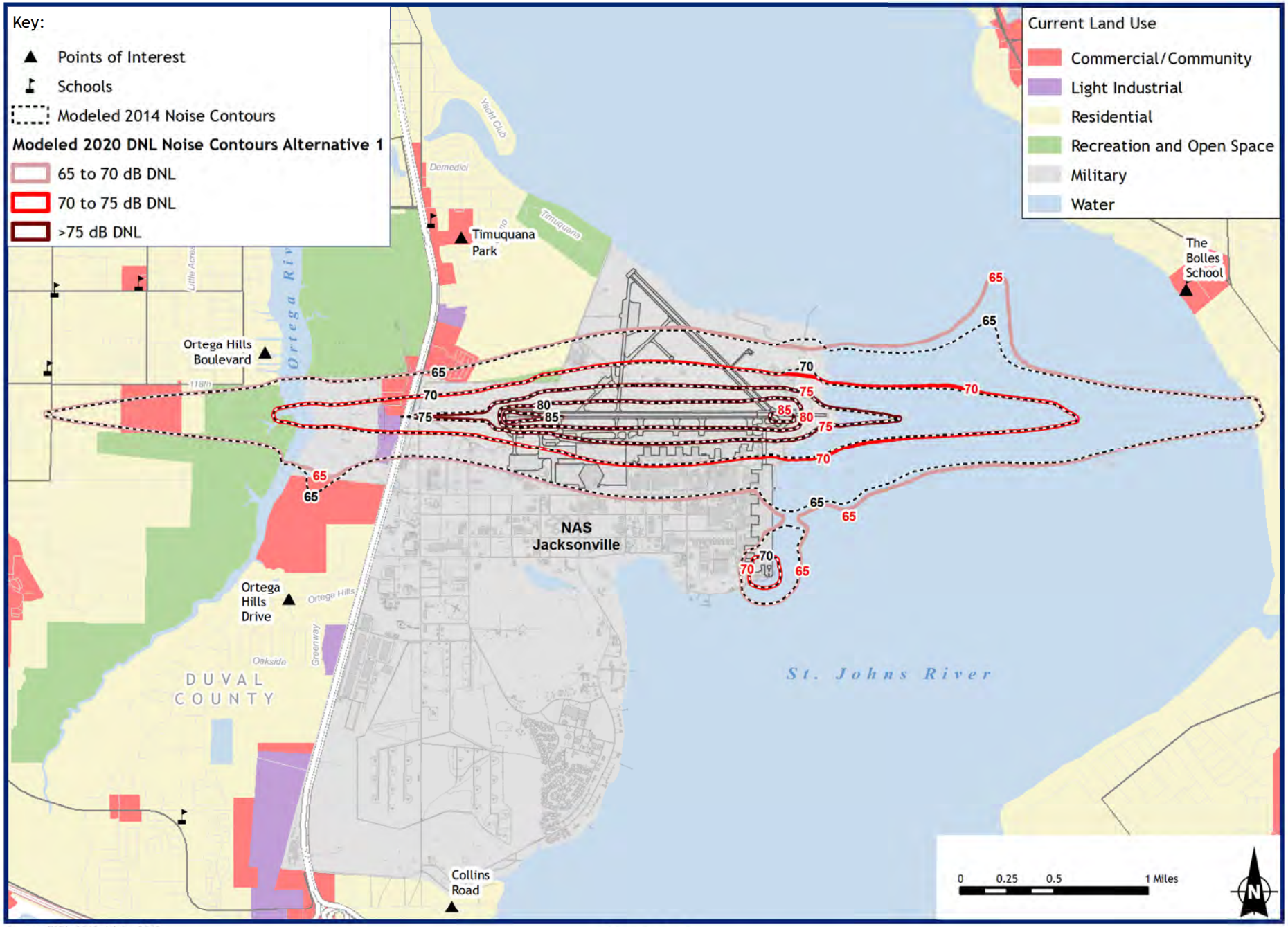
Key:
dB = Decibels.

Table 4-7 Comparative Single-Event Noise Levels for the P-3C, P-8A, and FA-18E/F Aircraft

Event	SEL (dB) during Flyover at 1,000 feet AGL		
	P-3C	P-8A	FA-18E/F
Departure	94	95	117
Arrival	85	87	113
Touch-and-Go (Downwind)	86	94	113

Key:
AGL = Above ground level.

The P-3C, as a turboprop, and the P-8A, as a jet aircraft, generally have different noise characteristics. For example, the P-8A exhibits more noise in some higher frequency bands during approach (2,500 hertz [Hz] to 5,000 Hz) than the P-3C, and, as a result, while the overall sound energy of the two aircraft is similar, people on the ground will likely detect the "whine" from the P-8A turbofan engines during arrivals. However, the actual increase in total sound energy at a distance of 1,000 feet during arrivals for a P-8A would range from only 1 dB to 2 dB. A larger difference in SEL noise values can be found when comparing T&G operations. In this case, the P-8A is on average about 8 dB louder than the P-3C.



Source: ESRI, 2012; Wyle, 2013; City of Jacksonville 2012.

Figure 4-1
Comparison of Modeled 2014 DNL Noise Contours and
2020 End-State DNL Noise Contours Projected under Alternative 1 at NAS Jacksonville
Jacksonville, Florida

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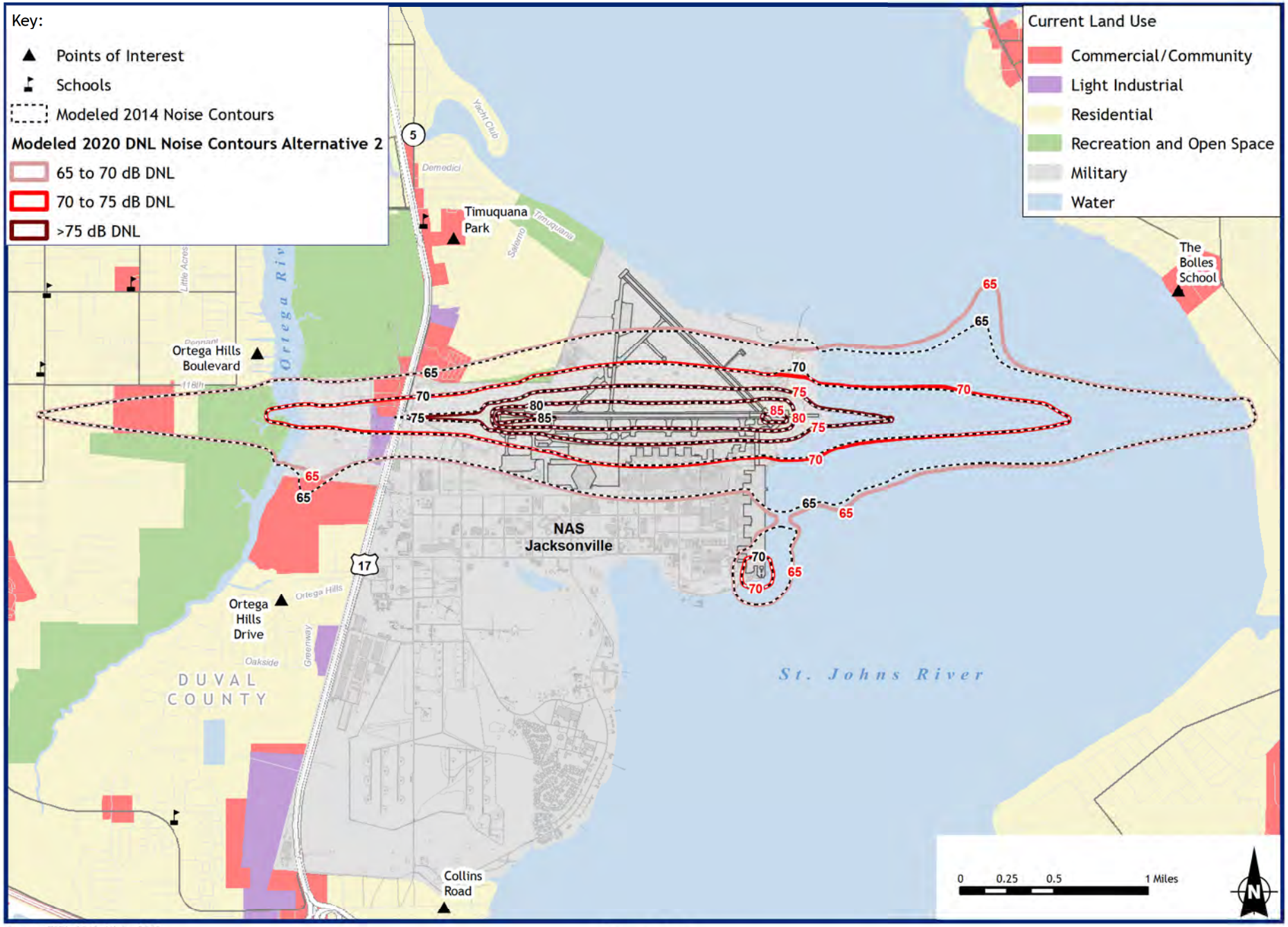

Source: ESRI, 2012; Wyle, 2013; City of Jacksonville 2012.

Figure 4-2
Comparison of Modeled 2014 DNL Noise Contours and
2020 End-State DNL Noise Contours Projected under Alternative 2 at NAS Jacksonville
Jacksonville, Florida

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Noise exposures at the five selected POI locations identified in Chapter 3.2 in the vicinity of NAS Jacksonville were analyzed for SEL and DNL. These locations and the modeled SEL and DNL are listed in Table 4-8. The POI locations are shown on Figure 4-3.

Table 4-8 Outdoor SEL (dB) and DNL (dB) for Modeled Aircraft Operations and Noise Levels at Points of Interest near NAS Jacksonville for Alternatives 1 and 2[1]

	SEL			DNL	
Point of Interest	P-3C	P-8A	FA-18E/F	All Modeled Aircraft	Change from 2014 Baseline
Ortega Hills Drive	92	99	110	60	0
Collins Road	84	85	94	47	0
Timuquana Park	78	87	102	55	0
Ortega Farms Boulevard	87	90	108	60	0
The Bolles School	78	87	102	55	1

Note:
[1] The modeled sound is representative only for each individual location and does not provide a representative measure of the sound heard during aircraft overflights in other areas.

The SEL provided at each location represents the loudest event (i.e., arrival, departure, T&G) for the, P-3C, P-8A, and FA-18E/F aircraft. The difference in SEL between the P-3C and the P-8A ranges from 1 to 9 dB. For most operations, the difference in the single-event sound level of the P-8A can be described as noticeably louder than the P-3C.

Both Ortega Hills Drive and Ortega Farms Boulevard would continue to experience the highest DNL of 60 dB. The remaining three locations would continue to be exposed to 55 dB DNL or less. The DNL at all locations would not change, except at the Bolles School, where it would increase by 1 dB, to 55 dB DNL, due to the additional P-8A T&G pattern operations.

The aircraft operations were further analyzed to determine their relative effect on the overall DNL at the five POIs. At both Ortega Hills Drive and Collins Road, the P-8A would account for the largest portion of the DNL, with 59 dB of the total 60 dB at Ortega Hills Drive and 46 dB of the total 47 dB at Collins Road. This slight increase of 2 dB in the P-8A contribution would have less than a 1-dB effect on total DNL at these locations. The increase in the P-8A contribution at the Bolles School would be approximately 3 dB greater than baseline, increasing the total DNL by 1 dB. The FA-18E/F would remain dominant as either the highest or second-highest contributor to DNL at all five POIs. Based on the above, when compared to the 2014 baseline, implementation of the action alternatives would result in negligible impacts to the DNL sound levels around NAS Jacksonville.

4.2.2 Supplemental Noise Analysis

The supplemental noise metrics used to describe the 2014 baseline noise environment were also used to evaluate the noise environment under Alternatives 1 and 2. These supplemental noise metrics include PA for the potential for sleep disturbance, the number of events at or above an NA for speech interference, and the L_{eq} for classroom learning interference.

Sleep Disturbance

Tables 4-9 and 4-10 present the results of the sleep disturbance analysis for the five POIs for Alternatives 1 and 2, respectively. The PA would range from 2 percent to 6 percent with windows open and from 1 percent to 4 percent with windows closed. The P-8A T&G pattern operations would remain the primary contributor to the PA at all POIs. However, the removal of P-3C T&G operations, which included a higher percentage of nighttime events, would cause a net reduction of up to one percent in PA at four of the five POIs with windows open for Alternative 1 and Alternative 2.

Table 4-9 Analysis of Average Nightly (10:00 PM to 7:00 AM) Percent Probability of Awakening for Representative Residential Receptors for Alternative 1

Point of Interest	ALT 1		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[1]	Windows Closed[1]	Windows Open	Windows Closed
Ortega Hills Drive	5%	2%	-1%	-1%
Collins Road	2%	1%	-1%	0
Timuquana Park	5%	2%	0	-1%
Ortega Farms Boulevard	6%	4%	-1%	-1%
The Bolles School	4%	3%	-1%	+1%

Note:
[1] NLRs of 15 dB and 25 dB for windows open and closed, respectively.

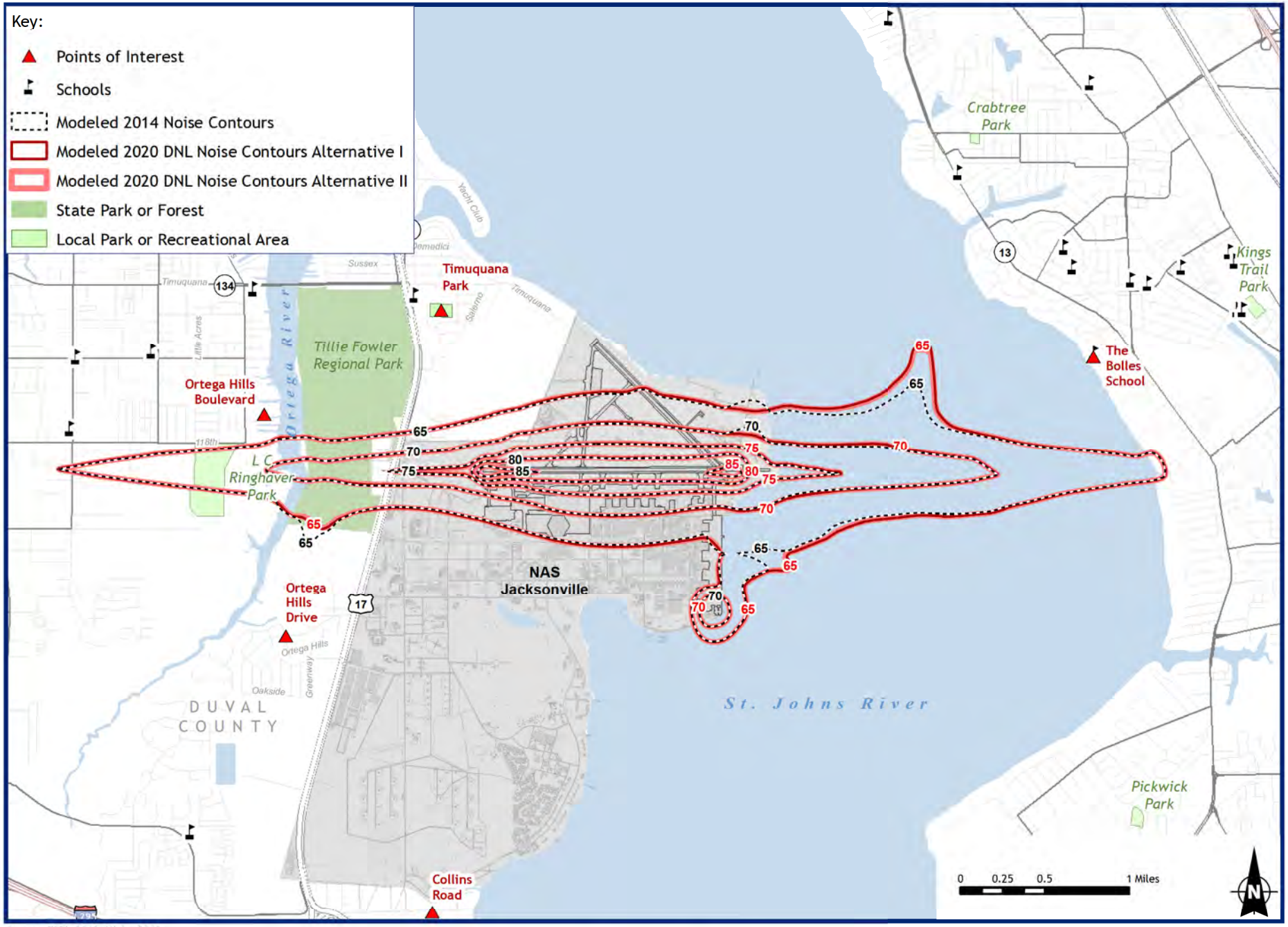
Table 4-10 Analysis of Average Nightly (10:00 PM to 7:00 AM) Percent Probability of Awakening for Representative Residential Receptors for Alternative 2

Point of Interest	ALT 2		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[1]	Windows Closed[1]	Windows Open	Windows Closed
Ortega Hills Drive	5%	2%	-1%	-1%
Collins Road	2%	1%	-1%	0
Timuquana Park	5%	2%	0	-1%
Ortega Farms Boulevard	6%	4%	-1%	-1%
The Bolles School	4%	3%	-1%	-1%

Note:
[1] NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Indoor Speech Interference

Tables 4-11 and 4-12 present the results of the speech interference analysis for Alternatives 1 and 2, respectively, for the five POIs. Three of the five POIs would have more than one speech-interfering event per daytime hour when windows are open, with the maximum of three events per hour occurring at Ortega Farms Boulevard under Alternative 1. Only Ortega Farms Boulevard would have more than one speech-interfering event per daytime hour during windows-closed conditions under each of the action alternatives. The P-8A T&G pattern operations would account for the majority of the speech-interfering events at all POIs. The overall trend would be toward a small reduction in speech-interfering events for the windows-open condition due to the lower number of P-8A T&G pattern operations under Alternatives 1 and 2. However, the P-8A is 5 to 10 dB greater in SEL than the P-3C it is replacing, which would cause some additional P-8A pattern events to exceed the windows-closed condition at Ortega Farms Boulevard that had not been exceeded by the P-3C.



Source: ESRI, 2012; Wyle, 2013;

Figure 4-3
Points of Interest in the Vicinity of NAS Jacksonville
Jacksonville, Florida

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Table 4-11 Analysis of Average Daily Indoor Speech Interference for Representative Residential Receptors for Alternative 1

Point of Interest	Indoor Number of Events per Daytime Hour[1]			
	ALT 1		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[2]	Windows Closed[2]	Windows Open	Windows Closed
Ortega Hills Drive	1	1	-1	0
Collins Road	1	0	0	0
Timuquana Park	2	1	0	0
Ortega Farms Boulevard	3	2	0	+1
The Bolles School	2	1	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour	3	1	-1	0
Minimum Number of Intrusive Events per Hour if Exceeding 1	2	2	0	0
Maximum Number of Intrusive Events per Hour if Exceeding 1	3	2	0	0

Notes:
1 Number of Annual Average Daily DNL Daytime Events at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB.
2 NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Table 4-12 Analysis of Potential for Average Daily Indoor Speech Interference for Representative Residential Receptors for Alternative 2

Point of Interest	Indoor Number of Events per Daytime Hour[1]			
	ALT 2		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[2]	Windows Closed[2]	Windows Open	Windows Closed
Ortega Hills Drive	1	1	-1	0
Collins Road	1	0	0	0
Timuquana Park	2	1	0	0
Ortega Farms Boulevard	2	2	-1	+1
The Bolles School	2	1	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour	3	1	-1	+1
Minimum Number of Intrusive Events per Hour if Exceeding 1	2	2	0	+2
Maximum Number of Intrusive Events per Hour if Exceeding 1	2	2	-1	+2

Notes:
1 Number of Annual Average Daily DNL Daytime Events at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB;
2 Noise level reductions of 15 dB and 25 dB for windows open and closed, respectively

Classroom Learning Interference

Table 4-13 contains the results of the classroom learning interference analysis for the Bolles School under Alternatives 1 and 2. Aircraft noise at the Bolles School would exceed the indoor $L_{eq(8h)}$ threshold of 35 dB for continuous noise by 5 dB with windows open, primarily due to the FA-18E/F arrival operations on Runway 28. The majority of speech-interfering events would be due to the P-8A T&G patterns and the P-3C departures from Runway 10. The $L_{eq(8h)}$ criteria would not be exceeded with windows closed. The interfering events would be 2 for windows open and 1 for windows closed. There would be no change in either $L_{eq(8h)}$ or numbers of interfering events for Alternatives 1 or 2 relative to the 2014 baseline.

4.2.3 Potential Hearing Loss Analysis

People working or living in high-noise environments for extended periods of time can potentially experience hearing loss. A 2009 DoD policy directive requires that under the proposed action, hearing loss risk be estimated for the at-risk population, defined as the population exposed to 80 dB DNL or greater (DoD 2009). Under Alternatives 1 or 2, no homes or populations would be located within the 80 dB DNL or greater noise contour. Therefore, no populations would be considered at risk for PHL under Alternatives 1 or 2.

4.2.4 Nonauditory Health Effects

Results from studies of nonauditory effects of noise on humans are not as easily substantiated as the effects on hearing. Several studies have been conducted that examine potential relationships between aviation noise and potential health effects, including cardiovascular disease, birth weight, and mortality rates.

A recent study, published in October 2013, was conducted by the FAA and organizations and universities to examine whether there was a possible correlation between aviation noise and cardiovascular disease in the elderly (Correia et al. 2013). The study analyzed multiple airports and controlled for individual demographics, socioeconomic status, air pollution, and roadway proximity. The outcome of the study showed that when averaged across all airports studied, a small but positive link exists between exposure to aircraft noise above 55 dB DNL and increased risk of hospitalization for cardiovascular disease. However, the study did not account for other local factors, such as the length of time living in the airport community. In addition, the data utilized for the study were from the Medicare database, which has some data gaps and inconsistencies between different communities. Therefore, the results of this study are considered too preliminary to provide the basis for guidance or policy related to aviation noise.

Other studies that analyzed potential correlations between noise and cardiovascular disease were similarly inconclusive, contradictory, or required additional data or analysis. Cantrell (1974) and Kryter and Poza (1980) proposed that annoyance and/or interruption of everyday activities as a result of aviation noise can be a stress producer. In turn, prolonged stress has been known to be associated with several health disorders; however, the assertion remained that additional studies would be required.

Several studies examining potential health effects found that hearing protection being used to protect from auditory effects will also protect against potential nonauditory health effects, at least in workplace conditions. This conclusion was outlined at the National Institutes of Health Conference on Noise and Hearing Loss (Von Gierke 1990), where it was stated that studies typically identified potential health effects at higher noise levels and that establishing and enforcing exposure levels protecting against noise-induced hearing loss would solve not only the hearing loss problem but also any potential nonauditory health effects in the workplace (Von Gierke 1990).

Table 4-13 Analysis of Average Daily (8:00 AM to 4:00 PM) Indoor Classroom Learning Interference for Alternatives 1 and 2

School Point Of Interest	ALTs 1 and 2					Change to Baseline				
	Outdoor	Indoor				Outdoor	Indoor			
		Windows Open[2]		Windows Closed[2]			Windows Open[2]		Windows Closed[2]	
	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour[1]	$L_{eq(8h)}$ (dB)	Events per Hour[1]	$L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour[1]	$L_{eq(8h)}$ (dB)	Events per Hour[1]
The Bolles School	55	40	2	30	1	0	0	0	0	0

Notes:

1 Number of annual average busy day events per hour during 8-hour school day (8:00 AM to 4:00 PM) at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB;

2 NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Although the above studies are generally inconclusive regarding nonauditory health effects of noise, the proposed action would not be expected to result in any significant nonauditory health effects from P-8A operations. This is based on the negligible change in DNL sound levels around NAS Jacksonville under Alternatives 1 and 2.

4.2.5 Construction Noise

Construction under each action alternative would result in short-term noise impacts at and near NAS Jacksonville. Construction activities are described in Chapter 2.3.1.

Typical noise emission levels for construction equipment that may be used for each alternative are listed in Table 4-14. Noise impacts related to construction would be intermittent and temporary (over an approximately 12-month construction period). Furthermore, the proposed construction is located at the NAS Jacksonville airfield, approximately 4,000 feet from the closest residential land use and other sensitive noise receptors. Therefore, neither action alternative would result in a significant construction-noise-related impact on the existing environment.

Table 4-14 Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (derrick)	88
Delivery Truck	88
Diamond Saw	90
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-Driven Vibro-compactor	76
Hoist	76
Jackhammer (paving breaker)	88
Line Drill	98
Motor Crane	83
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Tug	85
Vibratory Pile Driver/Extractor	89

Source: Barnes et al. 1977.

Key:
dBA = A-weighted decibels.

Conclusion

Overall, the proposed action alternatives would not result in significant operational or construction noise impacts at NAS Jacksonville because the change in acreage and population exposed to aircraft noise levels would not be significant. Supplemental noise analyses for aircraft operations indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. No populations would be considered at risk for PHL under Alternatives 1 or 2 because no populations are within the 80 dB DNL or greater noise contour. All construction-related noise would be temporary for the duration of construction only and would be located at the airfield, away from residential or other sensitive noise receptors.

4.3 Air Quality

Air emissions associated with the proposed action at NAS Jacksonville include construction, flight operations from the P-8A, and POV commuting activities of base personnel. Other stationary sources, other aircraft, ground support equipment (GSE), and other sources are assumed to remain constant under this action. The Conformity Rule does not apply to the implementation of this action because NAS Jacksonville is located in a region that is in attainment for all NAAQS. GHG emissions have been considered, and cumulative impacts are discussed in Chapter 9.

4.3.1 Construction Emissions

Construction may affect air quality primarily as a result of construction equipment emissions, paving and painting emissions, fugitive dust from grading and earthmoving, and on-road emissions from construction deliveries and worker commuting. These emissions are calculated separately from operational emissions because they are temporary and would occur before full implementation of the selected alternative.

Annual construction emissions were estimated using emission factors from multiple guidelines and references, including EPA's NONROAD emission modeling program (EPA 2008b); EPA 420-F-08-024 (EPA 2008b), and the EPA AP-42 (1995). Emissions were based on estimates of equipment to be used 8 hours per day on average, and assuming 250 workdays per year. Construction of new facilities under all alternatives would occur within one year. Particulate emissions from site preparation and demolition were also considered. Total projected annual construction emissions in tons per year (tpy) at NAS Jacksonville under both alternatives are listed in Table 4-15. The construction equipment, activities, emission factors, and calculations are detailed in Appendix E.

Table 4-15 Construction Emissions at NAS Jacksonville: Alternatives 1 and 2

Activity	Emissions (tpy)				
	NO_x	VOCs	CO	SO_2	PM_{10}
ALTs 1 and 2					
Construction equipment use	19.59	1.78	8.39	0.05	1.55
VOCs emitted during paving and painting	0	1.03	0	0	0
PM_{10} generated during site preparation	0	0	0	0	2.76
Worker and delivery traffic	0.57	0.25	2.24	0.008	0.81
Total	**20.16**	**3.06**	**10.63**	**0.06**	**5.12**

4.3.2 Operational Emissions

Operational emissions considered in this analysis include P-3C and P-8A flight and maintenance run up operations and POVs operated by squadron personnel. Assumptions and emission factors from the baseline analysis were incorporated into this analysis (See Chapter 3.3). Existing emissions are discussed in Chapter 3.3 and summarized in Table 4-16. These emissions are the baseline for comparison of

impacts with the proposed action alternatives. Annual aircraft operation and POV emission totals for each alternative and the change in emission totals that would result from this action are also listed in Table 4-16. Emission factors and calculations are detailed in Appendix E.

Table 4-16 Projected Operational Emissions at NAS Jacksonville, Alternatives 1 and 2 (2020 End-State)

Flight Operation	No. of Operations[1]	Emissions (tpy)[2]				
		CO	NO_x	VOCs	SO_2	PM_{10}
Alternative 1 (54 P-8A aircraft)						
Straight-In Arrival LTOs	4,357	38.4	58.1	5.2	5.8	1.9
Touch-and-Go	5,820	0.6	18.4	0.1	1.7	0.5
GCA Pattern	1,823	0.3	9.1	0.0	0.8	0.2
Maintenance Run Ups[3]		0.013	0.082	0.001	0.019	0.002
Total P-8A Emissions		**39.2**	**85.7**	**5.3**	**8.3**	**2.6**
2014 Baseline P-3C and P-8A Emissions		**77.6**	**92.2**	**38.3**	**17.0**	**22.0**
Change in Aircraft Emissions		**-38.3**	**-6.5**	**-32.9**	**-8.6**	**-19.4**
Change in POV Emissions		**-30.8**	**-2.4**	**-3.3**	**0.00**	**-9.08**
Total Change in Operational Emissions[2]		**-69.1**	**-8.9**	**-36.2**	**-8.6**	**-28.5**
Alternative 2 (47 P-8A Aircraft)						
Straight-In Arrival LTOs	4,080	36.0	54.4	4.9	5.4	1.8
Touch-and-Go	5,621	0.5	17.8	0.1	1.7	0.4
GCA Pattern	1,710	0.2	8.5	0.0	0.8	0.2
Maintenance Run Ups[3]		0.011	0.071	0.001	0.016	0.002
Total P-8A Emissions		**36.8**	**80.8**	**5.0**	**7.9**	**2.4**
2014 Baseline P-3C and P-8A Emissions		**77.6**	**92.2**	**38.3**	**17.0**	**22.0**
Change in Aircraft Emissions		**-40.8**	**-11.4**	**-33.2**	**-9.12**	**-19.5**
Change in POV Emissions		**-50.2**	**-3.9**	**-5.3**	**0.00**	**-14.8**
Total Change in Operational Emissions[2]		**-90.9**	**-15.3**	**-38.6**	**-9.1**	**-34.3**

Notes:

1 Number of operations provided by Wyle 2013. An LTO includes a departure and an arrival, and T&G and GCA patterns also include two operations; therefore, total operations listed in Chapter 2.4.2.1 and in the noise analysis will be double these air quality operation totals.

2 Total air emissions may not sum due to rounding.

3 Maintenance run up emissions based on emission factors from annual required run ups per aircraft, per year.

Key:

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter less than 10 microns in diameter.
POV = Privately owned vehicle.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOC = Volatile Organic Compound.

The Conformity Rule does not apply to the implementation of this action because NAS Jacksonville is located in a region that is in attainment for all NAAQS. Estimates of projected operational emissions show a decrease in annual emissions for all criteria pollutants under all alternatives. GHG emissions would also decrease. Consequently, there would be no adverse impacts on air quality from operational emissions or changes in GHG emissions.

Conclusion

In summary, the continued transition of P-3C to P-8A aircraft under the action alternatives would not result in adverse impacts on air quality at NAS Jacksonville. Construction emissions would be temporary, and projected operating air emissions show a decrease in annual emissions for all criteria pollutants and GHGs under both alternatives. The No Action Alternative would have no impact on air quality because there would be no new construction and no change in baseline aircraft operations.

4.4 Land Use

The impact analysis for land use in this SEIS focuses on those off-station areas affected by aircraft noise. The compatibility of off-station land uses with modeled noise zones is assessed. Land uses are frequently regulated by management plans, land use plans, comprehensive plans, and local zoning and ordinances. These plans and regulations assist in identifying where future development can occur so it is compatible with surrounding land uses and protects specially designated or environmentally sensitive uses. This analysis relies not only on zoning designations but on APZs and noise zones as defined by the Navy's AICUZ Program. As stated in Chapter 1.3.5, AICUZ studies provide recommendations to promote community development that is compatible with operations at an air station.

4.4.1 NAS Jacksonville Land Use

The area of new construction required to support six or five P-8A squadrons and the FRS is provided in Table 4-3. The locations of the proposed construction projects are shown on Figure 2-4 in Chapter 2, Proposed Action and Alternatives.

Primary development under both of the action alternatives would include construction of the 1,000-foot overrun to the approach end of Runway 10. This construction would be located on the western end of the airfield and would not interfere with the management or control of any existing land uses at the station.

4.4.2 Regional Land Use

Construction of new infrastructure proposed under the action alternatives would not be expected to cause direct or indirect impacts on regional land use because the facilities would be located entirely within NAS Jacksonville.

The proposed action would not result in any indirect growth-induced development under any of the home basing alternatives. The number of personnel at NAS Jacksonville would decrease by 422 personnel under Alternative 1 and 687 personnel under Alternative 2. Considering the projected 7.4-percent growth rate for the City of Jacksonville, the reduction in personnel that would occur under the proposed action would not be anticipated to change existing land use patterns. There would be no change in the number of personnel at NAS Jacksonville under the No Action Alternative, and thus no impacts related to growth-induced development or changes to existing land use patterns.

4.4.3 Land Use Consistency with Local Plans, Programs, and Policies

Implementation of the proposed action under all alternatives, including the No Action Alternative, would not affect the baseline APZs at NAS Jacksonville; would be consistent with goals and objectives of the RSIP Overview for the Jacksonville FCA; would have no effect on management practices currently implemented under the INRMP; would be consistent with the NAS Jacksonville Master Plan; and is consistent with the objectives of the City of Jacksonville Comprehensive Plan. The Navy would continue to work with the City of Jacksonville to plan for compatible land use development within the projected noise zones under both home basing alternatives, including the No Action Alternative.

4.4.4 Land Use Compatibility Assessment

Proposed aircraft operations associated with home basing five or six P-8A fleet squadrons and the FRS at NAS Jacksonville would result in a slight increase in the land area within the greater than 65 dB DNL noise zone when compared to 2014 baseline conditions. An analysis was conducted to determine how the projected noise zones compare to the 2014 baseline noise zones in terms of compatibility with land uses in the City of Jacksonville. This was accomplished by overlaying maps of the projected noise zones generated for each home basing alternative on existing land use maps for Jacksonville (see Figures 4-1 and 4-2).

Tables 4-17 and 4-18 show the types of land uses around NAS Jacksonville that would be affected by Alternatives 1 and 2 and impacts resulting from the home basing alternatives compared to 2014 baseline conditions. In summary, when compared with baseline conditions, implementation of Alternative 1 would result in a 5-percent increase in the acreage of land and water within the projected greater than 65 dB DNL noise zones; Alternative 2 would result in a 4-percent increase.

Table 4-17 Net Change in Area within the Projected Greater than 65 dB DNL Noise Zone around NAS Jacksonville under Alternative 1

Land Use	2014 Baseline (No Action Alternative) Total Area (acres)	65 to 70 dB DNL	70 to 75 dB DNL	>75 dB DNL	ALT 1 Total Area (acres)	Net Change (acres)	% Net Change
Residential[1]	**89**	90	3	0	93	4	4
Recreation/Open Space	**99**	91	8	0	99	0	0
Commercial/Community[2]	**69**	59	6	0	65	(4)	(6)
Light Industrial	**17**	9	8	0	17	0	0
Military	**1,136**	516	323	308	1,147	11	1
Water	**801**	683	202	12	897	96	12
Total[3]	**2,210**	**1,447**	**550**	**320**	**2,318**	**108**	**5**

Notes:
1 Residential Land Use includes Low Density Residential and Rural Residential designations.
2 Commercial/Community Land Use includes Community/General Commercial, Business Park, and Public Buildings and Facilities designations.
3 Total land use percentage may not sum to 100 percent due to rounding.

Table 4-18 Net Change in Area within the Projected Greater than 65 dB DNL Noise Zone around NAS Jacksonville under Alternative 2

Land Use	2014 Baseline (No Action Alternative) Total Area (acres)	65 to 70 dB DNL	70 to 75 dB DNL	>75 dB DNL	ALT 2 Total Area (acres)	Net Change (acres)	% Net Change
Residential[1]	**89**	89	3	0	**92**	3	3
Recreation/Open Space	**99**	91	8	0	**99**	0	0
Commercial/Community[2]	**69**	58	6	0	**64**	(5)	(7)
Light Industrial	**17**	9	8	0	**17**	0	0
Military	**1,136**	514	322	307	**1,143**	7	1
Water	**801**	675	201	11	**887**	86	11
Total[3]	**2,210**	**1,435**	**548**	**318**	**2,301**	**92**	**4**

Notes:
1 Residential Land Use includes Low Density Residential and Rural Residential designations.
2 Commercial/Community Land Use includes Community/General Commercial, Business Park, and Public Buildings and Facilities designations.
3 Total land use percentage may not sum to 100 percent due to rounding.

Residential land use is incompatible in the greater than 65 dB DNL noise zone (OPNAVINST 11010.36C). The amount of residential land within the greater than 65 dB DNL noise zone would increase by 4 acres under Alternative 1 and by 3 acres under Alternative 2. Most of the affected residential land uses under each of the alternatives would be within the 65 to 70 dB DNL noise zone. Three acres of residential land use are within the 70 to 75 dB DNL noise zone under the 2014 baseline, as well as the Alternative 1 and 2 conditions. Therefore, no additional residential areas would be exposed to noise levels greater than 70 dB DNL as a result of the proposed action.

Conclusion

In summary, implementation of the action alternatives at NAS Jacksonville would not result in significant impacts to local and regional land use. The acreage of land and water within the projected greater than 65 dB DNL noise zone would increase by no more than 5 percent under both of the action alternatives. Incompatible land use (i.e., residential land) within the noise zones would increase by just 4 acres under Alternative 1 and 3 acres under Alternative 2. Both of the action alternatives would be consistent with management plans, land use plans, comprehensive plans, and local zoning and ordinances designed to control growth and new development in the vicinity of NAS Jacksonville.

4.5 Socioeconomics

This assessment examines how the proposed action would affect population and housing (Chapter 4.5.1), the economy (Chapter 4.5.2), taxes and revenues (Chapter 4.5.3), education (Chapter 4.5.4), and environmental justice (Chapter 4.5.5) for the study area populations.

This socioeconomic analysis focuses on impacts attributable to changes in military and civilian personnel levels and construction expenditures. Economic impacts are defined to include direct effects, such as changes to employment, payrolls, and expenditures, that affect the flow of dollars into the local economy and secondary effects, which result from the “ripple effect” of spending and re-spending in response to the direct effects.

Socioeconomic impacts, particularly impacts such as those being evaluated in this SEIS, may be mixed: beneficial in terms of gains in jobs, expenditures, and tax revenues and adverse in terms of reduction in base personnel and growth management issues such as demands for housing and community services. The analysis in this SEIS identifies potential environmental justice issues. Impacts to environmental justice populations are identified where high and adverse human health or environmental effects may disproportionately affect minority or low-income populations. Impacts to children would occur if there was an increased disproportionate environmental, health, or safety risk to children.

4.5.1 Population and Housing

4.5.1.1 Population

Implementation of Alternatives 1 and 2 would result in minor impacts to personnel loading at NAS Jacksonville and to total population in the region. Total P-3C and P-8A personnel loading at NAS Jacksonville would decrease under Alternatives 1 and 2 compared to the 2014 baseline levels. As shown on Table 4-19, 2,619 P-3C and P-8A personnel (615 officers and 2,004 enlisted personnel) are assigned at NAS Jacksonville under baseline conditions. Following implementation of Alternative 1, 2,197 P-8A personnel would be assigned at NAS Jacksonville; under Alternative 2, 1,932 P-8A personnel would be assigned at the station. These personnel loading levels represent a decrease of 422 P-3C/P-8A personnel under Alternative 1 (a 16-percent decrease) and a decrease of 687 P-3C/P-8A personnel under Alternative 2 (a 26-percent decrease).

Table 4-19 P-8A Personnel Loading at NAS Jacksonville under Each Alternative at 2020 End-State[1]

Personnel	2014 Baseline P-3C/P-8A Personnel (No Action Alternative)[2]	ALT 1 (6 squadrons + FRS)		ALT 2 (5 squadrons + FRS)	
		P-8A Personnel	Change (+/-)	P-8A Personnel	Change (+/-)
Officers	615	574	-41	506	-109
Enlisted	2,004	1,623	-381	1,426	-578
Total	**2,619**	**2,197**	**-422**	**1,932**	**-687**

Notes:

1 The end-state for Alternatives 1 and 2 occurs in 2020.

2 The 2014 baseline assumes four of six P-8A squadrons, two P-3C squadrons, and a mixed P-3C/P-8A FRS.

The baseline P-3C and P-8A personnel loading at NAS Jacksonville would not change under the No Action Alternative.

The population and demographic characteristics of Duval County and the City of Jacksonville would be similarly impacted. Because fewer military personnel would be stationed at NAS Jacksonville, fewer military dependents (e.g., spouses and children) would be expected to reside in the region. The number of military dependents was calculated using a national Navy/USMC percentage of married enlisted personnel and officers, by rank, and the average number of dependents by their parents' rank (see *Unified Facilities Criteria: Facility Planning for Navy and Marine Corps Shore Installations, Series 700 Housing and Community Facilities UFC-2-000-05N)*. Personnel who were not married were assumed to have no dependents. These average percentages were applied to the number of enlisted personnel and officers who would be reassigned under each of the proposed alternatives to determine the corresponding number of dependents (see Table 4-20).

As shown in Table 4-20, the resulting changes in population would be minor relative to the size of the regional population. Implementation of Alternative 1 would be expected to reduce the number of military personnel and dependents in the Jacksonville area by 919 persons compared to 2014 levels. This decrease in population would represent a decrease of approximately 0.1 percent to the projected population of Duval County in 2020. Likewise, implementation of Alternative 2 would be expected to decrease the total population in Duval County by 1,520 personnel and dependents, which equates to approximately 0.2 percent of the county's projected 2020 population.

Table 4-20 Regional Population Impacts[1] Resulting from the Changes in P-3C and P-8A Personnel Loading at NAS Jacksonville Compared to the 2014 Baseline (No Action Alternative) Levels

Personnel	Change from 2014 Baseline (No Action Alternative)	
	ALT 1	ALT 2
Military Personnel	**-422**	**-687**
Military Dependents	-497	-833
Total Population Change (+/-)	**-919**	**-1,520**
Duval County's 2020 Projected Population	928,100	928,100
Total Population Change as a Percentage of Duval County's 2010 Projected Population	**-0.1%**	**-0.2%**

Source: Florida Bureau of Economic and Business Research 2012; U.S. Census Bureau 2010c.

Note:

1 Population impacts were calculated for the change between the 2014 baseline level compared to the time when all transitions would be completed, the 2020 end-state level.

Regional population would not be impacted under the No Action Alternative because baseline P-3C and P-8A personnel loading at NAS Jacksonville would not change.

4.5.1.2 Housing

The relatively small change in personnel loading at NAS Jacksonville that would occur under Alternatives 1 and 2 compared to the 2014 baseline levels would have only a minor impact to the overall housing market in the Jacksonville area. Implementation of Alternative 1 would result in a net decrease of 422 households in the region, while implementation of Alternative 2 would result in a net decrease of 687 households in the area. Assuming each household occupies a housing unit, 422 fewer housing units under Alternative 1 and 687 fewer housing units under Alternative 2 would be required. This reduction in demand for housing units represents 0.1 percent and 0.2 percent, respectively, of the total number of housing units in 2010 for the City of Jacksonville. Given the large number of housing units available in the region and the rapid population growth anticipated to occur in the next decade, the reduction in the number of military personnel stationed at NAS Jacksonville that would occur under both of the proposed alternatives would not have a significant impact on the availability of housing in the regional market, or the price of housing.

The housing market in the Jacksonville area would not be impacted by the No Action Alternative because baseline P-3C and P-8A personnel loading at NAS Jacksonville would not change.

4.5.2 Economy, Employment, and Income

Implementation of Alternatives 1 and 2 would have the potential to impact the regional economy in two ways. First, any additional construction required to support the proposed action would have a short-term positive economic effect as these funds were injected into the regional economy. Second, the decrease in personnel loading under Alternatives 1 and 2 compared to the 2014 baseline levels would have a long-term adverse economic impact on the Jacksonville regional economy as a result of the decreased employment and payroll at NAS Jacksonville under both alternatives. The impacts from construction would be one-time in nature, whereas the impacts from the change in employment and employee earnings would be annual and long term.

In order to quantify the total impact of the additional construction expenditures and the decrease in personnel loading on the regional economy under each alternative, the Navy used the Regional Input-Output Modeling System (RIMS II) designed by the U.S. Bureau of Economic Analysis. The multipliers used in this input-output model are based on regional information derived from databases analyzing commercial, industrial, and household spending patterns and relationships. These multipliers also estimate the potential number of jobs that would be created or lost as a result of changes in earning and spending patterns. Annual, long-term operational spending impacts are discussed below.

Short-Term Construction-Related Impacts

Implementation of Alternatives 1 and 2 would require construction and renovation of facilities at NAS Jacksonville to accommodate the P-8A aircraft (see Chapter 2.4.4.1 for a description of proposed construction). Both alternatives would require $20.8 million in construction expenditures. Construction is assumed to take place during FY 2015.

A number of jobs would be generated directly from these construction expenditures and indirectly from the increased economic activity in the area. The proposed projects would generate an estimated 272 jobs and $10.8 million employee earnings during construction. Table 4-21 presents the total (e.g., direct, indirect, and induced) economic impacts associated with both alternatives.

Table 4-21 Total Direct, Indirect, and Induced Impacts Resulting from Construction Expenditures in Duval County under Alternatives 1 and 2

Construction Expenditures	ALTs 1 and 2 ($millions)
Total Construction Expenditures	$20.8M
Total Direct, Indirect, and Induced Impacts	
Change in Regional Output[1]	$39.0M
Change in Value Added[1]	$21.6M
Change in Employee Earnings	$10.8M
Change in Employment (Jobs)	272

Note:
[1] The Terms "Regional Output" and "Value-Added" are measurements of economic activity.

Because these construction dollars represent a one-time expenditure, the resulting positive economic impacts would last only a short time. Once these funds leave the regional economy through savings, taxes, or purchases of goods and services outside the region, the positive effects would no longer be multiplied.

Long-Term Employee Earnings and Spending Impacts

As described above in Chapter 4.5.1, direct Navy employment at NAS Jacksonville attributed to the proposed action would decrease by 422 personnel under Alternative 1 and by 687 personnel under Alternative 2 by 2020 compared to 2014 employment levels.

As less income is injected into the regional economy through changes in NAS Jacksonville payroll, employment and earnings in the regional economy would further contract. Every job relocated from NAS Jacksonville would have the potential to reduce activity in the regional economy and create less employment and fewer business opportunities.

Because fewer personnel would be assigned to NAS Jacksonville, fewer personnel would spend a portion of their disposable income in the regional economy, and the profits and sales of local merchants and suppliers would therefore decrease. These local merchants and suppliers may, in turn, decrease employment or decrease output as a direct result of the reduction in demand for their goods and services. Thus, the economic impacts of the change in personnel would be cycled back into the economy, repeating or multiplying the effect.

Table 4-22 summarizes projected changes in employment and payroll at NAS Jacksonville under both of the alternatives and includes the estimated regional economic impact that would result from these annual changes. Payroll expenditures were calculated for all personnel transitioning from the area under both of the alternatives. The change in direct payroll for personnel stationed at NAS Jacksonville is also shown in Table 4-22. Direct annual military payroll in the region would decrease by approximately $28.3 million under Alternative 1 and approximately $49.5 million under Alternative 2.

Table 4-22 Annual Direct, Indirect, and Induced Impacts on Employment and Employee Earnings in Duval County under Alternatives 1 and 2

	ALT 1	ALT 2
Annual Employment Impacts (in Jobs)		
Direct Employment Changes	-422	-687
Indirect and Induced Employment Impacts	-273	-444
Total Annual Employment Impacts	-695	-1,131
Annual Employee Earnings Impacts (2013 $Million)		
Direct Changes in Military Payroll	-$28.3	-$49.5
Indirect and Induced Impacts	-$18.0	-$31.5
Total Annual Employee Earnings Impacts	-$46.3	-$81.0

Note: Columns may not sum to total due to rounding.

The indirect and induced impacts as well as the total impacts of the decrease in regional employment and employee earnings income is also presented in Table 4-22. These indirect, induced, and total effects were calculated using RIMS II Type II direct-effect multipliers.

The decrease in personnel and payroll expenditures at NAS Jacksonville under Alternative 2 would have the greatest regional economic impact, with a combined decrease of 1,131 direct, indirect, and induced jobs and a total decrease in employee earnings of approximately $81.0 million (see Table 4-22). Total employment for Duval County in 2012 was 407,843 persons (U.S. Department of Labor 2013a; 2013b). Therefore, the reduction of 1,131 jobs resulting from implementation of Alternative 2 would represent a decrease of 0.3 percent in the total number of people employed in Duval County.

Long-term employee earnings and spending would not be impacted under the No Action Alternative because baseline P-3C and P-8A personnel loading at NAS Jacksonville would not change.

4.5.3 Taxes and Revenues

The reduction of personnel at NAS Jacksonville under Alternatives 1 and 2 would have a slight negative impact on the generation of tax revenues in the City of Jacksonville, Duval County, and the State of Florida as a whole. Property tax and sales tax receipts would all decrease slightly as a direct result of the contracted regional economy. However, the small reduction in regional population (e.g., 0.2 percent or less) would also reduce the amount of government services and facilities that would be required, thereby reducing total government expenditures.

Taxes and revenues would not be impacted under the No Action Alternative because baseline P-3C and P-8A personnel loading at NAS Jacksonville would not change.

4.5.4 Education

The reduction in personnel at NAS Jacksonville under Alternatives 1 and 2 would be expected to reduce the number of school-aged children living in the area and attending local public schools. Assuming that all impacted military personnel and their families stationed at NAS Jacksonville relocate outside the area, a net decrease in the population of school-aged children would occur under both alternatives. Under Alternative 1, an estimated 219 fewer school-aged military dependents would be associated with personnel at NAS Jacksonville, while under Alternative 2, an estimated 369 fewer school-aged military dependents would be associated with personnel at the station.

The projected decrease in school-aged children in the area would have a minimal impact on enrollment within the Duval County School District. Given the size of the Duval County School District (serving a projected total student population of approximately 127,000 in FY 2012-13), the projected loss in school-

aged children under both alternatives would represent less than a 0.3-percent decline in the total enrollment for the entire district.

The enrollment losses from school-aged military dependents would be expected to be concentrated in schools with a history of high enrollment from dependents of NAS Jacksonville personnel. While the overall impact on specific schools is difficult to determine, it is evident that the impact on the school district as a whole would not be significant.

The decrease in "federally connected students" attending local district schools would result in a corresponding decrease in federal impact aid received by the district. However, this decrease in aid would not be expected to have a significant fiscal impact because federal impact aid typically does not cover the full per-pupil costs incurred by the district.

The number of school-aged children would not change as a result of the No Action Alternative because baseline P-3C and P-8A personnel loading at NAS Jacksonville would remain the same.

4.5.5 Impacts on Minority and Low-Income Populations and Environmental Health and Safety Risks to Children

Consistent with Executive Orders 12898 and 13045, and as discussed in Chapter 3.5.5, the Navy's policy is to identify any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations or that pose environmental health and safety risks to children. The potential for minority and low-income populations and children to be exposed to additional aircraft noise was identified as the most likely negative environmental and human health impact that could potentially result from the proposed action.

To identify potential impacts, the Navy compared the 2014 baseline noise zones to the projected noise zones under each of the alternatives to determine whether any additional area of census block groups or census tracts would fall partially or wholly within the noise zones for Alternatives 1 or 2 (see Table 3-19 in Chapter 3.5.5 for a list of census block groups and census tracts within the 2014 baseline noise zones; see Figures 4-1 and 4-2 for a comparison of modeled baseline noise zones and noise zones for Alternatives 1 and 2).

Of the seven census block groups impacted by aircraft noise, only three (Block Group 1, Census Tract 132; Block Group 4, Census Tract 134.02; and Block Group 1, Census Tract 135.22) have more minority or low-income residents than the City of Jacksonville as a whole. The remaining four census block groups have fewer minority or low-income residents than the city as a whole. Under Alternative 1, approximately 69 additional residents would experience increased aircraft noise. Only 21 of these residents would reside in areas with higher than average minority or low-income populations. Likewise, under Alternative 2, approximately 55 additional residents would experience an increase in aircraft noise. Only 16 of these residents would reside in areas with higher than average minority or low-income populations.

After analyzing the geographic location of the additional residents impacted by aircraft noise under Alternative 1, and assuming that these individuals have demographic and economic characteristics similar to the average for the census block group in which they reside, approximately 11.4 percent of these individuals would be minority; 7.9 percent of these individuals would be Hispanic/Latino; 6.2 percent would be low-income; and 20.5 percent would be children. Likewise, under Alternative 2, approximately 8.3 percent of the newly impacted residents would be minority; 7.6 percent would be Hispanic/Latino; 5.3 percent would be low-income; and 19.9 percent would be children.

While the results of this analysis indicate that more residents would be impacted by the greater than 65 dB DNL noise zone under both alternatives compared to the baseline conditions, these impacts would not disproportionately impact minority and low-income populations because the percentages of the impacted residents that are from these populations are below the averages, or in the case of the impacted Hispanic/Latino population under Alternative 1, similar to those found in the City of Jacksonville as a whole. Consequently, no disproportionately high and adverse environmental and human health impacts would occur to minority and low-income populations, and the proposed action would not result in environmental health risks and safety risks that may disproportionately affect children.

Conclusion

Overall, implementation of the action alternatives would not result in significant impacts to population and housing, the economy, taxes and revenues, and education from the decrease in personnel levels at NAS Jacksonville. The decrease in personnel loading represents a decrease in the population of Duval County of no more than 0.2 percent under both of the alternatives. The local housing market would be expected to recover from any short-term impacts. Construction would have a short-term positive economic effect; personnel level decreases would result in a long-term reduction of employee earnings and spending in the region. These changes would not have significant impacts on the regional economy. No disproportionately high and adverse environmental and human health impacts would occur to minority and low-income populations, and the proposed action would not result in environmental health risks and safety risks that may disproportionately affect children.

4.6 Topography and Soils

The analysis of topography and soils focuses on the area of proposed construction where soils would be disturbed and where there would be potential for soil erosion. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into storm water.

Topography at NAS Jacksonville would not be affected by the proposed action alternatives because the site for new construction is generally level.

Soils at the proposed construction site would be affected by the proposed action. Impacts would include compaction and rutting from vehicle traffic and a potential for soil erosion during construction. The projected increase in new impervious area of approximately 12.89 acres under each alternative would increase the quantity and velocity of storm water runoff (see Chapter 4.7.2), which would increase the susceptibility of surrounding soils to erosion. These impacts would be minimized or avoided by using standard soil erosion- and sedimentation-control techniques at the construction site such as silt barriers (filter fabric) and appropriate revegetation techniques upon completion (NAS Jacksonville 2004). Revegetation techniques would include replanting disturbed areas with native plants and specific seed mixtures as recommended by the NRCS (NAS Jacksonville 2004). In addition, construction practices would meet the policies and objectives contained within OPNAVINST 5090.1D, which are to protect, conserve, and manage the vital elements of the natural resource program, including soils, as well as basing land use practices on scientifically sound conservation procedures and techniques. Construction practices would also be consistent with the goals of the INRMP, which directs identification of and appropriate use of soil in accordance with, and within the limits of, its physical characteristics while protecting it from uncontrolled storm water runoff to prevent and control soil erosion (NAS Jacksonville 2004). Consequently, potential impacts on soils at NAS Jacksonville would not be significant.

Under the No Action Alternative, no additional facilities would be constructed to support the P-8A operations; therefore, topography and soils would not be affected.

Conclusion

Overall, implementation of the proposed action at NAS Jacksonville would not result in significant impacts to topography and soils from construction. The projected increase in impervious surface of approximately 12.89 acres under each action alternative would represent a long-term loss of useable soils. Standard soil-erosion- and sedimentation-control techniques would be implemented to avoid and minimize erosion and sedimentation.

4.7 Water Resources and Wetlands

This assessment examines how the proposed action would affect surface water (4.7.1), water quality (4.7.2), floodplains (4.7.3), groundwater (4.7.4), and wetlands (4.7.5). In this SEIS, the analysis of groundwater focuses on the potential for impacts to the quality, quantity, and accessibility of water.

For the purposes of this SEIS, water quality is considered in light of the statutory requirements that regulate water quality conditions and considers the potential for impacts that may change the water quality, including both improvements and degradation to it.

The analysis of floodplains considers whether any new construction is proposed within a floodplain or may impede the functions of floodplains in conveying floodwaters. The analysis of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland.

4.7.1 Surface Water

No in-water construction would be required under the proposed action. In addition, no water bodies are present within or adjacent to the proposed construction areas; therefore, the proposed action would have no direct effects on surface waters.

4.7.2 Water Quality

Construction under both action alternatives at NAS Jacksonville would disturb approximately 36.10 acres of land. Storm water runoff from the construction site could potentially affect water quality in the lower St. Johns River basin through the introduction of sediments, particulates, and various toxins. A construction NPDES storm water permit will be obtained from the Florida Department of Environmental Protection storm water permitting program because more than 1 acre would be disturbed during construction under all three action alternatives. Under the permit, the Navy will submit a site-specific SWPPP for new discharges that will include a site plan for managing storm water runoff and that describes the BMPs to be implemented to eliminate or reduce erosion, sedimentation, and storm water pollutants. Examples of storm water BMPs that may be used include:

- **Temporary sediment basins.** Structures designed to detain sediment-laden runoff from disturbed areas long enough for sediments to settle out and control the release of storm water;
- **Silt fencing.** A temporary erosion and sediment control barrier used to prevent dirt from entering waterways before bare soil is stabilized with vegetation; and
- **Berms**. A temporary erosion and sediment control that physically prevents polluted runoff from entering nearby storm drain inlets and waters.

The use of the BMPs listed above will result in storm water runoff generated during construction being directed to the existing storm water conveyance system. With proper implementation of the SWPPP, impacts on water quality from erosion and off-site sedimentation would be minor.

The new construction to support the continued transition of P-3C aircraft to P-8A aircraft would create approximately 12.89 acres of new impervious surface under both action alternatives. This surface would,

on average, generate an additional 15.3 million gallons of runoff per year. Once the facilities would be constructed, storm water from the new impervious surface would be directed to an existing storm water conveyance system via sheet flow or grass-lined swales. Based on discussion with NAS Jacksonville natural resources personnel, additional storm water runoff would be directed to an existing storm water detention pond located approximately 2,000 feet from the end of the proposed overrun. Storm water discharge would comply with the conditions of the NPDES permit; therefore, the construction at the station under the proposed action alternatives would not have a significant impact on water quality.

Under the No Action Alternative, no additional facilities would be constructed to support the P-8A operations; therefore, water quality would not be impacted.

4.7.3 Floodplains

The proposed action would have no impact on the base flood elevation of the lower St. Johns River at NAS Jacksonville under either of the action alternatives because the mapped 100-year floodplain does not extend within or adjacent to the proposed construction area.

Under the No Action Alternative, no additional facilities would be constructed to support the P-8A operations; therefore, floodplains would not be affected.

4.7.4 Groundwater

The proposed action would not impact groundwater resources in the vicinity of NAS Jacksonville. None of the proposed construction at the station would extend below surface at a depth that would impact the Floridan aquifer that is used for drinking water. Although fuel or other chemicals could be spilled during construction, immediate cleanup of these spills would prevent any infiltration into the underlying groundwater. Since the number of personnel employed or stationed at NAS Jacksonville would decrease between 16 and 26 percent under the action alternatives (see Chapter 4.5), there would be a corresponding decrease in the demand for groundwater from the regional aquifer system. Therefore, construction and operational changes to support the continued transition of P-3C aircraft to P-8A aircraft at the station under the proposed action alternatives would not have a significant effect on groundwater resources.

Under the No Action Alternative no additional facilities would be constructed to support the P-8A operations; therefore, groundwater resources would not be affected.

4.7.5 Wetlands

The proposed action would have no impact on wetlands at NAS Jacksonville under either of the action alternatives because no wetlands are located on or adjacent to the proposed construction areas.

Under the No Action Alternative, no additional facilities would be constructed to support the proposed P-8A operations; therefore, wetlands would not be affected.

Conclusion

Overall, implementation of the proposed action at NAS Jacksonville would not result in significant impacts on water resources from proposed facility development. All construction activities would be performed in compliance with state general construction storm-water permit requirements. Furthermore, a SWMP and BMPs will be implemented to limit erosion and runoff. Groundwater, floodplains, and wetlands would not be directly impacted.

4.8 Biological Resources

This assessment examines how the proposed action would affect vegetation (4.8.1), wildlife (4.8.2), migratory birds (4.8.3), threatened and endangered species (4.8.4), other species of concern (4.8.5), bald and golden eagles (4.8.6), and marine mammals (4.8.7) at NAS Jacksonville.

This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or protected under federal or state law, including the Endangered Species Act of 1973, the Marine Mammal Protection Act of 1972, the Migratory Bird Treaty Act of 1918, as amended, and the Bald and Golden Eagle Protection Act of 1940, as amended.

4.8.1 Vegetation

Construction of new facilities at NAS Jacksonville under the proposed action alternatives would result in the permanent loss of approximately 12.89 acres of herbaceous vegetation (Bahia grass) that is regularly mowed as part of the airfield clear zone management program. Bahia grass is the most common and widely used warm-season perennial grasses in Florida (University of Florida 2013). Originally from South America, Bahia grass has adapted well to the low soil fertility typical of Florida's deep, sandy soils and is now used to grow low-maintenance lawns. The vegetation permanently removed for the proposed action would total less than 1 percent of the currently vegetated area at the station. The affected vegetation community would not be considered unique or regionally significant at NAS Jacksonville. Consequently, impacts on vegetation under both of the action alternatives would not be significant.

Vegetation would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

4.8.2 Wildlife

The maintained grassland that would be affected by the proposed construction supports a very limited diversity or abundance of terrestrial wildlife. Direct effects could include mortality of less-mobile species such as small mammals, reptiles, and amphibians. The loss of approximately 12.89 acres of maintained grassland could cause the migration of these species to other areas, indirectly resulting in a decrease in the number of wildlife species in the area. However, the overall loss of wildlife species would be undetectable at a population level, given the relatively large amount of suitable habitat that would remain near the proposed facilities. Some wildlife species such as songbirds, small mammals, reptiles, and amphibians that are able to adapt to the landscaped conditions of urban environments can be expected to inhabit the developed areas.

As discussed in Chapter 4.7, storm water created as a result of the new impervious surfaces would be controlled through the implementation of BMPs to prevent the degradation of water quality in the St. Johns River to the greatest extent possible. These BMPs employed during construction would prevent silt from entering the storm water system and impacting aquatic habitats in the St. Johns River. Also, no additional outfalls would be expected to be installed to accommodate storm water discharge. Consequently, any impacts on aquatic species from additional storm water discharge during construction would be expected to be highly localized based on the implementation of on-site BMPs to reduce storm water run-off.

As discussed in Chapters 4.1 and 4.2, annual aircraft operations would decrease, and there would be a slight increase in noise levels compared to baseline conditions under both of the action alternatives. Given the nature of the current NAS Jacksonville operations, locally occurring wildlife species have likely become habituated to aircraft noise at NAS Jacksonville. Studies that focus on investigating the impacts of aircraft noise on wildlife and domestic animal species have observed a variety of species, including waterfowl, shore birds, songbirds, terrestrial mammals, and domestic animals (cows, chickens,

sheep, and horses). Overall, the studies suggest that species differ in their response to aircraft noise (Manci et al. 1988). All species not exposed to aircraft noise, however, seem to initially respond with some form of a startle response, the intensity and duration of which diminishes or disappears with subsequent exposures. Other general responses include running, stampeding, flying, circling, or becoming motionless. Several studies indicate that there is a strong tendency for species to acclimate or habituate to noise disturbances (Black et al. 1984; Fraser et al. 1985; Manci et al. 1988; Ellis et al. 1991; Grubb and King 1991). Consequently, given the nature of the current NAS Jacksonville operations, the proposed action would have no adverse impacts on wildlife at or in the vicinity of NAS Jacksonville from aircraft noise.

Based on the above analysis, proposed construction and aircraft operations at NAS Jacksonville under the proposed action alternatives would not have a significant impact on terrestrial or aquatic wildlife.

Wildlife would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

4.8.3 Migratory Birds

The maintained grassland that would be impacted by the proposed construction under both action alternatives does not support a high diversity or abundance of birds or suitable habitat to support large populations of nesting birds. While the proposed new construction would remove approximately 12.89 acres of habitat potentially used by various species of neotropical migratory songbirds, removal of this habitat would not have an adverse effect on migratory bird species populations at the station, based on the availability of remaining suitable habitat. In addition, management activities outlined in the station's INRMP to benefit migratory birds would continue to be implemented, offsetting any adverse impact associated with the proposed action. Such ongoing management activities may include conducting surveys to determine migratory bird and habitat use on the Jacksonville Complex, providing nest boxes and platforms for birds, and leaving snags and downed logs for nesting, roosting, foraging, cover, and/or perching.

Direct mortality of migratory birds is unlikely to occur during construction because birds would be expected to relocate to other areas; however, some limited mortality could occur to nesting individual birds depending on the timing of construction activities. As stated above, the impacted areas do not contain habitat that would attract large numbers of nesting birds, further reducing the potential for direct mortality of individual birds. Direct interactions with migratory birds are further reduced on and around the airfield through implementation of the BASH plan (see Chapter 4.11.2). This plan has established procedures to minimize the hazards of a bird-aircraft strike around the airfield and provides guidelines for dispersing birds on the airfield.

The P-8A aircraft would continue to operate in the same airfield environment and would continue to fly the same flight routes as the existing aircraft. As a result, the potential strike risk along these routes would remain the same. However, with annual aircraft operations at NAS Jacksonville reduced by 8 percent under Alternative 1 and 11 percent under Alternative 2 compared to the 2014 baseline conditions, there would be an expected slight reduction in the overall potential for bird-aircraft strikes.

Given the nature of the current NAS Jacksonville operations, locally occurring avian species have likely become habituated to aircraft noise. As such, the predicted minor change in noise levels as described in Chapter 4.2 would have no adverse or disruptive impacts on migratory birds. The NAS Jacksonville BASH Plan also provides project and operations guidance to aid in MBTA compliance.

Based on the above analysis, the proposed action alternatives would have no significant adverse or disruptive impacts to migratory birds.

Migratory birds would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

4.8.4 Threatened and Endangered Species

4.8.4.1 USFWS-Managed Species

Piping Plover and Red-Cockaded Woodpecker

There have been no sightings of these species at or in the immediate vicinity of NAS Jacksonville. Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the piping plover or red-cockaded woodpecker. In addition, under NEPA, no significant impacts on these species would occur at NAS Jacksonville.

Wood Stork

The closest wood stork nesting colony to NAS Jacksonville is located approximately 10 miles north of the station, within the St. Johns River floodplain (USFWS 2013c). From 1997 to 2003, one wood stork was detected at the main station, along the shores of Lake Scotlis (NAS Jacksonville 2004). Because of the distance of the nearest nesting colony (i.e., 10 miles) and lack of presence of this species at the installation, construction would not cause ground disturbance of the wood stork's habitat or indirectly impact this species (e.g., from dust created during construction). No construction would occur in areas where transient observations of wood storks have recently been recorded. Consequently, no construction-related noise impacts to the wood stork are expected.

While noise levels would generally increase at NAS Jacksonville, high noise levels (e.g., within the greater-than-75 dB noise zone) would not encompass areas where wood storks could potentially forage. The wood stork nesting colony located approximately 10 miles north of the station would not be affected by aircraft noise.

Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the endangered wood stork. In addition, under NEPA, no significant impacts on the wood stork would occur at NAS Jacksonville.

Manatee

Manatees are commonly present along the station's shoreline in the lower St. Johns River. The proper implementation of measures outlined in Chapter 4.7.2 to control storm water runoff from construction sites and new impervious surfaces would prevent the degradation of water quality in the surface waters surrounding the station. Therefore, the proposed action would have no effect on aquatic habitats adjacent to NAS Jacksonville that are known to support the manatee.

As discussed in Chapter 4.2.1, the proposed action alternatives would result in a slight increase in the modeled noise zones over the St. Johns River. The total sound energy of the P-8A at a distance of 1,000 feet during departures and arrivals is only 1 dB to 2 dB louder than the P-3C. A larger difference in SEL noise values can be found when comparing T&G operations; the P-8A is on average about 8 dB louder than the P-3C. However, the SEL noise value of the FA-18E/F during departures, arrivals, and T&G operations is 19 to 26 dB greater than the noise value of the P-8A, so single-event noise levels over water would not increase as a result of the proposed action.

Based on previous studies conducted on the manatee, the Navy has concluded that the slight increase in the modeled noise zones over water as a result of the proposed action alternatives would not affect the manatee. Although manatees respond to human-generated noise, such as boats approaching them, they

appear relatively unresponsive to the point that they are often suspected of being deaf to the noise, particularly in shallow water (Nowacek et al. 2004). Little data exist on the effects of aircraft overflights on the manatee. Manatees have been observed occupying canals near Miami International Airport, which suggests they became habituated to human disturbance and noise (Metro Dade County 1996). Furthermore, a previous investigation showed manatees did not react to a fixed-wing aircraft moving at approximately 81 miles per hour at a 525-foot altitude (Rathbun 1988). These studies suggest that the manatee has likely become habituated to aircraft noise and would not display any change in behavioral characteristics due to the slight increase in the modeled noise zones over the St. Johns River as a result of the proposed action. Furthermore, since manatees spend most of their time below the surface and do not startle readily, no effect of P-8A aircraft overflights on manatees would be expected.

Based on the above analysis, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the endangered manatee. In addition, under NEPA, no significant impacts under NEPA would occur on the manatee in the vicinity of NAS Jacksonville.

Eastern Indigo Snake

There have been no recorded occurrences of the eastern indigo snake at NAS Jacksonville. As eastern indigo snakes are closely associated with the gopher tortoise and use gopher tortoise burrows as dens and for egg-laying, the potential occurrence of this snake would be limited to suitable habitat areas in the southern portion of the station, where gopher tortoise burrows are known to exist. Based on discussions with NAS Jacksonville natural resources personnel, no gopher tortoise burrows are present within the proposed construction area; these suitable habitat areas are located more than 0.5 mile from the proposed construction site. Thus, the proposed construction would cause no direct or indirect disturbance of the eastern indigo snake's habitat.

Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the eastern indigo snake. In addition, under NEPA, no significant impacts on the eastern indigo snake would occur at NAS Jacksonville.

Frosted Salamander

There have been no sightings of frosted salamanders at or in the immediate vicinity of NAS Jacksonville. Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the frosted salamander. In addition, under NEPA, no significant impacts on this species would occur at NAS Jacksonville.

Sea Turtles

There are no known sea turtle nesting beaches at or adjacent to NAS Jacksonville, and these species have not been recorded in the St. Johns River adjacent to NAS Jacksonville. Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on any sea turtle species. In addition, under NEPA, no significant impacts on sea turtles would occur at NAS Jacksonville.

4.8.4.2 NMFS-Managed Species

Shortnose Sturgeon

Previous sampling efforts did not identify any shortnose sturgeon in the lower St. Johns River near NAS Jacksonville (FFWCC 2013b). In addition, water quality in the lower St. Johns River would not be affected by the proposed action (see Chapter 4.7.2). Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the endangered shortnose sturgeon. In addition, under NEPA, no significant impacts on the shortnose sturgeon would occur at NAS Jacksonville.

4.8.5 Other Species of Concern

Other species of concern on or in the immediate vicinity of NAS Jacksonville include the gopher tortoise and the striped newt.

Although the gopher tortoise has previously been observed in the southern end of the station, inhabiting the pine flatwoods in the vicinity of the Weapons Area, there is no suitable habitat (i.e., mature longleaf pine-savanna with turkey oak) in or adjacent to the proposed construction area. Furthermore, based on discussions with NAS Jacksonville natural resources personnel, no gopher tortoise burrows are present within the proposed construction areas (NAS Jacksonville 2013). Consequently, implementation of any of the proposed action alternatives would have no effect on the gopher tortoise. In addition, under NEPA, no significant impacts on the gopher tortoise are anticipated at NAS Jacksonville.

The striped newt occupies shallow, unpolluted water, usually with some kind of vegetation. No suitable habitat for this species has been identified at NAS Jacksonville. Consequently, implementation of any of the proposed action alternatives would have no effect on this species at NAS Jacksonville. In addition, under NEPA, no significant impacts on the striped newt would occur at NAS Jacksonville.

4.8.6 Bald and Golden Eagles

Given the historical occurrence of bald eagles in the vicinity of NAS Jacksonville, there is the potential for bald or golden eagles to be in the general vicinity of the proposed action. However, neither of these species is likely to be present within or adjacent to the proposed construction areas because of the absence of preferred foraging or nesting habitat. The nearest active bald eagle nest to the proposed construction areas is in Ringhaver Park, approximately 1.65 miles from the construction area associated with the overrun to the approach end of Runway 10.

The bald eagle or golden eagle would not be adversely affected by aircraft noise because noise levels would increase only slightly compared to the current baseline conditions under any alternatives. A study by Grubb and King (1991) on the reactions of bald eagles to human disturbances showed that pedestrians and helicopters elicited far greater responses from them than fixed-wing aircraft. Ellis et al. (1991) showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 300 feet, rather than its noise level.

Based on the above analysis, a take permit as authorized under the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978) is not applicable. In addition, under NEPA, there would be no significant impact on bald and golden eagles at NAS Jacksonville under the proposed action alternatives and the No Action Alternative.

4.8.7 Marine Mammals

In addition to being designated endangered under the ESA, the manatee is also protected under the MMPA. As previously discussed under Chapter 4.8.4.1, this species would not be affected by construction activities at NAS Jacksonville under any of the action alternatives or under the No Action Alternative. Consequently, the Navy has determined that the proposed action and No Action Alternative would not result in reasonably foreseeable “takes” of a marine mammal species by harassment, injury, or mortality as defined under the MMPA.

Conclusion

Overall, implementation of the proposed action at NAS Jacksonville would not result in significant impacts to biological resources. Proposed construction activities would impact actively managed areas; no unique or critical vegetation habitats would be impacted. Short-term noise increases from construction would temporarily displace wildlife and migratory birds. Noise levels associated with aircraft operations

under any of the action alternatives would not result in significant impacts to wildlife and migratory birds because overall noise levels at NAS Jacksonville would not significantly increase compared to baseline conditions. There would be no significant impacts to ESA-listed species and marine mammals under any of the action alternatives.

4.9 Cultural Resources

The potential effects of the proposed action are being assessed by considering any changes to historic structures (Chapter 4.9.1), archaeological resources (Chapter 4.9.2), and Native American resources (Chapter 4.9.3).

Under NEPA, the evaluation of impacts of a proposed action on cultural resources, including archaeological resources, architectural or built resources, and Native American resources, is considered in terms of direct or indirect impacts that are permanent or temporary (long-term or short-term). Where appropriate, impacts on cultural resources were also considered in terms of beneficial or negative impacts.

Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800 require the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking to consider the effects of the proposed undertaking on historic properties. The effects of the impacts of the proposed action on historic properties are being evaluated in accordance with 36 CFR 800.4(d) and 800.5(d), including the ACHP's *Criteria of Adverse Effect* in 36 CFR 800.5(a)(1). The criteria of adverse effect are listed in Table 4-23.

Table 4-23 Criteria of Adverse Effects on Historic Properties

Criteria of Adverse Effect
"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or cumulative" (36 CFR 800.5[a][1]).
Examples of Adverse Effect
"Adverse effects on historic properties include but are not limited to: ■ Physical destruction of or damage to all or part of the property ■ Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines ■ Removal of the property from its historic location ■ Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance ■ Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features ■ Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization ■ Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance" (36 CFR 800.5[a][2]).

Source: ACHP 2004.

4.9.1 Architectural Resources

The proposed action alternatives would result in direct impacts on one architectural resource, Hangar 511, due to renovations that would reconfigure a portion of the interior for use by P-8A aircraft. Surface modification, including remarking and relocation of lighting and tie-downs, would have no impacts on the structural integrity of the CALA.

As discussed in Chapter 3.9.1, one of the two architectural or built resources associated with the APE for the proposed action alternatives at NAS Jacksonville, Hangar 511, is a modern structure, built in 2009, that would not be NRHP-eligible due to its age (four years old). The other built resource, the CALA, is located along the eastern side of Taxiway Charlie, which was built in 1941 and has been recommended for NRHP-eligibility evaluation (SEARCH 2010). However, the Navy considers the surface modification, including remarking and relocation of lighting and tie-downs, as changes that would not affect the structural integrity of the CALA.

Architectural resources at NAS Jacksonville would not be impacted or affected by the No Action Alternative because no construction would take place.

4.9.2 Archaeological Resources

The proposed action alternatives and the No Action alternative would have no impacts on archaeological resources because none were identified within the APE at NAS Jacksonville (Johnson 1997, as cited in SEARCH 2010). If any unanticipated archaeological resources are discovered during construction, the Navy would stop construction immediately and take appropriate steps to avoid further disturbance. NAS Jacksonville's cultural resources program manager would be notified immediately, and he or she would then contact the Florida SHPO. If the discovery may be related to Native American interests, the appropriate tribal officer would be contacted.

4.9.3 Native American Resources

The proposed action alternatives and the No Action Alternative would have no impacts on known Native American resources because none have been identified within the APE at NAS Jacksonville (SEARCH 2010).

Conclusion

The proposed action would have no impacts on architectural, archaeological, or Native American resources at NAS Jacksonville. The Navy provided the Florida SHPO the opportunity to comment on the effects of the proposed action as part of their review of the Draft SEIS. No comments were received from the Florida SHPO during the Draft SEIS public comment period.

4.10 Hazardous Materials and Waste Management

The analysis of hazardous materials, hazardous waste, and contaminated sites focuses on the potential for hazardous substances to be introduced into the environment from aircraft operations and maintenance, or during construction activities. Potentially affected areas consist of the airfield and aircraft support and maintenance facilities. Factors considered in the analysis include the potential for increased human health risk or environmental exposure, as well as changes in the quantity and types of hazardous substances transported, stored, used, and disposed. The methodology for evaluating contaminated sites compares the proximity of proposed facility development to contaminated sites and considers the operational uses of the facilities to determine potential impacts to or from the sites.

Operation and maintenance of additional P-8A aircraft under both alternatives would not introduce any hazardous materials and/or waste streams that cannot be managed by existing hazardous material and waste management functions and facilities at NAS Jacksonville. The addition of 20 P-8A aircraft and

elimination of 18 P-3C aircraft under Alternative 1 and addition of 13 P-8A aircraft and elimination of 18 P-3C aircraft under Alternative 2 would not result in changes to the handling, use, storage, or disposal of fuel, oils, and lubricants at NAS Jacksonville. All wastes would continue to be collected, managed, and stored on-site in accordance with NAS Jacksonville's RCRA Part B operating permit. With new aircraft requiring less maintenance, incorporation of the appropriate procedures for handling of hazardous materials, and the application of BMPs for the management of hazardous substances and spill response at NAS Jacksonville, the proposed action would have no impacts to hazardous materials and the waste management program.

Hazardous materials and waste would not be impacted by the No Action Alternative because baseline P-3C and P-8A aircraft loading and operations at NAS Jacksonville would not change.

Environmental Restoration Program Sites

The proposed action would have no impact on ongoing remedial programs at NAS Jacksonville and would not result in potentially hazardous exposure of on-site personnel. No proposed construction project would require large-scale removal or disturbance of surface soil, subsurface soil, groundwater, or existing groundcover within any ERP site. Land use controls at the nearby PSC 4 restrict ground water use and land use at the site; however, construction under the proposed action would not impact these controls. Therefore, contaminated media would not likely be encountered near ERP site locations.

Conclusion

Overall, as discussed above, implementation of the action alternatives at NAS Jacksonville would not result in significant impacts to public health and safety from hazardous materials and waste related to proposed P-8A operations or new construction. Hazardous waste management activities would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste.

4.11 Safety

This assessment examines how the proposed action would affect flight safety (Chapter 4.11.1) and BASH (Chapter 4.11.2). Environmental health and safety risks to children are analyzed in Chapter 4.5.5.

4.11.1 Flight Safety

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these measures are implemented, risks are minimized, even though they can never be eliminated. Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization.

Implementation of Alternative 1 or 2 would reduce total air operations up to 10 percent at NAS Jacksonville. As discussed in Chapter 2.4.2.1, the 27,480 baseline P-3C and P-8A operations would decrease to 24,000 P-8A operations under Alternative 1, a 13-percent decrease, and to 22,821 operations under Alternative 2, a 17-percent decrease. The up to 10-percent decrease in total airfield flight operations (considering projected changes in other aircraft operations) would reduce the potential for aircraft incidents at NAS Jacksonville and in the community. In addition, current airspace safety procedures, maintenance, training, and inspections discussed previously would continue to be implemented, and additional airfield flight operations would adhere to established safety procedures.

Modeling, simulation, and ground tests of new aircraft reduce the uncertainties of flight testing, and the subsequent flight-test program includes efforts to ensure flight safety and to reduce risks associated with the operation of new aircraft. In all cases, each new aircraft type has met all required standards prior to certification. While it is generally difficult to project future safety/mishap rates for any new aircraft, the P-8A is a military variant of the commercial Boeing 737 aircraft, which has a well-documented and established safety record as one of the most reliable aircraft currently in operation.

Construction of the proposed 1,000-foot overrun would provide the required safety margins for fully loaded P-8A operations on very hot and humid days. All current training regulations and procedures would continue to reflect P-8A specific rules, and pilots would continue to adhere to training policies. Since the P-8A is an existing airframe at the station, it would not require an update to response plans specific to the P-8A and associated equipment, including the emergency and mishap response plans. Furthermore, no changes to established clear zones, APZs, or other established airfield safety features would be required. As such, the NAS Jacksonville airfield safety conditions would be similar, if not improved, compared to existing conditions. No increase in the potential safety risk from the P-8A operational training actions would be expected for NAS Jacksonville airfield and surrounding airspace.

4.11.2 Bird/Wildlife Aircraft Strike Hazards

No aspect of the action alternatives or the No Action Alternative would create attractants with the potential to increase the concentration of birds in the vicinity of the airfield. In addition, considering the decrease in annual operations and use of existing flight tracks, Alternatives 1 and 2 would cause a decrease in the potential BASH risk at NAS Jacksonville.

Conclusion

Overall, implementation of the action alternatives at NAS Jacksonville would not result in adverse impacts to safety from the continued transition of P-3C aircraft to P-8A. P-8A operations would decrease under each action alternative compared to baseline P-3C/P-8A operations, and extensive use of flight simulators would minimize the risk associated with aircraft mishaps due to pilot error.

5 NAS Whidbey Island Existing Environment

This chapter provides a description of the existing environment that could be affected by the proposed action at NAS Whidbey Island. As directed by NEPA, Navy procedures for implementing NEPA (32 CFR Part 775), and Navy environmental instructions, the description of the affected environment focuses on those resources potentially subject to impacts. Therefore, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. As discussed in Chapter 1.3.2, three resource areas (infrastructure and utilities, transportation, and community services) are not discussed in this SEIS for NAS Whidbey Island because the proposed action would not result in noticeable effects to these resources. Resources at and in the vicinity of NAS Whidbey Island would be affected by changes to aircraft operations and number of personnel, and new development on the installation. Therefore, the analysis of the affected environment includes the following: airspace and airfield operations, noise, air quality, land use, socioeconomics, topography and soils, water resources and wetlands, biological resources, cultural resources, hazardous materials and waste management, and safety.

5.1 Airspace and Airfield Operations

This chapter describes the existing airfield operations at NAS Whidbey Island and the airspace in which the P-8A would operate. The study area for airspace is the NAS Whidbey Island airfield, Ault Field, and airspace surrounding the station. This chapter does not address the training airspace that NAS Whidbey Island aircraft utilize as those types of training activities would not change as a result of the proposed action. As noted in Chapter 1.3.4, the NWTT EIS/OEIS analyzes current P-3C and future P-8A training requirements at existing range complexes, OPAREAs, and testing ranges in the northwest. P-3C and P-8A aircraft at NAS Whidbey Island do not conduct any training operations at OLF Coupeville; therefore, this SEIS does not analyze training operations at OLF Coupeville because existing training activities would not change as a result of the proposed action or be affected by P-8A operations.

5.1.1 Airspace

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. Navigable airspace is considered to be airspace above the minimum altitudes of flight prescribed by regulations under U.S.C. Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 U.S.C. § 40102). Congress has charged the FAA with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of the airspace (49 U.S.C. § 40103(b); FAA Order 7400.2 2004). The FAA considers multiple and sometimes competing demands for airspace in relation to civil, commercial, and military aviation. Specific rules and regulations concerning airspace designation and management are listed in FAA Order 7400.2.

Under the National Airspace System, the airspace above Ault Field is designated as Class C airspace. The Class C airspace around Ault Field is: 1) airspace extending upward from the surface to 4,000 feet above msl within a 5-NM radius of Ault Field; 2) airspace that extends upward from 1,300 feet above msl to 4,000 feet above msl within a 10-NM radius of the airport from the 050° bearing from the airport clockwise to the 345° bearing from the airport; and 3) airspace extending upward from 2,000 feet msl to 4,000 feet msl within a 10-NM radius of the airport from the 345° bearing from the airport clockwise to the 050° bearing from the airport (Navy 2002).

ATC services to all aircraft operating within the Class C airspace are provided by the NAS Whidbey Island ATC facility. The NAS Whidbey Island ATC facility is responsible for the safe, orderly, and expeditious flow of both civil and military air traffic and provides the en-route traffic control service within 2,100 square miles of the airspace surrounding the Class C airspace.

Aircraft flying patterns at, approaching, or departing from Ault Field normally fly specific routes, i.e., flight tracks. These routes were established on the basis of land use and obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current aircraft operational characteristics of the aircraft operating at NAS Whidbey Island. Flight tracks are represented as single lines on maps and depict the average route of the aircraft over the ground. These tracks are affected by aircraft performance, pilot technique, other air traffic, and weather conditions such that the actual flight path (or track) is an airway corridor up to 8 nautical miles wide rather than a single line as depicted on the maps. P-3C aircraft flight tracks associated with Ault Field are depicted in Figures 5-1 and 5-2.

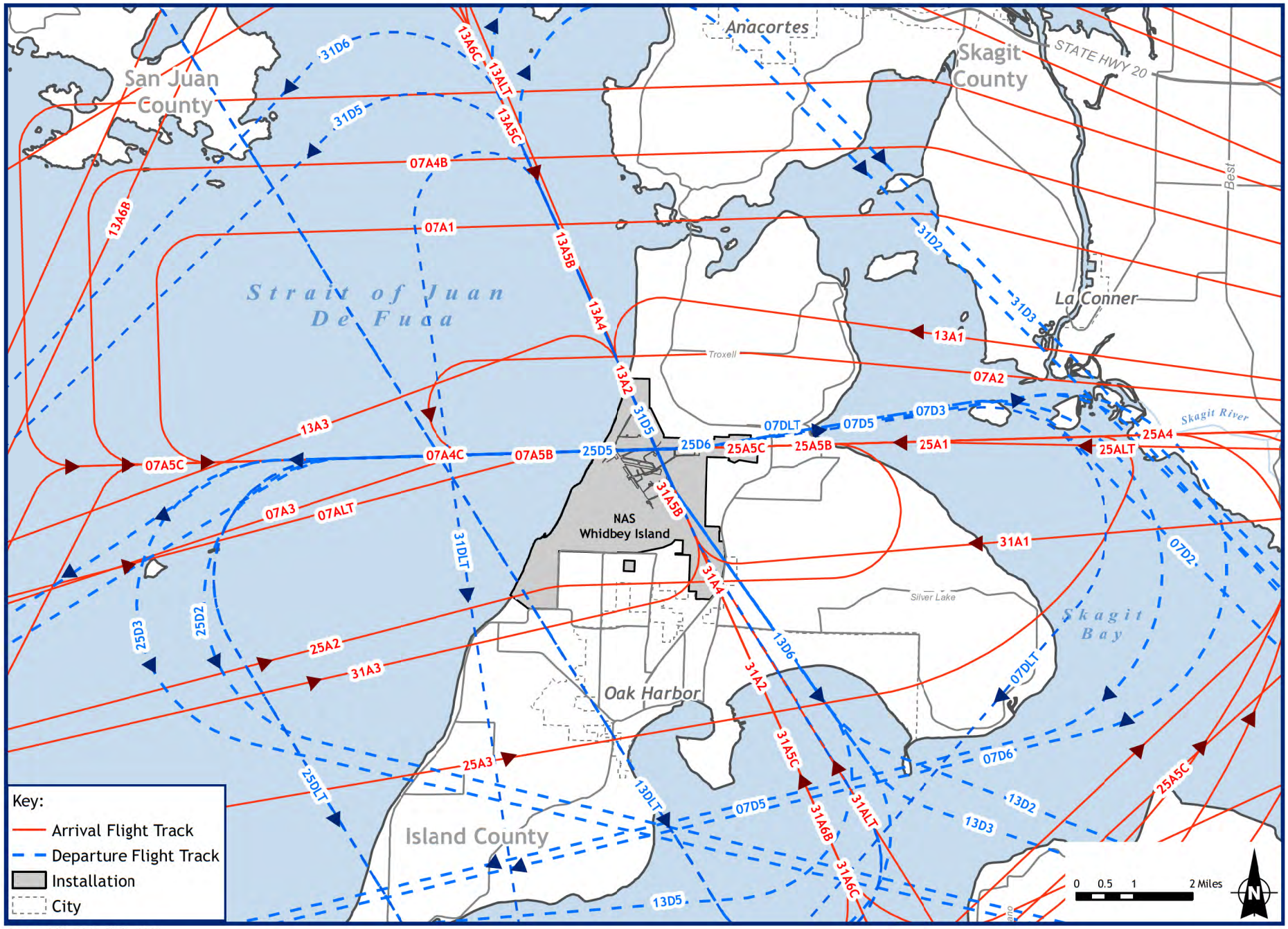
5.1.2 Airfield Operations

Ault Field consists of two intersecting runways, Runway 07/25 and Runway 14/32. Both runways are 8,000 feet long and 200 feet wide. Ault Field is open 7 days per week, 24 hours per day. The prevailing wind direction and noise abatement procedures result in Runways 25 and 14 being the most frequently used runways at the station. Approximately 44 percent of the airfield operations are assigned to Runway 25, and 36 percent are assigned to Runway 14. Runways 07 and 32 are used less frequently; 13 percent of the airfield operations are assigned to Runway 07, and 7 percent are assigned to Runway 32.

A flight operation refers to any takeoff or landing. The takeoff and landing may be part of a training maneuver (or pattern) associated with the air station runway or may be associated with a departure or arrival of an aircraft.

Basic flight operations at NAS Whidbey Island are:

- **Departure.** An aircraft taking off to a local training area, a non-local training area, or as part of a training maneuver (e.g., T&G).
- **Straight-In/Full-Stop Arrival.** An aircraft lines up on the runway centerline, descends gradually, lands, comes to a full stop, and then taxis off the runway.
- **Overhead Break Arrival.** An aircraft approaches the runway 500 feet above the altitude of the landing pattern. Approximately halfway down the runway, the aircraft performs a 180-degree turn to enter the landing pattern. Once established in the pattern, the aircraft lowers landing gear and flaps and performs a 180-degree descending turn to land on the runway.
- **Ground-Controlled Approach Box.** A radar or “talk down” approach directed from the ground by ATC personnel. ATC personnel provide pilots with verbal course and glide-slope information, allowing them to make an instrument approach during inclement weather. The GCA Box is generally counted as two operations—the landing is counted as one operation, and the takeoff is counted as another. However, some instrument-controlled full-stop approaches are counted as one operation.



Source: ESRI, 2012; Wyle, 2007

Figure 5-1
P-3C Arrival and Departure Flight Tracks at NAS Whidbey Island
NAS Whidbey Island, Washington

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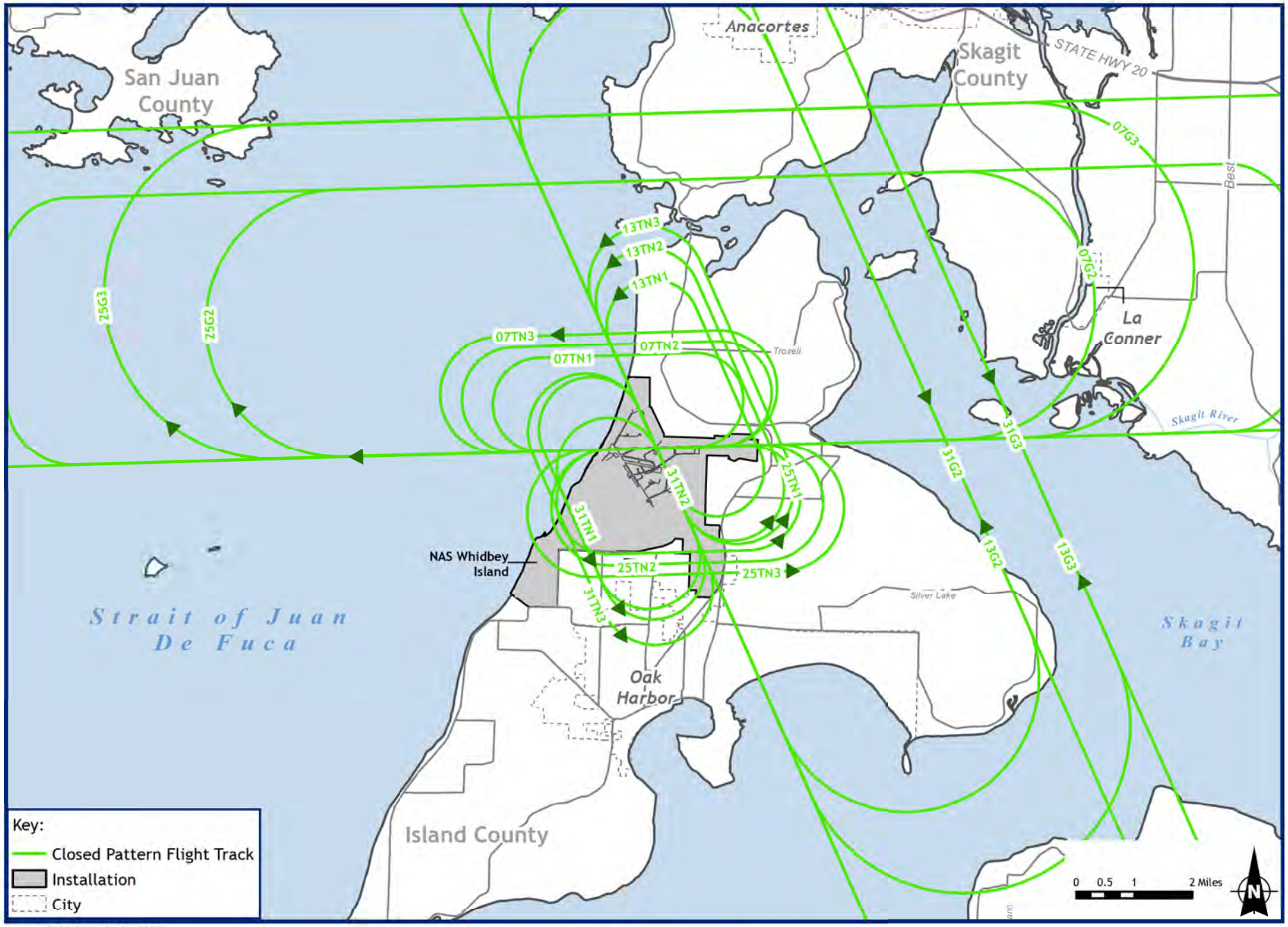

Source: ESRI, 2012; Wyle, 2007

Figure 5-2
P-3C Closed Pattern Flight Tracks at NAS Whidbey Island
Whidbey Island, Washington

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- **Touch-and-Go Operation.** An aircraft lands and takes off on a runway without coming to a full stop. After touching down, the pilot immediately goes to full power and takes off again. The T&G is counted as two operations—the landing is counted as one operation, and the takeoff is counted as another.
- **Field Carrier Landing Practice.** An aircraft practices simulated carrier landings. FCLPs are required training for all pilots before landing on a carrier. The number of FCLPs performed is determined by the length of time that has elapsed since the pilot's last landing on a carrier. The FCLP is counted as two operations—the takeoff is counted as one, and the landing is counted as another. (Because P-3C and P-8A squadrons are not based aboard aircraft carriers, they will not be performing FCLPs at Ault Field or OLF Coupeville.)

For this SEIS, the Navy used the NASMOD as the best available tool for modeling airfield flight operations to support the noise assessment and other operational planning. The results of this analysis are presented in Table 5-1 as the 2014 baseline aircraft operations. This baseline scenario represents the existing P-3C operations, the replacement of EA-6B with EA-18G aircraft, and the addition of one EA-18G VAQ reserve squadron at NAS Whidbey Island. In 2014, all electronic attack operations are assumed to be conducted by EA-18Gs. While one squadron of EA-6Bs may still be operating at NAS Whidbey Island in 2014, it would conduct only 1,100 operations, or about 2 percent of the total annual EA-18G operations.

Under the 2014 baseline, pilots will perform approximately 71,466 flight operations annually at Ault Field (Wyle 2013). As shown on Table 5-1, approximately 71, 28, and 1 percent of 2014 baseline flight operations will be performed by the EA-18G Growler, P-3C, and C-9A Skytrain aircraft, respectively. The FA-18E/F Super Hornet is the surrogate for the EA-18G because the EA-18G and FA-18E/F share the same engine and airframe. In addition to the three fleet squadrons and one reserve squadron, the P-3C operations include EP-3 reconnaissance aircraft and transient operations. The C-9A aircraft is the surrogate for NASMOD's "Transient Jet Large" category (Wyle 2013).

Table 5-1 Annual Modeled 2014 Baseline (No Action Alternative) Operations at Ault Field, NAS Whidbey Island

Aircraft Type	Departure	Straight-in/ Full-Stop Arrival	Overhead Break Arrival	FCLP[2]	Touch-and-Go[2]	GCA Box	Total
P-3C	1,852	1,852	0	0	7,304	3,622	**14,629**
P-8A	0	0	0	0	0	0	**0**
EP-3	767	767	0	0	1,668	1,668	**4,870**
EA-18G[1]	9,942	4,191	5,747	16,975	6,270	7,452	**50,577**
C-40	0	0	0	0	0	0	**0**
C-9A	437	437	0	0	0	0	**874**
Transient	258	258	0	0	0	0	**516**
Total Airfield Operations[3]	**13,256**	**7,505**	**5,747**	**16,975**	**15,242**	**12,742**	**71,466**

Notes:

1 The analysis assumes that all electronic attack operations in 2014 would be conducted by EA-18G aircraft. It is anticipated that one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014 and would contribute approximately 1,100 EA-6B operations, or about 2 percent of the total annual EA-18G operations, until fully transitioned to EA-18G aircraft.

2 FCLP and Touch and Go numbers indicate one takeoff and one landing per listed event. GCA box operations can be full stop operations. Please see page 5-2 for additional description of these operations.

3 Total air operations numbers may not sum exactly due to rounding.

5.2 Noise

Several metrics are available to quantify the physical characteristics of the sound produced by an activity and to relate these physical characteristics to the potential human responses to it. Two metrics are used in this SEIS to describe aircraft noise exposure: the DNL and the SEL.

DNL is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. Aircraft noise events are associated with flight operations and ground engine-maintenance run ups. The DNL metric includes a 10-dB penalty for nighttime operations (10:00 PM to 7:00 AM) because people are more sensitive to noise during normal sleeping hours, when ambient noise levels are lower. The DNL metric has been determined to be a reliable measure of long-term community reaction to transportation noise, especially aircraft noise, and has become the standard metric used by many federal and state governmental agencies and organizations in the United States, such as the EPA and the FAA, for assessing aircraft noise.

The DNL for the community is depicted as a series of contours that connect points of equal value, usually in 5-dB increments. It is calculated based on modeled aircraft noise events; calculated noise contours therefore do not represent exact scientific measurements. The area between two specific contours is known as a noise zone. The noise zones used in this study are:

- 65 to 70 dB DNL;
- 70 to 75 dB DNL; and
- Greater than 75 dB DNL.

The Navy has developed guidance for communities on the types of land uses that are compatible or not compatible within these noise zones. Navy guidance begins with the 65 to 70 dB DNL noise zone. DNL noise zones have historically been used as the noise metric for NAS Whidbey Island. For a detailed discussion of noise and noise modeling, please refer to part one of Appendix D, Background Noise Information, and the Wyle Laboratories, Inc., Noise Report WR13-02.

SEL is a metric used for a single flight event. It is an integrated metric that represents both the intensity of a sound and its duration. Individual time-varying noise events, such as aircraft overflights, have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of the net exposure of the entire event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL would include both the maximum noise level and the lower noise levels produced during the onset and recess periods of the overflight.

Flight operations are the primary source of noise generated at NAS Whidbey Island. Baseline flight operations at NAS Whidbey Island are dominated by the EA-18G and P-3C aircraft (see Table 5-1). However, EA-18G aircraft contribute approximately 98 percent of the acoustic energy to the noise environment at NAS Whidbey Island and, together with the remaining EA-6B aircraft, are the loudest aircraft operating there (Wyle 2013).

At NAS Whidbey Island, in-frame and out-of-frame engine maintenance run ups are used to test aircraft engines at various power settings and durations. In-frame engine maintenance run ups designated for low- or high-power testing are conducted at several locations on Ault Field at NAS Whidbey Island. EA-18G high-power run-ups are conducted at the high-power pad, which is located just west of Runway 32, and aircraft are oriented parallel to Runway 32. EA-18G low-power run-ups are conducted on the ramp in the southwest portion of NAS Whidbey Island, with aircraft oriented approximately perpendicular to Runway 32.

P-3C and P-8A low-power run-ups would also be conducted on the southwest ramp, while P-3C high-power run-ups are conducted on the active runway near the threshold at Red Label Foxtrot and Red Label Delta with the aircraft oriented along the runway heading. Out-of-frame engine testing is conducted at an engine test cell in Building 2525 and next to Building 2765. Pre-flight engine run ups are generally not conducted for the types of aircraft stationed at NAS Whidbey Island (Wyle 2012).

5.2.1 DNL Noise Zones and SEL Noise

The noise zones representing the 2014 baseline environment for NAS Whidbey Island are shown on Figure 5-3; they were developed using the estimated annual airfield operations shown in Table 5-1 and average annual engine maintenance run ups as detailed in part two of Appendix D, Background Noise Information, and Wyle Laboratories, Inc., Noise Report WR13-02. As discussed in Chapter 5.1, all electronic attack operations in 2014 are assumed to be conducted by EA-18G aircraft. While one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014, it would conduct only 1,100 operations, or about 2 percent of the total annual EA-18G operations shown in Table 5-1. These approximately 1,100 EA-6B operations would contribute to a 1- to 2-dB increase in the DNL contours until the EA-6B transition to the EA-18G is complete in 2015. A 1- to 2-dB increase would be a temporary condition and would not result in a noticeable difference in the noise zones.

At NAS Whidbey Island, the 70 and 75 dB DNL noise contours extend eastward toward the eastern shore of the mainland across Skagit Bay and are generally associated with the flight track of aircraft flying the GCA at an altitude of 1,000 feet AGL over the bay. The 65, 70, and 75 dB DNL contours extend to the north and west over the Strait of Juan de Fuca. To the south, the 65, 70, and 75 dB DNL noise contours extend over land, with the 65 dB DNL contour extending approximately 3 to 4 miles from the center of the airfield. Noise exposure to the south is generally associated with the overlapping T&G and FCLP flight tracks (see Figures 5-2 and 5-3). The 80 dB and 85 dB DNL contours are largely contained within the station boundaries and over the Strait of Juan de Fuca. However, the 80 dB DNL noise contour extends south of the installation and approximately 1.5 miles to the east outside the station boundary, which is generally associated with the arrival portion of the EA-18G/EA-6B T&G pattern on Runway 25. Residential structures are located within the greater than 80 dB DNL noise contour along West Sullivan and West Frostad Road at the eastern end of Runway 07.

The off-station area and estimated population in the modeled 2014 baseline noise zones for NAS Whidbey Island are provided in Table 5-2. The population shown is derived from the 2010 U.S. Census population data. Most of the land surrounding Ault Field and within the existing noise zones is forested and agricultural/open fields, scattered rural residential land, and scattered residential subdivisions at higher densities. Clover Valley Day School is located within the greater than 75 dB DNL noise zone, and portions of Deception Pass State Park north of Ault Field are located within the 65 to 70 dB, 70 to 75 dB, and greater than 75 dB DNL noise zone around Ault Field. Other land uses within the baseline noise zones are discussed further in Chapter 5.4.

The outdoor DNL and SEL for the loudest flight operation for the P-3C, EA-6B and EA-18G aircraft were analyzed for 2014 baseline conditions for six selected locations in the vicinity of NAS Whidbey Island (see Table 5-3 and Figure 5-3). The locations were selected based on comments received during the public comment period for the 2008 DEIS to represent POIs to the public in the vicinity of NAS Whidbey Island. The DNL for Deception Pass State Park is 70 dB DNL and is attributable primarily to EA-18G/EA-6B break arrivals to Runway 14 that occur during the nighttime. The DNLs for Clover Valley Day School and Olympic View Elementary School are 75 dB and 65 dB DNL, respectively. The DNL at the remaining three locations (City Beach Park; La Conner Middle School; and Picnic Point, Anacortes) is 56 dB or less. Although specific flights would be noticeable at these three locations, as the

SEL would be between 73 dB (P-3C) at Picnic Point, Anacortes, to 114 dB (EA-6B) at City Beach Park, the DNL indicates that periods would occur when aircraft overflights are not occurring.

Table 5-2 Off-Station Area and Estimated Population within Modeled 2014 Baseline (No Action Alternative) DNL Noise Zones for NAS Whidbey Island

Noise Zone	2014 Baseline	
	Area (acres)[1]	Population[2]
65 to 70 dB DNL	8,581	5,198
70 to 75 dB DNL	7,293	2,890
75 dB DNL or greater	12,762	3,732
Total	**28,636**	**11,819**

Source: Wyle 2013, U.S. Census Bureau 2010h.

Notes:
1 The area within the 65 dB and greater DNL noise zone does not include the area within the boundary of NAS Whidbey Island.
2 2010 Census data are reported by blocks. The population shown is a proportion of the census block population based on the geographic area of the noise zone. These data should be used for comparative purposes only and are not considered actual numbers within the noise zones.

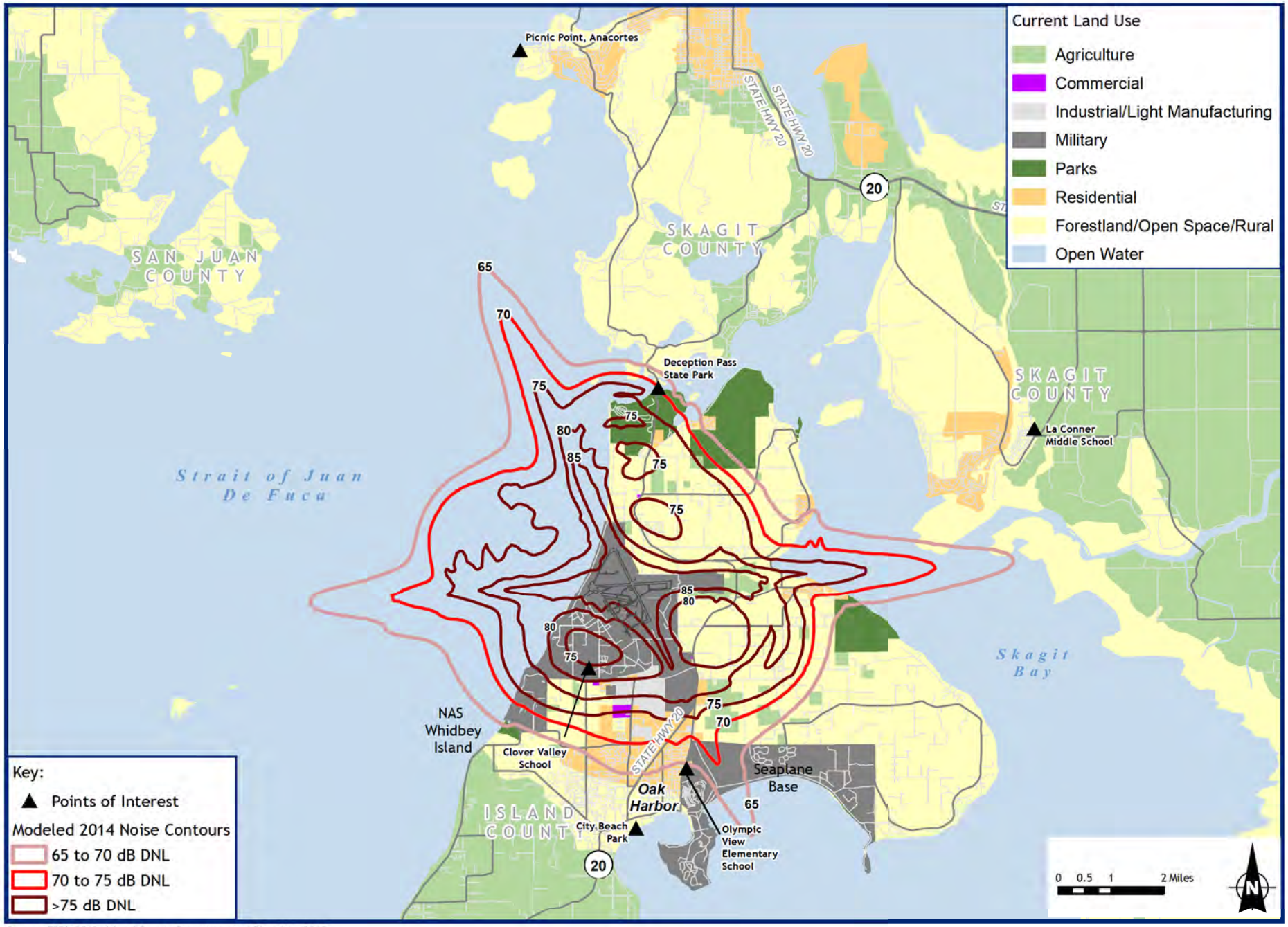
Key:
dB = Decibel.
DNL = Day-night average sound level.

Table 5-3 Outdoor SEL (dB) and DNL (dB) for Modeled 2014 Baseline (No Action Alternative) Aircraft Operations at Points of Interest near NAS Whidbey Island

Point of Interest	SEL			DNL
	P-3C	EA-6B[2]	EA-18G	
Clover Valley Day School	74	115	111	75
City Beach Park	75	114	104	56
Olympic View Elementary School	76	120	118	65
Deception Pass State Park	75	112	112	70
La Conner Middle School	68	103	93	47
Picnic Point, Anacortes	73	99	90	47

Source: Wyle 2013

Notes:
1 The modeled sound is representative only for each individual location and does not provide a representative measure of the sound heard during aircraft overflights in other areas.
2 The analysis assumes that all electronic attack operations in 2014 would be conducted by EA-18G aircraft. EA-6B data were not modeled but are shown for comparison purposes as it is anticipated that one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014 and would contribute approximately 1,100 operations, or about 2 percent of the total annual EA-18G operations, until fully transitioned to EA-18G aircraft.



Source: ESRI, 2012; Island County Department of Planning, 2010; Skagit County Comprehensive Plan, 2008; Wyle 2013.

Figure 5-3
Modeled 2014 Baseline DNL Noise Contours at NAS Whidbey Island
Whidbey Island, Washington

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5.2.2 Supplemental Noise Analysis

Aircraft noise may interfere with a broad range of human activities, including speech; communication; listening to radio, television, or other audio equipment; studying; relaxation; and sleep. Community noise studies conducted in the U.S. since the early 1970s have indicated that adverse effects resulting from aircraft operations, such as annoyance, sleep interference, and speech interference, are generally associated with exposure to sound levels exceeding 65 dB DNL.

This SEIS examines the potential for, sleep disturbance, speech interference, and classroom learning interference using metrics of PA, numbers of events at or above an NA, and L_{eq}. The methodologies for these three analyses are described in detail in Appendix D, Background Noise Information, and Wyle Laboratories, Inc., Noise Report WR13-02.

Common to all three analyses is the determination of indoor sound levels. The noise models compute the outdoor noise levels that must be converted to interior noise levels. For the purpose of this analysis, typical NLRs of 15 dB and 25 dB were used to account for the effect of noise on a typical home with windows open and windows closed, respectively (FICON 1992). The same NLR values were applied to schools.

All POIs are considered to be at or near residential areas and relevant to sleep disturbance and speech interference analyses. Only school POIs were relevant to the classroom learning interference analysis.

Sleep Disturbance

The analysis of sleep disturbance, PA, is a calculation of the probability of awakening from a single aircraft overflight. Thus, it is based on the outdoor SEL at each of the POIs, converted to an indoor SEL. Events that were considered are those that occur between 10:00 PM and 7:00 AM Table 5-4 presents the results of the sleep disturbance analysis for the six POIs. For the 2014 baseline scenario, the PA ranges from 5 percent at a residence with windows open (1 percent with windows closed) near Picnic Point, Anacortes, to 47 percent for a residence with windows open (33 percent with windows closed) near Clover Valley Day School. The EA-18G/EA-6B T&G pattern operations on Runways 25 and 14 are the primary contributor to the PA at all POIs.

Table 5-4 Analysis of Average Nightly (10:00 PM to 7:00 AM) Percent Probability of Awakening for Representative Residential Receptors for the 2014 Baseline (No Action Alternative) Scenario

Point of Interest	Windows Open[1]	Windows Closed[1]
Clover Valley Day School	47%	33%
City Beach Park	24%	13%
Olympic View Elementary School	32%	21%
Deception Pass State Park	30%	16%
La Conner Middle School	6%	1%
Picnic Point, Anacortes	5%	1%

Note:
[1] NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Indoor Speech Interference

The analysis of indoor speech interference is based on the number of noise events per daytime hour that are greater than the maximum sound level of 50 dB indoors. Table 5-5 presents the results of the speech interference analysis for the 2014 baseline scenario for the six POIs. For the 2014 baseline scenario, four of the six sites have more than one speech-interfering event per daytime hour with windows open; Clover Valley Day School has six of these events and four speech-interfering events per daytime hour when the

analysis is run assuming the windows are closed. None of the other POIs have more than one speech-interfering event per daytime hour for windows-closed conditions.

Table 5-5 Analysis of Average Daily Indoor Speech Interference for Representative Residential Receptors for the 2014 Baseline (No Action Alternative) Scenario

Point of Interest	Number of Indoor Events per Daytime Hour[2]	
	Windows Open[1]	Windows Closed[1]
Clover Valley Day School	6	4
City Beach Park	2	0
Olympic View Elementary School	4	1
Deception Pass State Park	4	1
La Conner Middle School	1	0
Picnic Point, Anacortes	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour	4	1
Minimum Number of Intrusive Events per Hour if Exceeding 1	2	4
Maximum Number of Intrusive Events per Hour if Exceeding 1	6	4

Notes:
1 NLRs of 15 dB and 25 dB for windows open and closed, respectively.
2 Number of Annual Average Daily DNL Daytime Events at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB.

The EA-18G/EA-6B departures account for the majority of speech-interfering events at Clover Valley Day School, City Beach Park, Olympic View Elementary School, and Deception Pass State Park. The EA-18G/EA-6B GCA is the primary cause for interfering events at La Conner Middle School.

Classroom Learning Interference

To evaluate the potential for classroom learning interference, noise levels were calculated for each of the schools identified as a POI using the L_{eq} metric. The L_{eq} metric provides the average sound level generated by aircraft operations during an eight-hour school day (i.e., from 8:00 AM to 4:00 PM). Also considered in the potential for classroom learning interference is a metric similar to the speech interference metric—that is, the number of noise events per daytime hour that are greater than the maximum sound level of 50 dB indoors but confined to only those events that occur during the eight-hour school day (i.e., 8:00 AM to 4:00 PM). Table 5-6 contains the results of the classroom learning interference analysis for Clover Valley Day School, Olympic View Elementary, and La Conner Middle School. For the 2014 baseline scenario, aircraft noise at Clover Valley Day School exceeds the indoor $L_{eq(8h)}$ threshold of 35 dB for continuous noise by 22 dB with windows open and 12 dB with windows closed. Speech-interfering events are seven and five per hour with windows open and windows closed, respectively. Olympic View Elementary School exceeds the indoor $L_{eq(8h)}$ threshold of 35 dB for continuous noise by 16 dB with windows open and 6 dB with windows closed. Speech-interfering events are five and two per hour with windows open and windows closed, respectively. The EA-18G/EA-6B departure and re-enter patterns are the primary cause for the $L_{eq(8h)}$ because the flight path is less than a quarter mile from these schools. The learning-interfering events are primarily due to the EA-18G/EA-6B departures. La Conner Middle School does not exceed the $L_{eq(8h)}$ threshold of 35 dB or experience more than one interfering event per hour under either windows-open or windows-closed conditions.

Table 5-6 Analysis of Average Daily (8:00 AM to 4:00 PM) Indoor Classroom Learning Interference for 2014 Baseline (No Action Alternative) Scenario

School Point Of Interest	Outdoor $L_{eq(8h)}$ (dB)	Indoor			
		Windows Open[1]		Windows Closed[1]	
		$L_{eq(8h)}$ (dB)	Events per Hour[2]	$L_{eq(8h)}$ (dB)	Events per Hour[2]
Clover Valley Day School	72	57	7	47	5
Olympic View Elementary School	66	51	5	41	2
La Conner Middle School	47	32	1	22	0
Number of Sites Exceeding 1 Intrusive Event per Hour			2		2
Minimum Number of Intrusive Events per Hour if Exceeding 1			5		2
Maximum Number of Intrusive Events per Hour if Exceeding 1			7		5

Notes:
1 NLRs of 15 dB and 25 dB for windows open and closed, respectively.
2 Number of annual average busy day events per hour during an 8-hour school day (8:00 AM to 4:00 PM) at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB;

5.2.3 Potential Hearing Loss Analysis

People working or living in high-noise environments for extended periods of time can potentially experience hearing loss. Hearing loss can occur as a temporary or as a permanent "shift" in the threshold of hearing. The EPA has established 75 dB for an 8-hour exposure and 70 dB for a 24-hour exposure as the average noise level standard requisite to protect 96 percent of the population from a greater than 5-dB permanent threshold shift in sound perception (EPA 1978).

EPA's 1982 *Guidelines for Noise Impact Analysis* specifically addresses the criteria and procedures for assessing noise-induced hearing loss in terms of the Noise-induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in hearing level, or threshold, caused by exposure to noise (EPA 1982). Numerically, the NIPTS is the change in threshold averaged over the frequencies 0.5, 1, 2, and 4 kiloHertz (kHz) that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at an age of 20 years. An average of the NIPTS over time (40 years) and hearing sensitivity (10th to 90th percentiles of the exposed population) is termed the "average NIPTS."

A 2009 DoD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to DNL greater than or equal to 80 dB. To assess the potential for NIPTS, the Navy generally uses the 80 dB DNL noise contour as a threshold to identify the exposed population that may be at the most risk of possible hearing loss from aircraft noise (EPA 1982; DoD 2009). However, it should be recognized that characterizing noise exposure in terms of DNL overestimates hearing-loss risk but suffices when nighttime operations are 5 percent or less than the total operations. When nighttime operations are greater than 5 percent, $L_{eq(24)}$ is recommended for calculating potential hearing loss because hearing loss is a physical phenomenon due to the sound level and independent of annoyance. Thus, the additional penalties applied to DNL for nighttime operations do not accurately portray the NIPTS. This SEIS calculates potential hearing loss using $L_{eq(24)}$ to obtain the accuracy necessary for the larger number of nighttime operations.

The average NIPTS that can be expected for noise exposure as measured by the $L_{eq(24)}$ metric is noted in Table 5-7 along with the potentially affected population within the 10th percentile (most sensitive 10 percent of the population) for the baseline condition. Because of the split in day and night operations at NAS Whidbey Island, an $L_{eq(24)}$ of 71-72 dB roughly equates to the 80 dB DNL noise contour; therefore, the 71-$L_{eq(24)}$ noise zone is used as the starting point for the PHL analysis.

As shown in Table 5-7, 962 people off the installation are potentially exposed to noise levels greater than 71 dB $L_{eq(24)}$. During a span of 40 years, the average person living in noise zone 80-81 dB $L_{eq(24)}$ may experience a hearing loss of 3 dB, 3.5 dB in zone 81-82, and so forth. For example, a person prior to exposure may perceive a sound at 60 dB and after the prolonged exposure the same sound would be perceived as 57 dB. The most sensitive population in the 10th percentile in the 80-81 dB $L_{eq(24)}$ zone may experience a 7 dB hearing loss. Under baseline conditions, up to 255 people may have a lifetime NIPTS of at least 5 dB attributable to NAS Whidbey Island aircraft noise.

Table 5-7 Average NIPTS and 10th Percentile NIPTS as a Function of L_{eq}

$L_{eq(24)}$	Average NIPTS dB	10th Percentile NIPTS dB	Potentially Affected Population
71-72	0.0	2.5	1
72-73	0.0	3.0	30
73-74	0.5	3.0	104
74-75	0.5	3.5	341
75-76	1.0	4.0	155
76-77	1.0	4.5	99
77-78	1.6	5.0	84
78-79	2.0	5.5	42
79-80	2.5	6.0	31
80-81	3.0	7.0	23
81-82	3.5	8.0	17
82-83	4.0	9.0	12
83-84	4.5	10.0	9
84-85	5.5	11.0	6
85-86	6.0	12.0	4
86-87	7.0	13.5	3
87-88	7.5	15.0	1
88-89	8.5	16.5	0

NIPTS (dB)	Average Population	10th Percentile Population
<5 dB(2)	948	730
5-10 dB(3)	14	232
≥10 dB	0	23
Total ≥5(3)	14	255

Notes:
1 Noise-induced permanent threshold shift (NIPTS) values rounded to nearest 0.5 dB
2 Sum of population less than 84 dB Leq_{24} for average population
3 Sum of population greater than or equal to 84-85 Leq_{24} band for average population

5.2.4 Noise Abatement Measures

NAS Whidbey Island periodically reviews ongoing operational procedures to ensure noise impacts can be minimized whenever and wherever practicable while maintaining flight safety. Numerous noise abatement procedures are contained in the current air operations manual for NAS Whidbey Island. NAS Whidbey Island's policy is to conduct required training and operational flights with a minimum impact on surrounding communities. All aircrews using NAS Whidbey Island facilities are responsible for the safe conduct of their mission while complying with published course rules, noise abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of their aircraft and must be committed to minimizing noise impacts without compromising operational and safety requirements. Additionally, as noted in the Department of Navy's AICUZ Program Guidance (OPNAVINST 11010.36C), the Navy updates AICUZ studies to address noise-reduction strategies and can conduct interim noise studies. Such studies could include, as appropriate, monitoring and a review of operational procedures in response to changes in training requirements and/or changes in land uses in the vicinity of the installation. The Navy provides recommendations on land use compatibility in noise and safety zones; however, it is the local community's responsibility for ensuring compatible land uses within these zones.

5.2.5 Noise Complaint Process

NAS Whidbey Island takes all noise complaints seriously. Calls arriving on the complaint hotline (360-257-2681) are received by the operations duty officer (ODO), who records pertinent information such as the location, time, and description of the noise-generating event, as well as the address and contact information for the caller. The ODO provides copies of any complaints to several persons, including the commanding officer, executive officer, operations officer, and CPLO within one day of receiving the complaint. These persons may, when necessary, initiate an informal inquiry into the allegations of any complainant to determine the validity of those allegations. This inquiry may involve a follow-up call to the complainant. The CPLO maintains a file of noise complaints.

5.3 Air Quality

5.3.1 Air Quality Regulations

National Ambient Air Quality Standards

The CAA is the primary federal statute governing the control of air quality. The CAA designates six pollutants as "criteria pollutants" for which NAAQS have been established to protect public health and welfare. These include particulate matter less than 10 microns in diameter (PM_{10}) and less than 2.5 microns in diameter ($PM_{2.5}$), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and ozone (O_3) (see Table 5-8). O_3 is not an emission; it is created in the atmosphere primarily from the emissions of its precursors, NO_2 and VOCs.

Areas that do not meet NAAQS for criteria pollutants are designated as "nonattainment areas" for that pollutant. Areas that achieve the air quality standard after being designated nonattainment areas are redesignated as "attainment areas" following EPA approval of a maintenance plan. The CAA prohibits federal agencies from engaging in, supporting, providing financial assistance for licensing, permitting, or approving any activity that does not conform to an applicable SIP. Federal agencies must determine that a federal action conforms to the SIP before proceeding with the action. This determination is conducted in accordance with the General Conformity Rule (40 CFR 93).

Table 5-8 National Ambient Air Quality Standards

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 μg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution [78 FR 3086, January 15, 2013][5]	$PM_{2.5}$	primary	Annual	12 μg/m^3	Annual mean, averaged over 3 years
		secondary	Annual	15 μg/m^3	Annual mean, averaged over 3 years
			24-hour	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2013

Notes:

1 Final rule published November 12, 2008. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

2 The official level of the annual nitrogen dioxide standard is 0.053 ppm, equal to 53 ppb, which is shown here to allow comparison to the 1-hour standard.

3 Final rule published March 27, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

4 Final rule published June 22, 2010. The 1971 annual and 24-hour sulfur dioxide standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

5 The EPA has revised the annual primary $PM_{2.5}$ standard by lowering the level to 12.0 micrograms per cubic meter (μg/m^3), and maintaining the 15.0 (μg/m^3) $PM_{2.5}$ standard as a secondary standard,. The final rule became effective on March 18, 2013.

Key:

μg/m^3 = Micrograms per cubic meter.
mg/m^3 = Milligrams per cubic meter.
PM_{10} = Particulate matter less than 10 microns in diameter.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
ppb = Parts per billion.
ppm = Parts per million.

The Northwest Clean Air Agency (NWCAA) is the regional agency responsible for overseeing the state's operating permit program for Island, Skagit, and Whatcom counties. Island County is in attainment of the NAAQS for all criteria pollutants. Because the region is in attainment, the CAA General Conformity Rule does not apply, and a General Conformity Determination is not required.

Hazardous Air Pollutants

In addition to the ambient air quality standards for criteria pollutants, national standards exist for HAPs, which are regulated under Section 112(b) of the 1990 CAA Amendments. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR Part 61). HAPs emitted from mobile sources are called MSATs. MSATs are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects (EPA 2013). In 2001, the EPA issued its first MSATs Rule, which identified 21 compounds as being HAPs that required regulation. A subset of six of these MSAT compounds were identified as having the greatest influence on health and included benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. The EPA issued a second MSAT Rule in February 2007, which generally supported the findings in the first rule and provided additional recommendations for compounds having the greatest impact on health. The rule also identified engine emission certification standards for automobiles, trucks, and off-road vehicles (40 CFR parts 59, 80, 85, and 86; FR 72 No. 37, pp. 8427-8570, 2007).

Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants in mobile sources are to reduce their content in fuel and alter the engine operating characteristics to reduce the volume of pollutants generated during combustion. Because there is a minimal change (or reduction) to all emissions from ground sources, and aircraft and HAPs represent a small percentage of combustion emissions, HAPs were not considered in the 2008 FEIS and are not further evaluated in this SEIS.

Greenhouse Gases

GHGs are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe. Climate change refers to any significant change in measures of climate lasting for an extended period. Global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health (EPA 2012). Many scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere. Worldwide use of fossil fuels is the primary cause of that increase (EPA 2012).

Washington Administrative Code (WAC), Chapter 173-441, establishes a mandatory GHG reporting requirement for facilities that emit 10,000 metric tons of carbon dioxide (CO_2) equivalents or more in a calendar year. A CO_2 equivalent is a metric used to compare emissions from various GHGs based upon their global warming potential.

GHG emissions occur locally, but GHG impacts are both global in scale and cumulative over time. Since Washington State has established specific requirements, GHG emissions that are subject to these requirements are discussed in this chapter and in Chapter 9, Cumulative Impacts.

5.3.2 Existing Emissions

NAS Whidbey Island is the only major source of stationary emissions in Island County, although other major sources are located in Skagit and Whatcom counties. NAS Whidbey Island has a Title V Operating

Permit approved by the NWCAA in 1999. The stationary sources regulated under the issued permit include aviation gasoline storage tanks; jet engine test cells; painting, cleaning, and repair operations; and boilers, furnaces, and generators. In accordance with the Title V Operating Permit, total stationary source emissions are reported on an annual basis. Mobile sources of air pollutants are not considered under the Title V permit. These sources at NAS Whidbey include aircraft, ground service equipment and vehicles, and private and government vehicles (POVs and GOVs [Government-Owned Vehicles]).

Existing P-3C emissions under 2014 baseline conditions are summarized in Table 5-9. Emissions of criteria pollutants result from aircraft flight operations and maintenance run ups of the aircraft. Aircraft emissions were calculated using emission factors provided by the Navy's AESO and operations information obtained from station personnel (Wyle 2013).

Emissions also result from the operation of POVs used by station personnel to commute to work. Existing annual POV emissions were estimated based on the 2014 baseline P-3C personnel loading levels, assuming an average daily commute of 25 miles, completed 250 days per year. VMT emission factors were obtained from "Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks (EPA420-F-08-024)" (EPA 2008a) (see Table 5-9). See Appendix E for emissions calculation information.

Table 5-9 2014 Baseline (No Action Alternative) Emissions at NAS Whidbey Island

Flight Operation/Activity	No. of Operations[1]	Emissions (tpy)				
		CO	NO_x	VOC	SO_2	PM_{10}
P-3C Operations						
Straight-In Arrival LTOs	1,852	34.7	19.6	22.8	6.3	10.0
Touch-and-Go	3,652	1.4	10.4	0.3	2.2	4.4
GCA Pattern	1,811	1.0	7.9	0.2	1.7	3.3
Maintenance Run Ups		15.32	5.62	10.41	2.05	3.25
Total P-3C Emissions		**52.5**	**43.5**	**33.7**	**12.3**	**21.0**
P-3C Personnel POV Emissions		**135.7**	**10.5**	**14.4**	**0.0**	**40.0**
Total 2014 Baseline Annual Emissions		**188.1**	**54.0**	**48.1**	**12.3**	**61.0**

Note:
[1] Operations information from Wyle 2013. An LTO includes a departure and an arrival, and T&G and GCA patterns also include two operations; therefore, total operations listed in Chapter 2.4.2.2 and in the noise analysis will be double these air quality operations totals.

Key:
CO = Carbon monoxide.
GCA = Ground control approach pattern.
LTO = Landing and takeoff operation.
NO_x = Nitrogen oxide.
PM_{10} = Particulate matter less than 10 microns in diameter.
POV = Privately owned vehicle.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOC = Volatile Organic Compounds.

GHG emissions at NAS Whidbey are reported in accordance with WAC, Chapter 173-441. In NAS Whidbey Island's 2011 Air Emission Inventory Report, GHG emissions resulting from stationary sources have been reported by fuel type and are summarized in Table 5-10.

Table 5-10 NAS Whidbey Island GHG Emissions by Stationary Fuel Combustion Sources (CY2011)

Fuel	Million BTUs	Metric Tons CO_2 equivalent
Natural Gas	297,437	15,786
Propane	3,256	201
Diesel	2,084	155
Jet Fuel	20,075	1,455
Total CY2011 NAS Whidbey Stationary GHG Emissions		**17,597**

5.4 Land Use

The study area for land use includes NAS Whidbey Island and those portions of the City of Oak Harbor, Island County, and Skagit County. Land use designations encompass undeveloped and developed land in the study area. Developed land uses range from airfield operations and administrative areas on station to residential and commercial land off station. Undeveloped land is commonly classified as open space or natural areas.

Existing land use conditions, challenges, and recommendations are provided in the following documents: 2005 *Air Installations Compatible Use Zones Study Update for Naval Air Station Whidbey Island's Ault Field and Outlying Landing Field Coupeville, Washington* (Navy NAVFAC Southwest 2005), the *Island County Comprehensive Plan (2011 Update)* (Board of Island County Commissioners et al. 1998), and the *City of Oak Harbor 2010 Comprehensive Plan and Zoning Code* (City of Oak Harbor 2010). These and other land use planning documents are described in Chapter 5.4.3.

5.4.1 NAS Whidbey Island Land Use

Ault Field occupies 4,337 acres on the north end of Whidbey Island in Island County, Washington. The airfield is bordered on the south by the City of Oak Harbor and on the west by the Strait of Juan de Fuca. Approximately 1,040 acres (24 percent) of Ault Field has been developed. The remaining land area is undeveloped and supports various vegetation communities and runway clear zones.

The airfield occupies the northeast portion of Ault Field and has two 8,000-foot intersecting runways, Runways 07/25 and 14/32. Aircraft operations areas are located south and west of the runways and include aircraft parking ramps, taxiways, aircraft maintenance hangars, a passenger terminal, an ATC tower, aircraft maintenance hangars, and various other support facilities. Other developed areas are scattered throughout Ault Field and include housing and administration, operational support, personnel support, and recreational facilities.

A fence surrounds all of Ault Field, except for the area along the Strait of Juan de Fuca shoreline. Access to the airfield is restricted to military and civilian personnel and authorized visitors.

Construction projects associated with the proposed action are proposed in developed and adjacent undeveloped areas in the aircraft operations area south and west of the runways (see Figures 2-6 and 2-7).

5.4.2 Regional Land Use

The majority of land surrounding Ault Field is rural, with large tracts of undeveloped forestland, agricultural land, and scattered residential subdivisions at higher densities. Other land uses in the vicinity of Ault Field include:

- A mixture of residential, industrial/light manufacturing, commercial, parks, and agricultural development south of Ault Field in the City of Oak Harbor.

- Commercial, agricultural, residential, and industrial/light manufacturing uses along State Route 20, which extends along the eastern boundary of Ault Field.
- Rural, residential, agricultural, commercial, and parks, including Deception Pass State Park and Hope Island State Park to the north of Ault Field.
- Joseph Whidbey State Park to the southwest and various public, private, and Navy-owned marinas, boat launches, campgrounds, beaches, hiking trails, and golf courses.

5.4.3 Land Use Consistency with Local Plans, Programs, and Policies

Development within and around NAS Whidbey Island is controlled, guided, or influenced by the following plans, programs, and policies:

- The 2006 NAS Whidbey Island AICUZ Update;
- The 2004 NAS Whidbey Island Activity Overview Plan (AOP);
- NAS Whidbey Island INRMP;
- NAS Whidbey Island Land Use Controls Implementation Plan Final, June 2009
- NAS Whidbey Island 1994 Historic and Archaeological Resources Protection Plan (HARP Plan);
- The Washington Growth Management Act (WGMA);
- Island County 1998 Comprehensive Plan (Updated 2011) and Zoning Ordinance; and
- City of Oak Harbor 2010 Comprehensive Plan and Zoning Ordinance.

Refer to Chapter 10 for further information on the CZMA and consistency with the Washington State Coastal Zone Management (CZM) Program.

2005 NAS Whidbey Island AICUZ Update

The Navy's AICUZ Program is described in Chapter 1.3.5. *The Air Installations Compatible Use Zones Study Update for Naval Air Station Whidbey Island* (Navy NAVFAC Southwest 2005) serves to balance the need for aircraft operations with community concerns over aircraft noise and accident potential. The AICUZ Program was developed in response to growing incompatible urban development around military airfields. The 2005 AICUZ Update identifies noise zones and APZs. Land use compatibility within the noise zones around NAS Whidbey Island is evaluated in Chapter 5.4.4.

APZs are areas where an aircraft mishap is most likely to occur, if an accident were to occur, and are delineated based on historical data and departure, arrival, and pattern flight tracks on and near the airfield runways. The Navy makes recommendations to local planning agencies that developments concentrating large numbers of people, such as apartments, churches, and schools, be constructed outside the APZs.

APZ configurations and dimensions are derived from the AICUZ Instruction. APZs are, in part, based on the number of operations conducted at the airfield—more specifically, the number of operations conducted for specific flight tracks. The three APZs include:

- **Clear Zone**. The Clear Zone extends 3,000 feet beyond the end of the runway; it measures 1,500 feet wide at the end of the runway and 2,284 feet wide at its outer edge.

- **APZ I**. APZ I extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet at its outer edge. APZ I is typically rectangular, although it may follow more than one flight track if each meets the minimum operations threshold.
- **APZ II.** APZ II extends 7,000 feet beyond APZ I, with a width of 3,000 feet. This zone is typically rectangular, although it, too, may follow more than one flight track if each meets the minimum operations threshold.

The NAS Whidbey Island APZs are included in the 2005 AICUZ update and are shown on Figure 5-4 (Navy NAVFAC Southwest 2005). As shown, the majority of the clear zones for NAS Whidbey Island are located on station or offshore in the Strait of Juan de Fuca. The boundaries of APZ I and APZ II extend off station into the local community. In 2006, the City of Oak Harbor added a small strip of land on the south side of the APZs to provide an extra margin of safety. In 2008, Island County expanded their definition of the APZs to cover the entire path of the FCLP pattern around Ault Field. This definition is designed to limit density and congregation of large crowds that would be incompatible with the low-level practice that occurs.

NAS Whidbey Island Activity Overview Plan

The AOP is a land use and facilities plan supporting the long-range vision (15 to 20 years) for NAS Whidbey Island. Prepared in 2004, the AOP is a planning tool for the station and incorporates information from special studies, such as the NAS Whidbey Island Airfield Recapitalization Plan. The AOP includes an analysis of the station's future aircraft and squadron-loading scenarios, including replacement of the P-3C aircraft with the P-8; baseline conditions and future operational needs of the mission-critical, mission-support, and personnel-support departments; and analysis of development constraints and development opportunity areas.

The AOP also contains a strategic action plan that identifies land use policy, land-holdings strategy, and project recommendations. Among these recommendations is the protection of NAS Whidbey Island as a critical Navy air operations asset. The AOP recommends that siting new facilities be consistent with flight line expansion areas and land use restrictions to preserve operations.

Integrated Natural Resources Management Plan

In January 2006, the DoD, the USFWS, and the AFWA entered into a Memorandum of Understanding for a cooperative program of INRMP development. Under this program, the INRMP is updated on a continuous basis to achieve mutually agreed upon fish and wildlife conservation objectives in compliance with the Sikes Act. The Navy prepared and adopted management recommendations and objectives of a revised INRMP for NAS Whidbey Island in compliance with DoDI 4715.3 and the Sikes Act (16 U.S.C. 670a *et seq.*) (NAS Whidbey Island 2014). The overall goal of the plan is to integrate management activities with all programs and mission requirements while sustaining, promoting, and restoring the health and integrity of NAS Whidbey Island ecosystems. The INRMP identifies land, water, plant, fish, and wildlife resources on the installation. The document guides both short-term resource management activities and long-range planning.

The NAS Whidbey Island Environmental Affairs Department is responsible for programmatic oversight, management, and supervision of natural resources management at the air station.

2009 NAS Whidbey Island Land Use Controls Implementation Plan

The Land Use Control Implementation Plan describes the procedures for implementing the institutional and engineering controls required by the RODs for Operable Units (OUs) 1 through 5 on NAS Whidbey Island. The RODs were signed by the U.S. Navy, the EPA, and Washington Department of Ecology. The five RODs specifically addressed are the following:

- OU 1, Ault Field, 20 December 1993, EPA/ROD/R10-94/075

- OU 2, Ault Field, 2 June 1994, EPA/ROD/R10-94/077
- OU 3, Ault Field, 29 March 1995, EPA/ROD/R10-95/113
- OU 4, Seaplane Base, 20 December 1993, EPA/ROD/R10-94/074
- OU 5, Ault Field, 10 July 1996, EPA/ROD/R10-96/142

Historic and Archaeological Resources Protection Plan

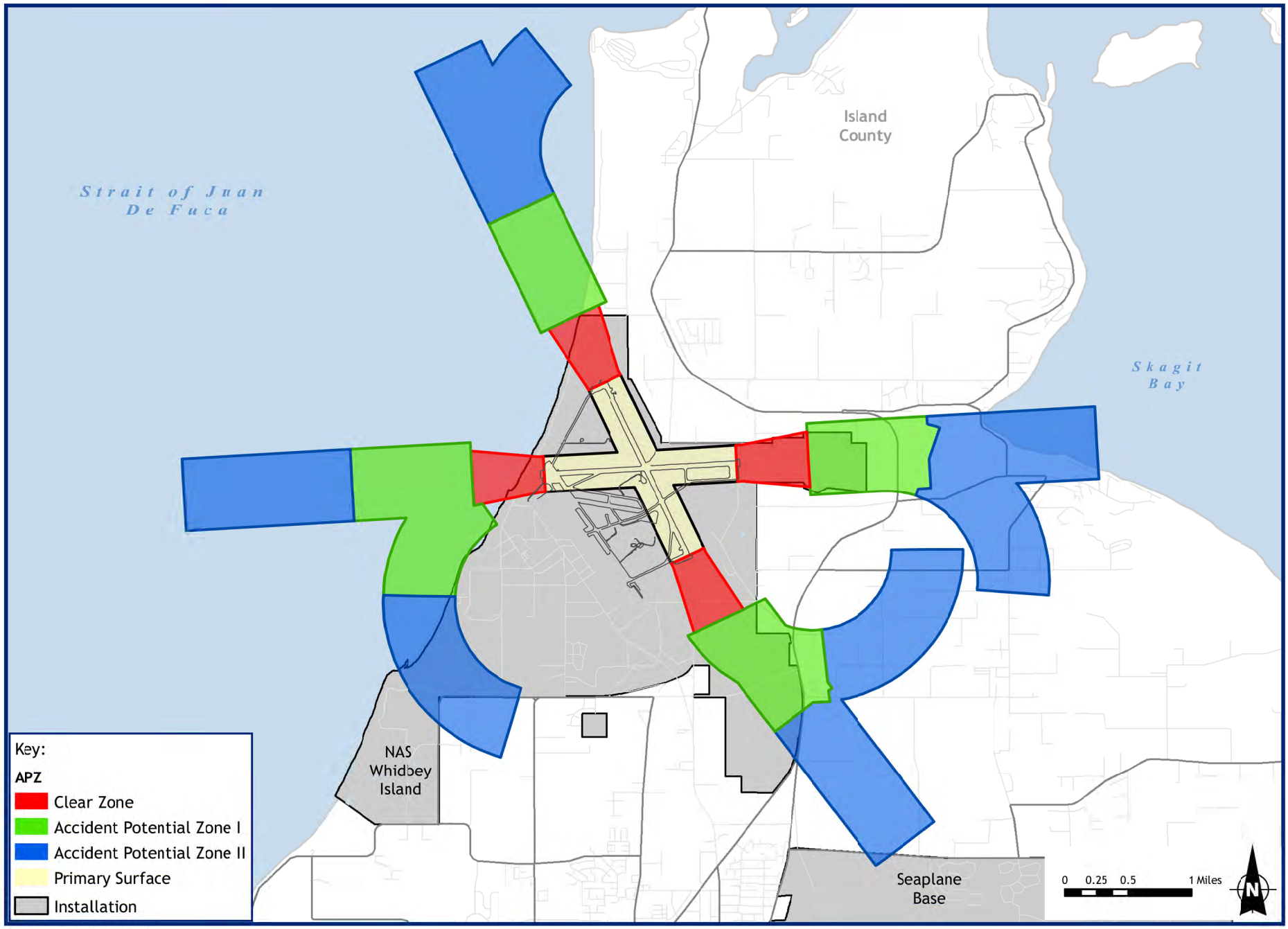
The Navy prepared a HARP Plan in 1994 (Dames and Moore 1994) for NAS Whidbey Island with the goal of protecting and managing cultural resources at the station by preventing or avoiding potential adverse effects of military training and new development. The plan summarizes previous archaeological investigations and historic surveys that have been completed at the station and identifies management actions that should be completed in compliance with Section 106 and Section 110 of the NHPA. The overall goal of the HARP Plan is to assist NAS Whidbey Island in meeting its statutory and regulatory requirements for identification and protection of cultural resources in a manner that is compatible with the facility's mission. NAS Whidbey Island is currently preparing an ICRMP for the installation; the plan is expected to be finalized in early 2014.

Washington State Growth Management Act

The WGMA was adopted in 1990 because the Washington State legislature found that uncoordinated and unplanned growth posed a threat to the environment, sustainable economic development, and the quality of life in Washington. The WGMA requires state and local governments to manage Washington's growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing comprehensive plans and implementing them through capital investments and development regulations. The WGMA has been amended several times, including in 2005, when provisions were added to address development around military installations. The 2005 amendment recognizes that military installations are of particular importance to the economic health of Washington's economy and quality of life. As such, the WGMA requires that county and city comprehensive plans restrict development in the vicinity of military installations that is incompatible with the installation's ability to carry out its mission requirements.

Island County Comprehensive Plan and Zoning Code

Washington State law requires every jurisdiction to have a comprehensive, long-term plan for its future development. The Island County Comprehensive Plan is a guide for the county on how to approach growth and development. The original Island County Comprehensive Plan was adopted in 1984. The Board of Island County Commissioners adopted a more comprehensive and integrated document in 1998 (Board of Island County Commissioners et al. 1998) consisting of ten elements, or chapters; this was most recently updated in 2008. More recent updates of the policy plan, and land use and parks and recreation elements of the plan, were completed in 2011.



Source: ESRI, 2012; Wyle 2007

Figure 5-4
AICUZ APZs at NAS Whidbey Island
Whidbey Island, Washington

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The comprehensive plan acknowledges the county's association with NAS Whidbey Island as well as the impacts associated with aircraft operations at Ault Field. The plan designates an "Airport and Aviation Safety Overlay," which recommends that future land use adjacent to Ault Field be maintained as rural and rural agricultural to encourage low-density development within the air station's noise zones.

Island County adopted the noise contours and APZs from the 2005 NAS Whidbey Island AICUZ, as well as adopted a closed-loop APZ for FCLP pattern operations at Ault Field to implement the airport and aviation safety overlay district through the county's zoning ordinance and other elements of the Island County Code. Existing land uses and zoning are consistent with the Navy's recommendations for land uses within the APZs. The goals and policies in the county's comprehensive plan support the adoption of codes for compatible development within the APZs.

Island County has also adopted an Airport and Aircraft Operations Noise Disclosure Ordinance for property sold, rented, or leased within the noise zones around Ault Field. The disclosure ordinance gives notice to prospective buyers, renters, or lessees that the property of interest is subject to aircraft noise for the northern two-thirds of Island County. Island County also enforces a separate Noise Level Reduction Ordinance, which sets minimum standards for building construction within the noise zones around Ault Field.

Zoning is the primary land use control used by Island County to control development on non-federal land. The majority of parcels under county jurisdiction near Ault Field and within the overlay district are zoned as rural or rural agriculture, with the exception of the area south of Ault Field, which is zoned as an urban growth area. The rural zone generally limits development density to one dwelling unit per 5 acres, while the rural agriculture zone generally limits development density to one dwelling unit per 10 acres, and the urban growth area limits development density to three dwelling units per 5 acres. Within the urban growth zone, the City of Oak Harbor has identified various future land uses, including industrial, planned industrial park, community commercial, open space, and planned business park.

City of Oak Harbor Comprehensive Plan and Zoning Ordinance

Maintaining land use compatibility with NAS Whidbey Island is of paramount importance to the City of Oak Harbor (City of Oak Harbor 2010). A stated goal/policy objective in the comprehensive plan is to prohibit residential development in any area within the 70 dB DNL or greater noise zone. Additionally, the plan promotes residential development to the southwest and away from Ault Field.

The City of Oak Harbor has adopted the same noise contours as Island County to implement the Aviation Environs Overlay Zone through the city's zoning ordinance and other elements of the municipal code. Land within the Aviation Environs Overlay Zone is designated for low-density development. The overlay applies additional standards to properties located within underlying zoning districts. These standards include noise-level reduction requirements ranging between 25 dB and 30 dB, depending on structure type, location within noise zones, and disclosure. The City of Oak Harbor has also adopted a lighting and glare ordinance, helping to ensure the safety of aircraft operations by placing limitations on lighting that can impair a pilot's vision, especially at night.

Existing land use and zoning in the Aviation Environs Overlay Zone are consistent with the Navy's recommendations for land use compatibility within the APZs. The goals and policies in the city's comprehensive plan support adoption of codes for compatible development within the APZs.

5.4.4 Land Use Compatibility Assessment

To determine the compatibility of land use with existing aircraft operations at NAS Whidbey Island, the modeled 2014 baseline noise zone map for the station was overlaid on the 2012 Island and Skagit county zoning maps (see Figure 5-3). Land use designations on the zoning maps were modified slightly as

needed to allow for comparison with the Navy/USMC land use compatibility recommendations under its AICUZ Program (see Appendix F).

Table 5-11 provides the total area, by land use category, within the greater than 65 dB DNL noise zone at NAS Whidbey Island. All land use categories in the less than 65 dB DNL noise zone are considered to be compatible, according to AICUZ guidelines.

Table 5-11 Existing Land Uses within the Greater than 65 dB DNL Noise Zone at NAS Whidbey Island (2014 Baseline) [No Action Alternative]

Land Use	Noise Zone (acres)			Total Acres
	65 to 70 dB DNL	70 to 75 dB DNL	>75 dB DNL	
Agriculture	135	178	689	1,001
Commercial		25	49	74
Forestland/Open Space	307	167	456	929
Industrial/Light Manufacturing	1	77	393	471
Military	616	485	3,659	4,759
Open Water	5,888	4,459	5,225	15,572
Parks	308	360	370	1,037
Residential	607	482	221	1,310
Rural	1,336	1,546	5,360	8,242
Total Acres	**9,196**	**7,779**	**16,421**	**33,396**

Source: Wyle 2013

Note: Some totals may not sum exactly due to rounding.

Key:
dB = Decibel.
DNL = Day-night average sound level.

Residential land use is incompatible in noise zones greater than 65 dB DNL (OPNAVINST 11010.36C). Under baseline conditions, 1,310 acres of residential land is within the greater than 65 dB DNL noise zone. Approximately 46 percent of this residential land is within the 65 to 70 dB DNL noise zone; 37 percent is within the 70 to 75 dB DNL noise zone; and 17 percent is within the greater than 75 dB DNL noise zone.

5.5 Socioeconomics

The study area for socioeconomic resources includes NAS Whidbey Island as well as surrounding municipalities with economic ties to NAS Whidbey Island (e.g., Island and Skagit counties; the cities of Oak Harbor and Anacortes; and the Town of Coupeville). This chapter on the affected socioeconomic environment discusses population and housing in Chapter 5.5.1, the economy in Chapter 5.5.2, taxes and revenues in Chapter 5.5.3, education in Chapter 5.5.4, and environmental justice in Chapter 5.5.5.

5.5.1 Population and Housing

5.5.1.1 Population

NAS Whidbey Island

NAS Whidbey Island is the major employer in the county. As shown on Table 5-12, 6,991 military personnel were assigned to NAS Whidbey Island in 2012. The number of military personnel assigned to the station has gradually declined since 2007 (see Table 5-11).

Table 5-12 Military Personnel Loading Summary for NAS Whidbey Island

Fiscal Year	Assigned Military Personnel
2007	8,131
2008	7,684
2009	7,624
2010	7,527
2011	7,259
2012	6,991

Source: Smith 2013.

Note: This table includes only military personnel; civilian employees at NAS Whidbey Island are not included in these totals.

The Navy is transitioning from its P-3C aircraft to P-8A aircraft at NAS Whidbey Island. In accordance with the 2008 ROD, the transition is expected to begin in the 2016-2017 timeframe with full transition in 2019. The transition from P-3C aircraft to P-8A aircraft will lead to a gradual increase in the number of personnel assigned to NAS Whidbey Island. During baseline year 2014, 1,858 P-3C personnel will be stationed at NAS Whidbey Island, comprising 487 officers and 1,371 enlisted personnel. No civilians or contractors will be assigned to the P-3C aircraft squadrons. No personnel associated with P-8A aircraft will be present at NAS Whidbey Island under 2014 baseline conditions.

Island County and Region

Table 5-13 indicates where personnel stationed at or employed by NAS Whidbey Island reside. As shown on the table, the majority of these personnel live within Island County (approximately 85 percent), with the remaining personnel living in Skagit County or in other communities outside the immediate region. These figures include both those personnel living in military housing (37 percent) as well as those renting or owning homes in the neighborhoods surrounding the station. The City of Oak Harbor is home to approximately 45 percent of those individuals stationed or employed by NAS Whidbey Island (see Table 5-13).

Table 5-13 Personnel Stationed and Employed at NAS Whidbey Island by Place of Residence

Jurisdiction	Percent of Personnel
Island County	
NAS Whidbey Island	37.0
City of Oak Harbor	44.6
Town of Coupeville	3.7
Subtotal	**85.3**
Skagit County	
City of Anacortes	4.8
Mount Vernon	3.2
Subtotal	**8.0**
Other (municipalities in various counties, each with less than 3 percent)	6.7
Total	**100**

Source: Department of the Navy 2005b.

The communities surrounding NAS Whidbey Island have experienced moderate population growth since 2000. Table 5-14 presents population totals for Island County, Oak Harbor, Coupeville, and Anacortes in 2000 and 2010. Over the past decade, these communities have had population growth rates that range

from a high of 11.5 percent in the City of Oak Harbor to a low of 6.3 percent in the Town of Coupeville (see Table 5-14). Total population in Island County is expected to continue to grow. By 2020, the State of Washington predicts that Island County will have 82,735 residents, an increase of 5.4 percent over its 2010 population (State of Washington 2012).

Table 5-14 Regional Population around NAS Whidbey Island (2000 and 2010)

Jurisdiction	2000	2010	Percent Change from 2000 to 2010
Island County	71,558	78,506	9.7
City of Oak Harbor	19,795	22,075	11.5
Town of Coupeville	1,723	1,831	6.3
City of Anacortes	14,557	15,778	8.4

Sources: U.S. Census Bureau 2000g; 2000h; 2000i; 2000j; 2010e; 2010f; 2010g; 2010h.

5.5.1.2 Housing

NAS Whidbey Island

The Navy provides housing to eligible military personnel stationed at NAS Whidbey Island in either bachelor (officer and enlisted) quarters or family housing units. Military personnel stationed at NAS Whidbey Island reside either in military-controlled bachelor/family housing or in private housing within the local communities surrounding the station. NAS Whidbey Island uses the Office of the Secretary of Defense Housing Requirement Determination Process Policy Guidance in determining on-station housing requirements. Under this guidance, the construction, operation, and maintenance of government housing is considered only if the private sector is not capable of providing military members with acceptable housing. In accordance with Department of Defense Manual: DoD Housing Management (Number 4165.63-M), factors utilized to determine whether a housing unit in the local community is acceptable include its affordability, location, features, and physical condition.

During FY 2011, a total of 4,427 military families at NAS Whidbey Island required housing units. At that time, a total of 4,994 adequate family housing units were available to military families in the area, including 1,710 family housing units under military control and 3,284 acceptable private housing units in the community. Consequently, there was an effective housing surplus of 567 units for military families (see Table 5-15).

Table 5-15 Total Military Family Housing Requirements and Available Assets at NAS Whidbey Island in FY 2011 and Projected in FY 2016

Type of Housing	FY 2011	FY 2016
Total Military Family Housing Requirement	4,427	4,103
Military-Controlled Units	1,710	1,504
Private Housing Units	3,284	3,107
Surplus (Deficit) of Military Family Housing Assets	**567**	**508**

Source: McClary 2013.

Due to changes in personnel strength and composition at NAS Whidbey Island by FY 2016, it is projected that the total requirement for family housing at the station will be 4,103 units. During the same time, 4,611 adequate housing units (1,504 under military control and 3,107 acceptable private housing units in the community) would be expected to be available, resulting in an effective housing surplus of 508 units for military families in FY 2016 (see Table 5-15).

The *Housing Requirements and Market Analysis: Whidbey Island Naval Air Station, Washington, 2008-2013* projected that 2,646 military bachelors would require housing in 2013 and that a deficit of 410 units would occur that year (SAIC 2008). Table 5-16 provides a summary of the analysis used to determine the deficit, which is explained in more detail below.

Table 5-16 Projected Housing Availability for Military Bachelors at NAS Whidbey Island in 2013

Type of Housing	Units
Bachelor Housing Requirement	2,646
On-Base Requirement	742
Private Sector Shortfall	703
Total Bachelors Requiring Government Quarters	**1,445**
Bachelor Housing Capacity	1,035
Surplus (Deficit) of Bachelor Housing Capacity	**(410)**

Source: SAIC 2008.

Of the 2,646 military bachelors projected to require housing in 2013, 742 must be housed on station because they are in pay grades E1 to E3 or in pay grade E4 with less than four years' service. Of the remaining 1,904 military bachelors who may live off station in the community, 1,705 are expected to prefer rental properties and 199 are expected to prefer owner-occupied homes. Military bachelors seeking an owner-occupied home are expected to have no difficulty acquiring one. Of the 1,705 military bachelors preferring rental units in the community, only 1,002 are expected to be able to obtain acceptable properties. The remaining 703 personnel would be required to either live on station in military quarters, if available, or to rent units in the community that do not meet the Navy's definition of acceptability. However, the available inventory of bachelor housing on station would be expected to be 1,035 units, resulting in a deficit of 410 housing units for unaccompanied military personnel in 2013 (SAIC 2008). Although a bachelor housing deficit is shown, the station has plans to increase capacity by reverting to a pre-2010 policy under which sailors check out of rooms during deployment and converting an under-utilized Navy Gateway Inns and Suites facility into bachelor housing (McClary 2013).

Island County and Region

Table 5-17 provides information on the regional housing market surrounding NAS Whidbey Island.

The total number of housing units increased throughout the region between 2000 and 2010. In Island County, total housing units increased by 24 percent, or by more than 7,800 units. Similarly, 1,781 new housing units were built in Oak Harbor, 119 were built in Coupeville, and 1,129 were built in Anacortes during the past decade. During the same time period, vacancy rates increased in Island County and in these municipalities (see Table 5-17).

Oak Harbor has a low owner-occupancy rate and a high renter-occupancy rate, most likely due to its proximity to NAS Whidbey Island and the large number of military personnel who tend to rent in the local community rather than live on station or purchase homes. In 2010, the vacancy rates for communities located near the station ranged from 9.1 percent in the City of Anacortes to 13.6 percent in the Town of Coupeville (see Table 5-17). The vacancy rate in Island County overall was 18.6 percent. This vacancy rate has continued to increase, possibly due to the continued reduction in military personnel stationed at NAS Whidbey Island. By 2011, the overall vacancy rate in Island County reached 19.1 percent (U.S. Census Bureau 2013o). The higher vacancy rates in Island County and in Coupeville reflect that these areas are used for recreational purposes, and many housing units are second homes or vacation properties. In 2010, approximately 63 percent of the vacant units in Island County and 46 percent of the

vacant units in the Town of Coupeville were classified as being "for seasonal, recreational, or occasional use."

Table 5-17 Regional Housing Availability around NAS Whidbey Island (2000 and 2010)

Jurisdiction	Housing Units				Percent Owner-Occupied[1]	Percent Renter-Occupied[2]	Percent Vacancy Rate[3]
	Owner-Occupied	Renter-Occupied	Vacant	Total			
2000							
Island County	19,473	8,311	4,594	32,378	70.1	29.9	14.2
City of Oak Harbor	3,172	4,161	439	7,772	43.3	56.7	5.6
Town of Coupeville	456	281	77	814	61.9	38.1	9.5
City of Anacortes	4,190	1,896	465	6,551	68.8	31.2	7.1
2010							
Island County	23,231	9,515	7,488	40,234	70.9	29.1	18.6
City of Oak Harbor	3,979	4,698	876	9,553	45.9	54.1	9.2
Town of Coupeville	492	314	127	933	61.0	39.0	13.6
City of Anacortes	4,554	2,426	700	7,680	65.2	34.8	9.1

Sources: U.S. Census Bureau 2000g, 2000h, 2000i and 2000j; 2010e, 2010f, 2010g and 2010h.

Notes:

1 Percent Owner-Occupied is calculated as the number of owner-occupied housing units divided by the sum of owner-occupied and renter-occupied housing units.

2 Percent Renter-Occupied is calculated as the number of renter-occupied housing units divided by the sum of owner-occupied and renter-occupied housing units.

3 Percent Vacancy Rate is defined as the number of vacant housing units divided by total housing units.

5.5.2 Economy

5.5.2.1 NAS Whidbey Island

According to a 2010 report that analyzed the economic impact of DoD expenditures in the State of Washington, the Navy Region Northwest (which includes Naval Base Kitsap and Naval Station Everett in addition to NAS Whidbey Island) employed just over 39,000 persons, had a payroll of approximately $2.08 billion, and was responsible for approximately $52 million in other expenditures in FY 2009 (Washington Economic Development Commission 2010).[12]

The report noted that the State of Washington's defense installations were responsible for $7.9 billion in expenditures in FY 2009 and that companies in the state received $5.2 billion in DoD contracts in that year. In particular, companies in Island County received almost $136 million in DoD contracts (Washington Economic Development Commission 2010).

After deducting that part of the defense installations' expenditures and DoD contracts spent in other states, the State of Washington's defense installations contributed almost $8.7 billion in expenditures directly into the state's economy in FY 2009. These expenditures generated an additional indirect or multiplier impact on the state's economy. In FY 2009, the defense installations and the DoD contracts

[12] A 2004 study that analyzed the economic impact of the military in the State of Washington estimated that nearly 88 percent of all economic activity in Island County was directly and indirectly linked to the Navy presence—specifically, NAS Whidbey Island—through direct impacts as employment, payrolls, retiree pension, payments to private health care providers, and purchases of goods and services from local vendors (State of Washington Office of Financial Management 2004).

resulted in a total (direct and indirect) economic impact of almost $12.2 billion in the State of Washington, an amount equivalent to almost 4 percent of the state's gross state product (i.e., the final value of all goods and services produced in the state) in that year (Washington Economic Development Commission 2010).

5.5.2.2 Island County and Region

The military is a major employer in Island County. As shown in Table 5-18, in 2011, the military directly accounted for 18.5 percent of total employment in Island County. When the indirect and induced employment impacts associated DoD spending are taken into account, this number of jobs in Island County associated with the military becomes much greater. However, the percentage of total direct employment accounted for by the military was higher in 2001 (24.0 percent) and 2005 (23.8 percent), indicating greater diversification of the local economy and a slight decline in military employment in the county over the past decade (see Table 5-18).

Table 5-18 Percent Employed by the Military in Island County (2001, 2005, and 2011)

Year	Percent Employed by the Military
2001	24.0
2005	23.8
2011	18.5

Sources: U.S. Department of Commerce, 2013d, 2013e and 2013f

The importance of the Navy to the regional economy can be seen in Table 5-19, which lists the top ten private and government employers in Island County. As shown on the table, NAS Whidbey Island is the county's top employer by a significant margin.

Other large employers include the Whidbey General Hospital, the Oak Harbor School District, and the Whidbey Island Bank (see Table 5-19).

Table 5-19 Top Private and Government Employers in Island County in 2010

Sector	Employer	Employees
Government	NAS Whidbey Island[1]	10,000
Private	Whidbey General Hospital	700
Government	Oak Harbor School District	534
Private	Whidbey Island Bank	400
Government	Island County	393
Private	Navy Exchange	250
Government	Skagit Valley Community College	220
Private	Wal-Mart Stores, Inc.	210
Private	Nichols Brothers Boat Builders	185
Government	South Whidbey School District	155

Source: Island County Economic Development Council 2010.

Note:
[1] Includes military personnel and civilian employees and contractors.

The importance of the medical and educational sector to the local economy can be seen in the data on Table 5-20. Between 2007 and 2011, approximately 20.5 percent of the county's employed civilian labor force worked in the education, health, and social services industry. Other large employment sectors were the retail trade industry, which accounted for 12.8 percent of the civilian jobs; the manufacturing industry, which accounted for 10.2 percent of the civilian jobs; and public administration, which accounted for 9.6 percent of the civilian jobs in the county (see Table 5-20).

Table 5-20 2007-2011 Percent of Total Civilian Employment by Industrial Sector for Island County, Washington (5-Year Estimates)

Sector	Island County (%)
Agricultural, Forestry, Fishing, and Mining	1.1
Construction	8.5
Manufacturing	10.2
Wholesale Trade	1.6
Retail Trade	12.8
Transportation and Warehousing	4.4
Information	1.9
Finance, Insurance, and Real Estate	5.9
Professional, Scientific, and Management Services	9.2
Education, Health, and Social Services	20.5
Arts, Entertainment, Recreation, and Accommodations and Food Service	8.3
Other Services	6.1
Public Administration	9.6

Source: U.S. Census Bureau 2013g

Note: Total may not add to 100 percent due to rounding.

As shown on Table 5-21, unemployment rates in Island County and in the State of Washington have decreased since 2010. In 2012, the unemployment rate in Island County was 8.2 percent. During the same time, the statewide unemployment rate was 8.3 percent. Both of these rates were slightly above the national average monthly unemployment rate of 8.1 percent (U.S. Department of Labor 2013i).

Table 5-21 Total Employment and Unemployment Rates in the State of Washington and Island County (2010-2012)

Jurisdiction	2010		2011		2012[1]	
	Employment	Unemployment Rate (%)	Employment	Unemployment Rate (%)	Employment	Unemployment Rate (%)
Island County	29,393	9.4	28,823	9.1	29,122	8.2
State of Washington	3,167,398	9.9	3,165,348	9.2	3,210,749	8.3

Source: US Department of Labor 2013c, 2013d and 2013e

Note:
[1] Employment totals and the unemployment rates were calculated using data that did not include December (for which data were unavailable at the time of publication) and which included provisional data for November.

Table 5-22 shows median household income, median family income, and per capita income statistics for the cities of Anacortes and Oak Harbor, the Town of Coupeville, Island County, and the State of Washington. Island County had a median household income level that was greater than the statewide median household income level of $58,890, and the City of Anacortes had a per capita income level greater than the statewide per capita income level of $30,481. In contrast, the cities of Oak Harbor and Anacortes and the Town of Coupeville each had median household and median family income levels below the statewide average (see Table 5-22).

Table 5-22 2007-2011 Income Levels for Island County, the City of Anacortes, the Town of Coupeville, the City of Oak Harbor, and the State of Washington (5-Year Estimates)

Income	Island County	City of Anacortes	Town of Coupeville	City of Oak Harbor	State of Washington
Median Household Income	$59,328	$57,901	$44,706	$50,372	$58,890
Median Family Income	$70,038	$70,456	$58,688	$56,198	$71,250
Per Capita Income	$30,352	$32,067	$27,412	$22,679	$30,481

Source: U.S. Census Bureau 2013g

5.5.3 Taxes and Revenues

During FY 2011, Island County Government collected $63,597,495 in revenues and expended $63,014,380. The major sources of revenue for Island County Government were property taxes and local sales taxes, inter-government revenues (i.e., grants), and charges for services (Island County Government 2012). Based upon the 2011 financial data and the 2010 census population total for Island County, the local per capita revenues were $810 and per capita expenditures were $803.

5.5.4 Education

The majority of students connected with NAS Whidbey Island attend schools in the Oak Harbor School District. The district has eight schools plus a program for alternative learners and a cooperative service for home-schooled students (Oak Harbor School District 2013). In the 2011-12 school year, the Oak Harbor School District employed 248 full-time teachers and had a total enrollment of 5,766 students, of which 3,045 were from military families (Oak Harbor School District 2012; State of Washington 2013). There are 931 school-aged children who attend local schools (K-12) and live in NAS Whidbey Island Navy family housing. The majority of these (911students) attend public schools in the Oak Harbor School District, while 20 attend private schools (Kovach 2013). During the 2011-2012 school year, total revenues for the district were approximately $9,000 per student, and in 2012 the district received almost $3.8 million in Federal Impact Aid (State of Washington 2013; Oak Harbor School District 2012). Schools in the Oak Harbor District are currently operating well below capacity and have fewer students than is optimal. Between 2002 and 2010, total enrollment in the district had declined by approximately 1,100 students (Schulte 2013).

5.5.5 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations. In addition, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, issued in 1997, directs federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children.

In this analysis, minority and low-income populations and children were defined as follows:

- **Minority.** Individuals who are Black or African American, American Indian and Alaska Native, Asian[13], Native Hawaiian and other Pacific Islander[14], or persons of two or more races (a separate distinction has been made for people of Hispanic or Latino[15] origin).
- **Low-Income.** Individuals living below the poverty level as defined by the U.S. Census Bureau.
- **Children.** Individuals under the age of 18.

Statistics pertinent to the study area surrounding NAS Whidbey Island are summarized in Table 5-23. The geographic areas compared in this environmental justice analysis are the State of Washington, Island County, Oak Harbor, Coupeville, and Anacortes.

The percent minority is lower in Island County, Coupeville, and Anacortes than in the State of Washington but higher in Oak Harbor than in the state as a whole. Island County, Oak Harbor, Coupeville, and Anacortes all have a lower percent Hispanic or Latino population than the State of Washington. The percentage of low-income individuals is not as high in Island County, Oak Harbor, and Anacortes as it is in the State of Washington. However, the percentage of low-income individuals in Coupeville is higher than the statewide average. Finally, the percentage of children is lower in Coupeville, Anacortes, and Island County than in the state as a whole but higher in Oak Harbor (see Table 5-23).

Table 5-23 Environmental Justice Statistics for NAS Whidbey Island (2010)

Jurisdiction	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Low-Income[1]	Percent Children
State of Washington	6,724,540	22.7	11.2	12.5	23.5
Island County	78,506	13.9	5.5	8.3	20.8
City of Oak Harbor	22,075	27.4	9.3	9.2	28.3
Town of Coupeville	1,831	12.8	9.0	13.0	17.1
City of Anacortes	15,778	8.5	5.0	8.0	19.6

Source: U.S. Census Bureau 2013e, 2013f, 2013g, 2013h, 2010e, 2010f, 2010g and 2010h

Note:
[1] Percent not available from the 2010 Census; estimate provided from the 2007-2011 American Community Survey.

Table 5-24 lists the census block groups and census tracts near NAS Whidbey Island within the modeled 2014 baseline greater than 65 dB DNL noise zone. This table also provides information on the minority and Hispanic/Latino populations, the percentage of children that reside within the census block groups, and the percentage of low-income residents within these census tracts. See Figure 5-5 for the location of these census tracts.

[13] Asian includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, and Other Asian alone, or two or more Asian categories.

[14] Native Hawaiian and other Pacific Islander includes Native Hawaiian, Guamanian or Chamorro, Samoan, and other Pacific Islander alone or two or more Native Hawaiian and other Pacific Islander categories.

[15] Hispanic or Latino (of any race) includes Mexican, Puerto Rican, Cuban, and other Hispanic or Latino composed of people whose origins are from the Dominican Republic, Spain, and Spanish-speaking Central or South American Countries.

Table 5-24 Environmental Justice Statistics for Census Block Groups within the Modeled 2014 Baseline (No Action Alternative) Noise Zones[1] at NAS Whidbey Island

Census Tract	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Low-Income[2]	Percent Children
Block Group 1, Census Tract 9701	1,102	16.5	4.3	11.5	23.9
Block Group 2, Census Tract 9701	1,502	11.3	3.5	11.5	19.4
Block Group 1, Census Tract 9702	1,633	27.9	12.8	24.0	6.3
Block Group 1, Census Tract 9703	791	20.7	9.4	7.2	22.9
Block Group 2, Census Tract 9703	1,203	10.4	8.5	7.2	23.6
Block Group 3, Census Tract 9703	1,044	11.0	4.4	7.2	19.5
Block Group 4, Census Tract 9703	1,951	9.0	4.1	7.2	18.0
Block Group 1, Census Tract 9704	951	30.5	14.2	14.7	27.5
Block Group 2, Census Tract 9704	2,256	27.2	8.5	14.7	25.8
Block Group 3, Census Tract 9704	2,924	25.5	7.1	14.7	27.7
Block Group 1, Census Tract 9706.01	1,299	36.1	9.9	10.2	25.3
Block Group 2, Census Tract 9706.01	981	27.8	6.6	10.2	24.4
Block Group 3, Census Tract 9706.01	906	30.7	11.9	10.2	21.1
Block Group 3, Census Tract 9706.02	1,365	29.3	6.9	10.2	23.6
Block Group 1, Census Tract 9707	1,111	23.5	9.3	9.2	18.3
Block Group 1, Census Tract 9708	1,484	22.0	6.7	4.2	23.7
Block Group 1, Census Tract 9708	1,222	24.0	8.7	4.2	19.6
Block Group 1, Census Tract 9709	1,123	20.6	8.5	11.2	45.9
Block Group 2, Census Tract 9709	2,097	34.4	16.2	11.2	40.3
Block Group 3, Census Tract 9709	1,581	24.4	13.3	11.2	45.4
Block Group 1, Census Tract 9403	1,174	5.5	3.4	6.1	16.2

Table 5-24 Environmental Justice Statistics for Census Block Groups within the Modeled 2014 Baseline (No Action Alternative) Noise Zones[1] at NAS Whidbey Island

Census Tract	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Low-Income[2]	Percent Children
Block Group 2, Census Tract 9403	1,579	5.1	1.7	6.1	15.5
Block Group 1, Census Tract 9408	2,278	31.0	2.2	18.6	19.0
Block Group 2, Census Tract 9521	658	10.4	10.0	6.8	18.4
Block Group 3, Census Tract 9527	906	10.6	9.5	6.8	21.4

Notes:
1 Noise zones represented in this table are for the greater than 65 dB DNL zone.
2 Percent low-income is based on census-tract-level data.

5.6 Topography and Soils

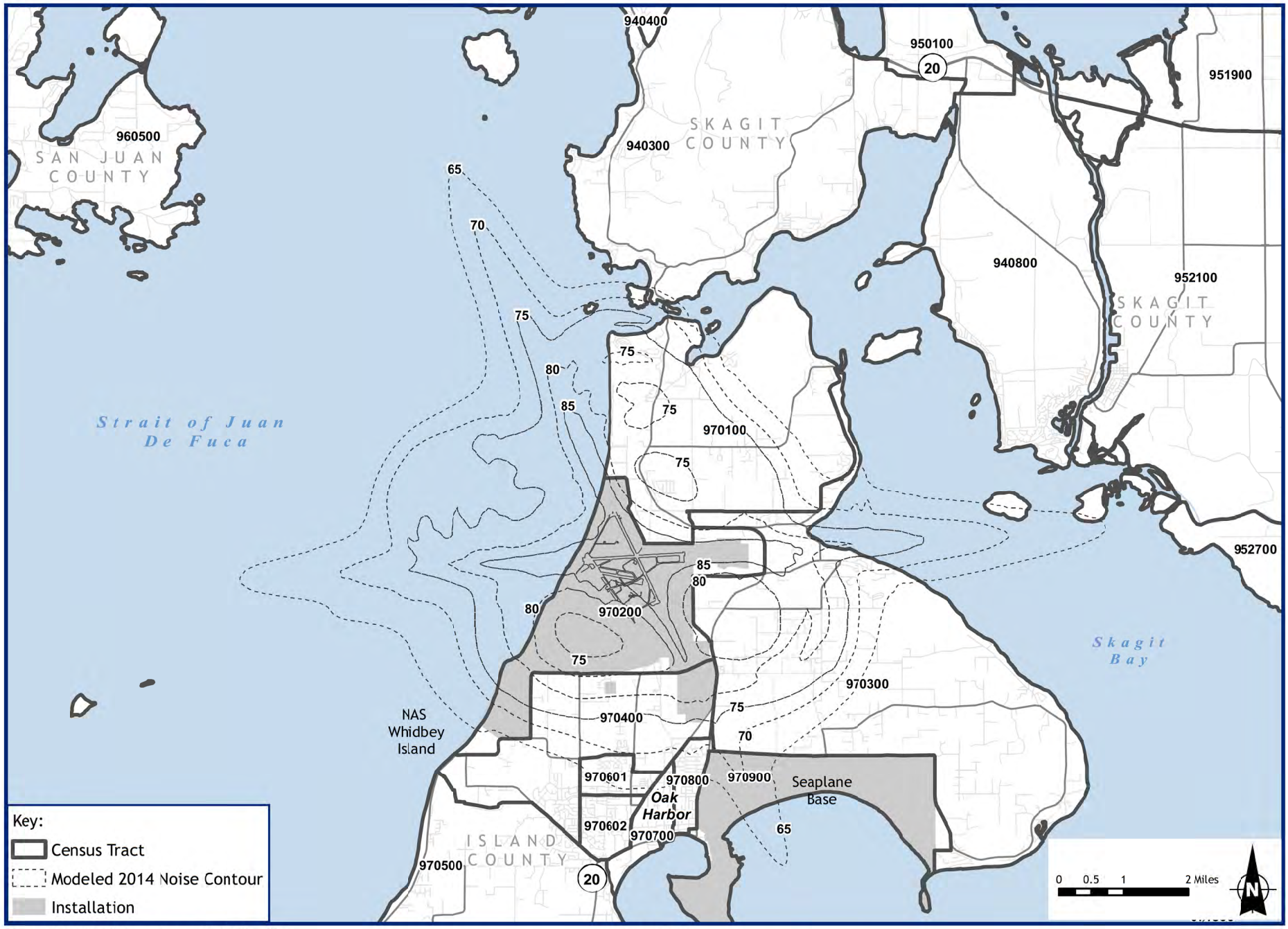
NAS Whidbey Island comprises the study area for topography and soils. Whidbey Island lies within the Puget Sound Lowland, a topographic and structural depression between the Olympic Mountains and the Cascade Range. Topography at Ault Field consists mainly of gentle to moderate slopes with elevations ranging from sea level to approximately 220 feet msl. The developed area of Ault Field, including the airfield and surrounding facilities, is in a level, low-lying area about 20 to 50 feet msl. Approximately 515 acres of this area were filled and leveled for construction of the station's taxiways and runways. Steep slopes occur mainly along the shoreline of the station. Ault Field is relatively flat to gently sloped with elevations ranging from 10 feet to approximately 50 feet msl.

Forty-one soil types are mapped within the boundaries of NAS Whidbey Island. Soils mapped by the NRCS include Sholander, cool-Spieden complex, and Urban Land-Coupeville-Coveland cool complex (NRCS 2012). These somewhat poorly drained soils are generally found in valleys and are made up of glacial drift, glacial outwash, dense glaciomarine deposits, and organic material. Typical soil profiles contain gravelly loam, gravelly sandy loam, and sandy loam soils (NRCS 2008). Areas also occur that have been previously filled to construct the airfield and support facilities, so natural surface soils do not occur in these areas.

5.7 Water Resources and Wetlands

NAS Whidbey Island's Ault Field and Seaplane Base are the study area for water resources and wetlands. Seaplane Base is included as part of the study area because the Navy plans to use the Crescent Harbor portion of Seaplane Base to mitigate any wetland impacts that may result from the proposed action. The following discussion describes station-wide water resources and wetlands for context as well as occurrence of these resources within the proposed construction area.

The Federal Water Pollution Control Act, as amended by the CWA, restores and maintains the chemical, physical, and biological integrity of the nation's waters. The CWA regulates the discharge of pollutants from point sources into waters of the U.S. The CWA, as amended in 1987, requires each state to establish water quality standards for its surface waters derived from the amount of pollutants that can be assimilated by a body of water without deterioration of a designated use. The CWA prohibits spills, leaks, or other discharges of oil or hazardous substances into the waters of the U.S. in quantities that may be harmful. The CWA limits any discharge of pollutants to a level sufficient to ensure compliance with the



Source: ESRI, 2010; US Census Bureau, 2010; Wyle, 2013.

Figure 5-5
2010 Census Tracts Wholly or Partially within Modeled 2014 Baseline
DNL Noise Contours at NAS Whidbey Island
NAS Whidbey Island, Washington

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state water quality standards. Direct discharges of effluents are regulated under the NPDES permits issued by the EPA or under state NPDES programs approved by EPA.

5.7.1 Surface Water

Ault Field and the mitigation site at the Seaplane Base are located in the upper Puget Sound basin, at the eastern end of the Strait of Juan de Fuca. Defined by the U.S. Geological Survey as a 95-mile-long channel, the Strait of Juan de Fuca is the principal outlet for the Georgia Strait and Puget Sound, connecting both to the Pacific Ocean (USGS 2007). NAS Whidbey Island includes 15.5 miles of shoreline bordering the inland estuarine waters of Puget Sound. These waters include the Strait of Juan de Fuca, Admiralty Inlet, Oak Harbor, Crescent Harbor, and Saratoga Passage. The eastern end of Ault Field is approximately 2 miles west of Dugualla Bay. This water body is on the northeast corner of Whidbey Island and leads into the larger Skagit Bay to the east.

No naturally occurring rivers, streams, lakes, or ponds are present on Ault Field. The original shallow, meandering watercourses that were present on Ault Field have been channelized and straightened into a series of ditches that now comprise the station's storm water conveyance system (NAS Whidbey Island 2014). These ditches have a total length of approximately 20 miles.

Approximately 1,535 linear feet of maintained drainage ditches bisect the proposed construction area at Ault Field. These ditches range from approximately 10 to 40 feet wide at the top of bank, have steep banks, and maintain water flow throughout most of the year. Water flows to these ditches from surrounding storm water runoff and from the adjacent wetlands.

Historically, the Crescent Bay Marsh, which contains the mitigation site, was hydraulically connected to the bay by a channel located in the southwestern portion of the marsh. In the 1910s, the marsh was diked and ditched for agricultural use. The channel inlet was replaced with a gated culvert, allowing seasonal management of on-site water levels and blockage of any tidal return (flood tide) flows. Ditches were constructed to improve site drainage. Subsequently, the marsh surface subsided approximately three feet below natural marsh elevations due to soil decomposition and compaction.

The Navy entered into a partnership with Skagit Cooperative, made up of the Swinomish and the Sauk-Suiattle tribes, to restore a portion of the Crescent Bay Marsh. In 2009, the tidal gate was removed and a bridge was constructed over the inlet location. This effort re-established full tidal action to the lower portion of the Crescent Bay Marsh. Crescent Creek, a channelized, non-fish-bearing, perennial stream enters the northwestern border of the marsh and the site via a culvert under West Crescent Harbor Road.

5.7.2 Water Quality

The waters around Ault Field are generally clear except during storms, when turbidity increases temporarily. Water quality in the area of Ault Field is considered good for the eastern Strait of Juan de Fuca. According to the 2012 CWA 303d list for Washington State (a list, compiled every two years, of water bodies that do not meet the CWA requirements), no impaired water bodies are listed on or near Ault Field (Washington Department of Ecology 2012a, 2012b).

Impervious surfaces cover approximately 600 acres (14 percent) of Ault Field. The Clover Valley watershed drains most of this impervious surface, including the runways, taxiways, hangars, auxiliary buildings, and support roadways. A primary surface drainage system comprising numerous swales and ditches conveys water from Ault Field to Clover Valley stream, which flows east toward the Dugualla Lagoon and Dugualla Bay (see Figure 5-6). The Dugualla Lagoon serves as a detention basin for drainage from approximately 7,000 acres of land drained by the ditch network. Constructed in the 1940s, the lagoon was maintained previously by various government entities.

Dugualla Lagoon provides limited storm water storage and minimal water quality treatment capacity. Water is then discharged from Dugualla Lagoon to Dugualla Bay via a system of pumps. NAS Whidbey Island currently maintains the pumping station that pumps water from the lagoon into Dugualla Bay in order to prevent flooding of Ault Field and nearby land (URS Consultants, Inc. 1995). By controlling this pumping system, the Navy maintains the current water surface elevation in Dugualla Lagoon at its maximum. Prior to installation of this system of pumps, two tidal flumes conveyed flows to Dugualla Bay.

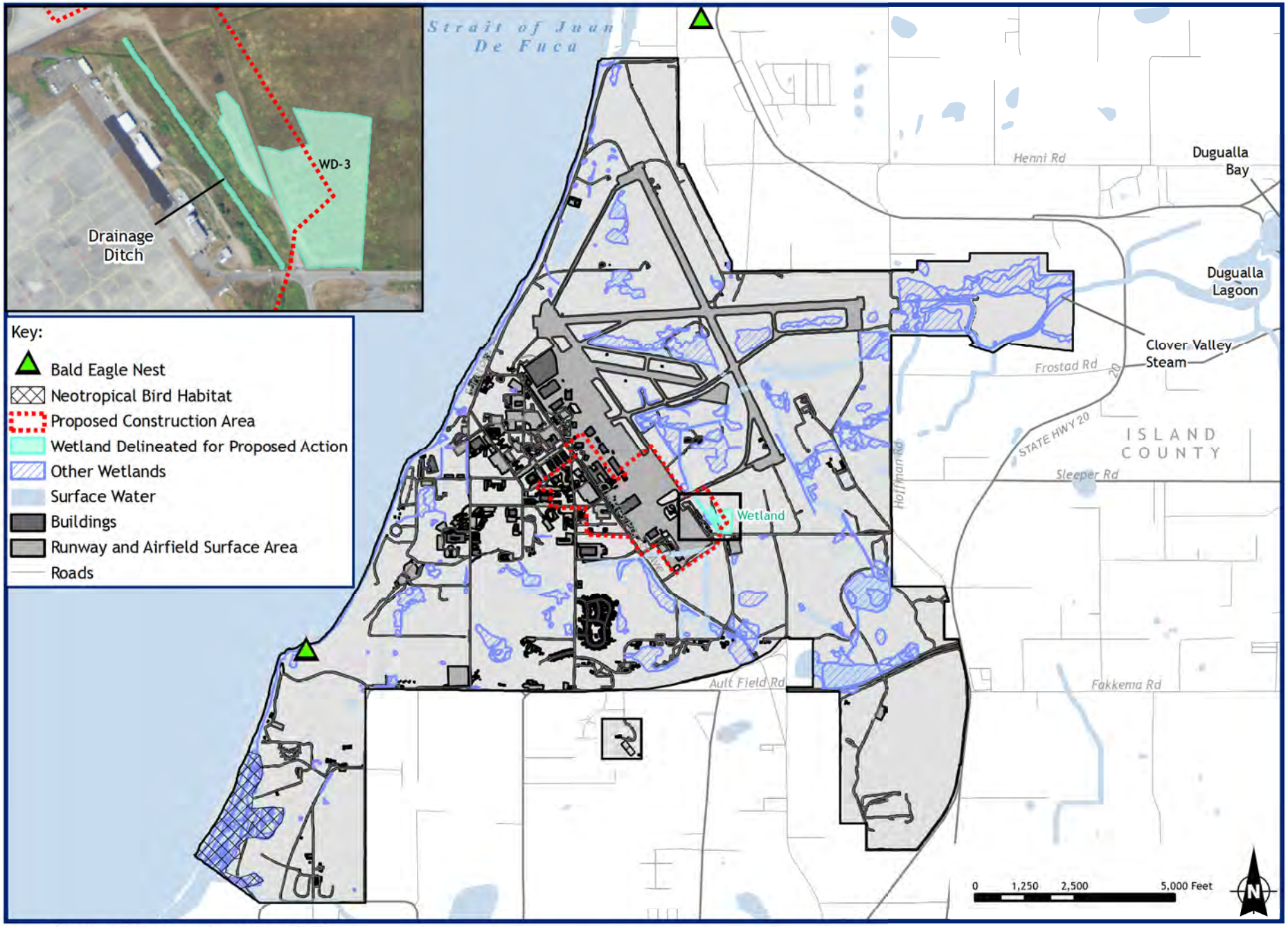
Dugualla Lagoon may provide storm water retention volume until flows are discharged, via a system of pumps, to Dugualla Bay to eliminate exceeding the maximum water surface elevation. The maximum water surface elevation of Dugualla Lagoon was agreed upon in negotiations between the Navy and local landowners. The retention volume of Dugualla Lagoon has been quantified through hydraulic modeling of storm water flows. One ditch, located north of Runway 07/25, empties into the Strait of Juan de Fuca.

NAS Whidbey Island complies with its NPDES permit for discharge of storm water from various industrial facilities located at the station. As part of the permit program, NAS Whidbey Island has prepared a SWPPP to control storm water discharges from the station that may adversely affect the water quality in the Strait of Juan de Fuca and Dugualla Bay. The plan identifies potential sources of storm water contamination and describes the BMPs that are used to prevent or minimize exposing storm water to pollutants. Structural BMPs are used at on-station industrial and process areas, such as vehicle or aircraft maintenance, wash-down, and fueling areas; material storage, loading, and unloading areas; and waste disposal areas that are exposed to storm water. Structural BMPs include erosion and sediment controls, berms or dikes around critical areas, retention/detention basins, oil/water separators, and leak detection systems. Non-structural BMPs include preventive maintenance practices, regular inspections, spill prevention and response, procedures and practices for significant materials storage and handling, and regular pavement cleaning to remove oil and grease.

5.7.3 Floodplains

EO 11988, *Floodplain Management*, requires federal agencies to identify and consider practicable alternatives for locating incompatible facilities in areas identified as floodplains. The EO defines the term "floodplain" as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a 1-percent or greater chance of flooding in any given year." This zone of a 1-percent or greater chance of flooding in any given year is also commonly referred to as the 100-year floodplain because flooding is expected to occur once every 100 years, on average. Where practicable alternatives to siting federal facilities in the 100-year floodplain are not available, the facilities must be constructed in accordance with and be consistent with the intent of the standards and criteria of the National Flood Insurance Program.

According to the Island County Department of Planning and Community Development, areas within the 100-year floodplain at Ault Field have been mapped by the Federal Emergency Management Agency (FEMA) as Zone V (Griffin 2012). Zone V areas are those along coasts subject to inundation by the 1-percent annual-chance flood event, with additional hazards associated with storm-induced waves (FEMA 2013). Storm-related tidal flooding occasionally occurs east of the runways, next to the eastern boundary of the installation, during winter storms when high winds combine with extreme high tides on Dugualla Bay to bring the tidal surge farther inland than normal (EA Engineering, Science, and Technology, Inc. [EST] 1996). The runway ditch network handles storm water drainage for Ault Field and the surrounding area.



Source: ESRI, 2011; Washington Department of Fish and Wildlife, 2013; E&E 2013; NAS Whidbey Island, 2006, 2013; NAIP 2011.

Figure 5-6
Surface Waters, Wetlands, and Other Natural Resources at NAS Whidbey Island, Island County, Washington

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5.7.4 Groundwater

Groundwater beneath NAS Whidbey Island is present in three main aquifer systems: the shallow, intermediate, and deep aquifers. The aquifers are composed of sand or sand and gravel with confining layers of till, clay, and silt. The shallow aquifer is a major water-bearing zone on Whidbey Island and generally ranges in depth from 20 to 145 feet below ground surface; the intermediate aquifer extends throughout the northern portion of Whidbey Island, and its water levels are generally 5 to 20 feet beneath the shallow aquifer; the deep aquifer (or sea level aquifer) is a continuous water-bearing zone on Whidbey Island, with water levels ranging from 11 to 17 feet above msl (Simonds 2002).

The EPA has designated the Whidbey Island aquifer system as a sole-source aquifer: it is the only supply of potable water for at least half of the residents. There is no viable alternative source of drinking water for those using groundwater, and the aquifer boundaries have been defined (URS Consultants, Inc. 1995).

Water-level data from environmental investigations at NAS Whidbey Island and regional studies indicate that groundwater flow at Ault Field generally follows surface topography. Most of the groundwater underlying Ault Field converges in the central runway areas and likely discharges eastward to Dugualla Bay. Groundwater along the western side of Ault Field appears to discharge westward to the Strait of Juan de Fuca (NAS Whidbey Island 2014).

NAS Whidbey Island does not use groundwater as a source of drinking water. Rather, treated surface water is piped to the installation from the Skagit River. The City of Oak Harbor uses the Skagit River for 75 percent of its drinking water, with the remaining 25 percent supplied by three municipal wells. Island County residents near Ault Field but not located within the Oak Harbor water district use private wells for drinking water.

In the mid-1990s, contaminated groundwater beneath Ault Field from a former landfill was found to be migrating off site toward private water supply wells. In response, the Navy designed an extraction and treatment system to control the migration of contaminated groundwater. All private wells in the vicinity of the contaminant plume were closed, and the residences were connected to public water supplies (Agency for Toxic Substances and Disease Registry 1993).

Groundwater levels at the Crescent Harbor Marsh were measured prior to the tidal gate being removed. Levels were within 5 feet of the surface (Navy 2008a). However, with the opening of the bridge in 2009, the hydrologic regime of the site has changed significantly, likely making the groundwater level shallower.

5.7.5 Wetlands

More than 500 acres of wetlands are estimated to be located on Ault Field, concentrated in the flat, low-lying areas near the center of the installation (NAS Whidbey Island 2014).The majority of these wetlands have been identified using an aerial review process and have not been verified in the field. Freshwater marshes and wet meadows are the most common wetland communities occurring at Ault Field. The Seaplane Base's Crescent Harbor marsh contains nearly 500 acres of wetlands (Navy 2008b). Similar to Ault Field, wetlands at the Seaplane Base occur in low-lying areas and are comprised of both freshwater and saltwater marshes.

The Navy completed a wetland delineation of the proposed construction area at Ault Field on February 1, 2013 (Ecology and Environment, Inc. 2007, 2013). Wetlands were delineated in accordance with the *U.S. Army Corps of Engineers Regional Supplement for the Western Mountains, Valleys, and Coast Region* (USACE 2010). Wetland rating, using the *Western Washington Wetland Rating System* (Washington Department of Ecology 2004), was also conducted for delineated wetlands. Results of the wetland

delineation are described in Appendix H, the *Wetland Delineation Report for NAS Whidbey Island* (Ecology and Environment, Inc. 2013), and summarized below.

One palustrine emergent wetland covering approximately 4.54 acres was initially delineated (see Figure 5-6). This wetland was identified as WD-3 and is located east of the ramp, south of Taxiway "D," and north of Aries Road. This wetland is dominated by reed canary grass (*Phalaris arundinacea L.*) and traces of rush (*Juncus* spp). Potential functions of this wetland include minimal wildlife habitat, flood-flow alteration, minimal sediment stabilization, sediment/toxic substance retention and removal, and transformation of nutrients and sediments. Findings of the wetland delineation were submitted to the U.S. Army Corps of Engineers (USACE) for concurrence as part of request for a jurisdictional determination (JD). Based on a site inspection on May 9, 2013, the USACE identified additional wetland within the proposed construction area associated with an artificial drainage ditch surrounding the tarmac at Hangar 9. This wetland, identified as WS-1, is hydrologically connected to WD-3 and is considered part of the Depressional Category III wetland. WS-1 covers approximately 0.8 acre of the construction area. Potential functions of this wetland include flood-flow alteration, sediment stabilization, sediment/toxic substance retention and removal, and transformation of nutrients and sediments.

The Navy's request for a JD of wetland boundaries is currently under review by the USACE.

In 2008, the Navy also completed a wetland delineation of the Crescent Harbor marsh portion of Seaplane Base (Navy 2008b). As with the wetland delineation at Ault Field, wetlands at Crescent Harbor were delineated in accordance with the *U.S. Army Corps of Engineers Regional Supplement for the Western Mountains, Valleys, and Coast Region* (USACE 2010). Wetland rating, using the *Western Washington Wetland Rating System* (Washington Department of Ecology 2004), was also conducted for delineated wetlands. A total of 489 acres of wetland was delineated with the following wetland vegetation types the most prominent: estuarine emergent, palustrine emergent, palustrine scrub-shrub, and palustrine forest. The area contained four wetlands rated as Category III and two wetlands rated as Category II. Potential functions of these wetlands include wildlife habitat, flood-flow alteration, sediment stabilization, sediment/toxic substance retention and removal, and transformation of nutrients and sediments.

5.8 Biological Resources

5.8.1 Vegetation

Vegetation communities cover approximately 84 percent of Ault Field (NAS Whidbey Island 2014). Grasslands are the dominant vegetation community, covering 1,956 acres (46 percent) of the total land area. The grasslands comprise open fields and agricultural lease areas and include native and exotic grasses, grains, and annual crops. Other vegetation communities at Ault Field include a variety of upland forested, wetland, and marine habitats. These communities are most concentrated around the periphery of Ault Field, away from the airfield and adjacent development.

The proposed construction area at Ault Field includes a mixture of developed areas and herbaceous vegetation. This herbaceous vegetation is predominantly wet meadow wetland, most of which is homogenous stands of reed canary grass (see Chapter 5.7.5 for additional discussion on wetland communities). Non-wetland vegetation includes maintained grassland habitat. Plant species present in each of the wetland and non-wetland grassland communities include a variety of grasses, rushes, sedges, and herbs.

Vegetation communities at the Crescent Harbor mitigation site are a mixture of wetland and upland habitats (see Chapter 5.7.5 for additional discussion on wetland communities). Upland habitats include

grass fields, scrub-shrub, and forest (deciduous, conifer and mixed) (Navy 2008b). The proposed mitigation area at Crescent Harbor is dominated by herbaceous vegetation.

5.8.2 Wildlife

Landscaped areas are used by wildlife species able to acclimate to human disturbance. These include small mammals such as the raccoon (*Procyon lotor*), house mouse (*Mus musculus*), squirrels, and moles; songbirds such as swallows and the American robin (*Turdus migratorius*); non-native birds such as the European starling (*Sturnus vulgaris*) and rock pigeon (*Columba livia*); and common reptiles such as garter snakes (*Thamnophis* spp.) (NAS Whidbey Island 2014).

Grasslands have little structural diversity and provide limited habitat niches for relatively few wildlife species, so the grasslands and wet meadow wetland habitats that dominate the proposed construction areas at Ault Field do not support a diverse or abundant wildlife population. Similarly, the wet meadows lack structural diversity and the hydrologic regime to provide surface water year-round and thus attract fewer species than more complex wetland systems with deeper marsh and open-water components. Wildlife that would be present in these habitats includes migratory waterfowl, neotropical migratory songbirds and raptors, small burrowing mammals, and reptiles. The northern harrier (*Circus cyaneus*) is known to nest in undisturbed grasslands near the runway (NAS Whidbey Island 2014). Other species observed in these habitats during field surveys included the great blue heron (*Ardea herodias*) and black-tailed deer (*Odocoileus hemionus columbianus*) (Ecology and Environment, Inc. 2007).

The highest diversity of wildlife species at Ault Field occurs in the southwest portion of the station in the vicinity of Rocky Point because of the number and contiguity of habitat types, including stands of mature forest, coastal bluffs, beach strand, native dune vegetation, and a large freshwater wetland. The freshwater wetland in this area is shown on Figure 5-6 and has been identified by the Washington Department of Natural Resources as a significant habitat for neotropical migratory birds.

Several small and two relatively large forest blocks are scattered throughout Ault Field. Common wildlife using the forested habitat include the black-tailed deer, cottontail rabbit (*Sylvilagus floridanus*), raccoon, coyote (*Canis latrans*), garter snakes, salamanders (*Ambystoma* spp.), frogs (*Rana* spp.), and numerous species of birds (NAS Whidbey Island 2014). Marine habitats are located adjacent to the western boundary of Ault Field and comprise intertidal and subtidal areas. Numerous marine fishes, terrestrial and aquatic mammals, and invertebrates occur on beaches and in adjacent waters associated with these habitats. Cormorants (*Phalacrocorax* sp.), loons (*Gavia* sp.), grebes (*Podiceps* sp.), and various species of diving ducks are common year-round and/or are seasonal residents of the marine habitats (NAS Whidbey Island 2014). No access to freshwater spawning and rearing habitats is available along the shores of Ault Field for anadromous species (NAS Whidbey Island 2007).

The riparian habitat along the runway ditches and Clover Valley Lagoon provides nesting areas for many bird species, including ducks, rails, coots, blackbirds, and kingfishers. Amphibians that live in the aquatic and riparian habitat of the runway ditches and lagoon include frogs and salamanders. Clover Valley Stream, which has been straightened and channelized on the air station but transitions to a natural feature east of the installation, is listed by the Washington Department of Fish and Wildlife (WDFW) as a priority resident fish habitat for resident cutthroat trout (*Oncorhynchus clarki* [WDFW 2012]). Farther east, Dugualla Bay is home to the many species of flora and fauna that are typical in other inlets in Puget Sound.

Species observed at the proposed Crescent Harbor wetland mitigation site included the coyote (*canis latrans*), deer, northern harrier (*Circus cyaneus*), red-tail hawk (*Buteo jamaicensis*), great blue heron (*Ardea herodias*) (fly-overs), mallard (*Anas platyrynchos*), American crow (*Corvus brachyrhyncos*), and robin (*Turdus migratorius*). Pacific tree frog (*Pseudacris regilla*) vocalizations have also been heard in

the forested area adjacent to this area. Rabbit scat is often observed in the area, as are beaver dams (Navy 2008a).

5.8.3 Migratory Birds

The MBTA of 1918 is the primary legislation in the U.S. established to conserve migratory birds. The MBTA prohibits taking, killing, or possessing migratory birds unless permitted by regulation.

Migratory bird conservation in relation to the proposed action is addressed in a Memorandum of Understanding developed in accordance with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, signed January 10, 2001. This memorandum between the DoD and the USFWS outlines the responsibility of federal agencies to protect migratory birds and how to incorporate conservation efforts into their routine operations and construction activities and was recently re-signed to cover DoD activities through 2013.

In 1994, the Navy initiated a point-count monitoring program for neotropical migratory songbirds at NAS Whidbey Island in cooperation with the Student Conservation Association. These counts are repeated every five years. The most frequently observed neotropical migratory songbirds at the station included the American robin, savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), marsh wren (*Cistothorus palustris*), American goldfinch (*Spinus tristis*), bushtit (*Psaltriparus minimus*), rufous hummingbird (*Selasphorus rufus*), European starling, American crow (*Corvus brachyrhynchos*), chestnut-backed chickadee (*Poecile rufescens*), golden-crowned kinglet (*Regulus satrapa*), Swainson's thrush (*Catharus ustulatus*), red-winged blackbird (*Agelaius phoeniceu*s), common yellowthroat (*Geothlypis trichas*), and house finch (*Carpodacus mexicanus*) (EA EST 1996).

5.8.4 Threatened and Endangered Species

The ESA and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants and the habitats in which they are found. The Navy conducts consultations as required under Section 7 of the ESA for any action that "may affect" a federally listed threatened or endangered species. Although protection of species listed at the state level as threatened or endangered is not legally mandated for federal agencies, the Navy encourages cooperation with states to protect such species where such protection is consistent with an installation's mission.

Information on the potential occurrence of federally listed threatened and endangered species within and in the vicinity of NAS Whidbey Island and adjacent waters was obtained from the NAS Whidbey Island INRMP, USFWS Western Washington Fish and Wildlife Office, and the National Oceanic and Atmospheric Administration, NMFS Northwest Regional Office. NMFS and the USFWS share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous[16] species.

Each of these agencies maintains databases to track the occurrence of threatened and endangered species: the USFWS provides species occurrences on a county level (USFWS 2012a, b); the NMFS provides species occurrences by marine and estuarine water bodies (NMFS 2012e, f, g). For this SEIS, USFWS and NMFS databases, along with the NAS Whidbey Island INRMP, were searched and reviewed to identify the potential occurrences of federally listed threatened and endangered species within Island County, on NAS Whidbey Island, and in the waters surrounding Whidbey Island.

A total of 15 ESA-listed species were identified as occurring within the vicinity of Ault Field, of which five are managed by the USFWS and 10 by NMFS. ESA-listed species managed by the USFWS include

[16] Migratory fishes that spend most of their lives in the sea and migrate to freshwater to breed.

the golden paintbrush (*Castilleja levisecta*), marbled murrelet (*Brachyramphus marmoratus*), Coastal Washington-Puget Sound bull trout (*Salvelinus confluentus*), streaked horned lark *(Eremophila alpestris strigata)*, and Taylor's checkerspot (*Euphydryas editha taylori*). Threatened and endangered species managed by NMFS within the vicinity of Ault Field include the Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*), Puget Sound steelhead (*O. mykiss*), Puget Sound/Georgia Basin bocaccio (*Sebastes paucispinis)*, Canary rockfish (*S. pinniger*), yelloweye rockfish (*S. ruberrimus)*, southern eulachon (*Thaleichthys pacifics)*, southern North American green sturgeon (*Acipenser medirostris)*, humpback whale (*Megatera novaengliae*), Steller sea lion (*Eumetopias jubatus*), and southern resident killer whale (*Orcinus orca*). The current federal protection status and presence of each of these species within the vicinity of NAS Whidbey Island are indicated in Table 5-25.

5.8.4.1 USFWS-Managed Species

Golden Paintbrush

The golden paintbrush was listed as a threatened species on June 11, 1997 (*Federal Register* 1997). This species occurs in native open grasslands, often on sites that are generally flat and at elevations below 330 feet. These sites are also typically moist in the winter but not inundated with water (Center for Plant Conservation 2010d).

This perennial herb occurs in open grasslands at elevations below 330 feet around the periphery of the Puget Trough (USFWS 2012b). Most populations occur on glacially derived soils. Primary threats to this species include competition with encroaching native and non-native species, habitat modification through succession of grassland to shrub and forest habitat, habitat conversion through residential or commercial development, and grazing by herbivores (USFWS 2012b).

Five populations of golden paintbrush occur on the north half of Whidbey Island (Chappell and Caplow 2004). The largest population occurs near Forbes Point on the Seaplane Base at Crescent Harbor, approximately 4 miles southeast of Ault Field (NAS Whidbey Island 2014). No populations or individual occurrences of the golden paintbrush have been identified on Ault Field. Furthermore, no suitable habitat to support the species occurs within the proposed construction areas (NAS Whidbey Island 2014; Ecology and Environment, Inc. 2013).

Marbled Murrelet

The marbled murrelet was listed as a threatened species on October 1, 1992 (*Federal Register* 1992). The marbled murrelet is a small seabird that nests in large trees in coniferous forests near coastal areas. Only small patches of this type of habitat occur on Whidbey Island, none of which have previously been identified as supporting marbled murrelet nesting activity (EA EST 1996). However, no marbled murrelet occupancy sites are currently known to be present in the vicinity of NAS Whidbey Island, and no marbled murrelets have been observed in terrestrial habitats on NAS Whidbey Island (NAS Whidbey Island 2014, WDFW 2012). This species forages in the inshore marine environment and uses waters offshore of NAS Whidbey Island when food sources are available (NAS Whidbey Island 2014). Critical habitat for marbled murrelet has been designated on approximately 1.5 million acres in Washington State; however, no lands on or near NAS Whidbey Island are designated as critical habitat (*Federal Register* 2011a, NAS Whidbey Island 2014).

Coastal Washington-Puget Sound Bull Trout

The Coastal Washington-Puget Sound bull trout was listed as a threatened species on June 10, 1998 (USFWS 2012a). This distinct population segment (DPS) includes an anadromous bull trout, which is reported to only occur in Puget Sound, rear in natal streams for a period of time, migrate to marine environments to mature, and then return to mountain tributaries to spawn.

Whidbey Island has no suitable spawning streams for bull trout. This species is known to migrate along the western shores of Whidbey Island and so would be present in the marine waters adjacent to Ault Field (NAS Whidbey Island 2014). Three primary estuarine rearing areas for this species are located east of Whidbey Island and are associated with the Skagit, Stillaguamish, and Snohomish Rivers for foraging (NAS Whidbey Island 2007).

Although bull trout have reportedly been caught by fishermen in some nearshore areas of Whidbey Island (Washington Conservation Commission 2000), this catch may have been Dolly Varden (*S. malma*) because bull trout and Dolly Varden are closely related char species native to Washington State. They coexist in many of the same drainages and, being similar in appearance, are difficult to differentiate visually (USFWS 1997a).

On October 12, 2012, approximately 18,975 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada were designated as critical habitat for the bull trout. In Washington, 754 miles of marine shoreline have also been designated critical habitat (USFWS 2010a). The west coast of Whidbey Island and adjacent land areas are not included in this designation.

Streaked Horned Lark

The streaked horned lark was listed as a threatened species on October 3, 2013 (USFWS 2013i). This species prefers wide open spaces with no trees and few or no shrubs. It nests on the ground in sparsely vegetated sites, such as prairies and open grassland habitats dominated by grasses and forbs (Stinson 2005). The current breeding range of the streaked horned lark includes three regions: (1) The south Puget Sound in Washington; (2) the Washington coast and lower Columbia River islands; and (3) the Willamette Valley in Oregon. The majority of streaked horned larks winter in the Willamette Valley; smaller numbers winter on the island in the lower Columbia River, on the Washington Coast, or in the south Puget Sound (USFWS 2013i). The species' decline is due to range contraction. No streaked horned lark populations have been identified on Whidbey Island, and Ault Field has no suitable habitat for this species (NAS Whidbey Island 2014).

Critical habitat for the streaked horned lark has been designated on approximately 4,629 acres of land in Grays Harbor, Pacific, and Wahkiakum Counties in Washington, and in Clatsop, Columbia, Marion, Polk, and Benton Counties in Oregon (USFWS 2013i). No critical habitat has been designated on or in immediate proximity to NAS Whidbey Island.

Taylor's Checkerspot

The Taylor's checkerspot butterfly was listed as an endangered species on October 3, 2013 (USFWS 2013i). This species is known to occur in only four populations, three in Washington and one in Oregon. Once widely distributed throughout inland and coastal grasslands in the Willamette Valley, Puget Sound, and south Vancouver Island, this species has significantly declined due to loss of suitable habitat (Stinson 2005). Habitat requirements for the Taylor's checkerspot butterfly consist of open grasslands and oak woodland or savannah sites where food plants for larvae and nectar sources for adults are available. No populations have been identified on Whidbey Island. Furthermore, no suitable habitat for the species occurs at Ault Field (NAS Whidbey Island 2014).

Critical habitat for the Taylor's checkerspot has been designated on approximately 1,941 acres of land in Island, Clallam, and Thurston Counties in Washington, and in Benton County in Oregon (USFWS 2013i). No critical habitat has been designated on or in immediate proximity to Ault Field.

5.8.4.2 NMFS-Managed Species

Puget Sound Chinook Salmon, Puget Sound Steelhead

The Puget Sound Chinook Salmon Evolutionarily Significant Unit (ESU) was listed as a threatened species on March 24, 1999, and its status was reaffirmed on June 28, 2005 (Good et al. 2005). The ESU includes all naturally spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound, including the Strait of Juan de Fuca (NMFS 2011a).

The Puget Sound steelhead DPS was listed as threatened on May 11, 2007 (*Federal Register* 2007). It includes all naturally spawned steelhead populations in streams in the river basins of Puget Sound, the Strait of Juan de Fuca, and Hood Canal, Washington.

Whidbey Island has no suitable spawning streams for Chinook salmon or steelhead. Both species are known to migrate along the western shores of Whidbey Island and so would be present in the marine waters adjacent to Ault Field (NAS Whidbey Island 2014). Three primary estuarine rearing areas for these species are located east of Whidbey Island and are associated with the Skagit, Stillaguamish, and Snohomish Rivers for foraging (NAS Whidbey Island 2007).

On September 2, 2005, critical habitat for Puget Sound Chinook salmon was designated (*Federal Register* 2005a). Critical habitat includes Puget Sound and surrounding rivers and streams. The east and west coast of Whidbey Island, including Crescent Harbor, Skagit Bay, and the Strait of Juan de Fuca, is included in the critical habitat. Critical habitat designation is exempted for lands on NAS Whidbey Island owned and controlled, as well as management lands and tide lands (down to the extreme low tide line, -4.5 feet mean lower low water), based on implementation of an existing INRMP. Furthermore, critical habitat designation is also exempted from water restricted areas off of Ault Field, and Crescent Harbor off the Seaplane Base, based on probable national security impacts (NAS Whidbey Island 2014).

The critical habitat for the Puget Sound steelhead DPS is currently under development (NMFS 2011b).

Puget Sound/Georgia Basin Bocaccio, Canary Rockfish, and Yelloweye Rockfish

On April 28, 2010, NMFS listed the bocaccio as endangered under ESA and the canary rockfish and yelloweye rockfish as threatened (*Federal Register* 2010a). Adult bocaccio and canary rockfish generally reside in water deeper than 160 feet, but juveniles and young adults inhabit shallow water (NMFS 2011c, d), such as those adjacent Whidbey Island. Adult yelloweye rockfish generally reside in water with a depth greater than 80 feet, and often greater than 300 feet, but juveniles and young adults inhabit shallow water (NMFS 2011e), such as those adjacent to Whidbey Island. No critical habitat has been designated for these species at this time.

Pacific Eulachon (Southern DPS)

On March 18, 2010, NMFS listed the southern eulachon as threatened under the ESA (*Federal Register* 2010b). The eulachon is anadromous, and in the CONUS, most eulachon originate in the Columbia River basin (NMFS 2011f). Therefore, these eulachon would not pass through the Puget Sound or Strait of Juan de Fuca on their way to the ocean. However, because eulachon are occasionally recorded in the coastal rivers and tributaries of Puget Sound (NMFS 2011f), they could occur in the waters off Whidbey Island. There is no suitable spawning habitat on Whidbey Island for this species.

Critical habitat for the southern DPS of Pacific eulachon was designated on October 20, 2011 (*Federal Register* 2011b). Waters surrounding Whidbey Island are not considered critical habitat for the Pacific eulachon.

North American Green Sturgeon (Southern DPS)

On April 7, 2006, NMFS listed the southern DPS of the North American green sturgeon as threatened under the ESA (*Federal Register* 2006a). The green sturgeon is anadromous, with the only known spawning population in the Sacramento River, California. The juvenile green sturgeon spends from one to four years in fresh and estuarine waters before entering saltwater. The adult green sturgeon resides in nearshore oceanic waters, bays, and estuaries and could occur in the waters off Whidbey Island. Once mature, this species returns to freshwater every two to five years to spawn, beginning its migration in late February and spawning from March through July (NMFS 2011g).

The critical habitat for the southern North American green sturgeon DPS includes coastal United States marine waters up to 360 feet deep from Monterey Bay, California, north to Cape Flattery, Washington, including the Strait of Juan de Fuca (*Federal Register* 2009). This includes the west side of Whidbey Island along Ault Field. However, critical habitat designation was exempted in the designated military restricted areas along Ault Field based on probable national security impacts (NAS Whidbey Island 2014).

Steller Sea Lion

The Steller sea lion was listed as threatened under the ESA throughout its range on April 5, 1990 (*Federal Register* 1990). Steller sea lions occur in the inland marine waters of Washington and have occasionally been observed in Saratoga Passage on the east side of Whidbey Island. In Washington, Steller sea lion numbers vary seasonally, with peak counts of 1,000 animals present during the fall and winter months (Jeffries et al. 2000). Haul out areas, or rest sites, used by this species include offshore rocks, coastal islands, and docks (Jeffries et al. 2000). There are no Steller sea lion rookeries in the state of Washington, and no haul-out sites for the species have been recorded on Whidbey Island (Jeffries et al. 2000; NAS Whidbey Island 2014). No critical habitat for this species has been designated in Washington State.

Humpback Whale

The humpback whale was classified as endangered under the original ESA listing in 1970 and as depleted under the MMPA (NMFS 2011h). Humpback whales are present off the Washington coast during winter. They are known to be present in the Strait of Juan de Fuca in low numbers. Historically, humpbacks used the inland waters of Puget Sound, and in recent years they have been rarely observed in Puget Sound (Falcone et al. 2005). Critical habitat for the humpback whale has not been designated.

Southern Resident Killer Whale

The southern resident killer whale was listed as endangered under the ESA in November 2005 (*Federal Register* 2005b). Southern resident killer whales are present in Puget Sound for several months during the summer and fall each year. The population is composed of three family groups of whales that have been named J, K, and L pods and have been observed on numerous occasions in the Strait of Juan de Fuca (NMFS 2008).

Effective November 29, 2006, critical habitat was designated for the southern resident killer whale (*Federal Register* 2006b), outlining the critical habitat boundaries of three unique marine areas of Puget Sound. Excluded from this critical habitat are the waters within the boundaries of DoD-managed lands and waters, including NAS Whidbey Island (*Federal Register* Vol. 71, Issue 229: 69054-69070; effective date December 29, 2006) (*Federal Register* 2006b; NAS Whidbey Island 2014).

Table 5-25 Federally Threatened and Endangered Species that May Occur at or in the Vicinity of NAS Whidbey Island's Ault Field

Common Name	Scientific Name	ESA Listing	Presence in the Study Area
Plants			
Golden paintbrush	*Castilleja levisecta*	Threatened	No populations or individual occurrences have been identified on Ault Field. No suitable habitat to support the species occurs in the proposed construction areas.
Birds			
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	Surveys indicate that marbled murrelet densities in shallow marine waters adjacent to Whidbey Island, including those off of Ault Field, range from two to nearly four individuals per square mile.
Streaked horned lark	*Eremophila alpestris strigata*	Threatened	No populations or individual occurrences have been identified on Ault Field. No suitable habitat to support this species occurs in the proposed construction areas.
Fish			
Puget Sound Chinook salmon	*Oncorhynchus tshawytscha*	Threatened	Occurs along the western shores of Whidbey Island. No suitable spawning streams occur on Whidbey Island. The marine waters adjacent to Ault Field are designated as critical habitat. However, NAS Whidbey Island-owned, -controlled, and -management lands and tide lands (down to the extreme low tide line, -4.5 feet mean lower low water) are exempt.
Puget Sound steelhead	*Oncorhynchus mykiss*	Threatened	Occurs along the western shores of Whidbey Island. No suitable spawning streams occur on Whidbey Island. Critical habitat is currently under review and has not been designated.
Coastal Washington-Puget Sound bull trout	*Salvelinus confluentus*	Threatened	Occurs along the western shores of Whidbey Island. No suitable spawning streams on Whidbey Island. The marine waters adjacent to Ault Field are not designated as critical habitat.
Bocaccio	*Sebastes paucispinis*	Endangered	Juveniles and young adults may inhabit shallow marine waters adjacent to Ault Field. There is no critical habitat surrounding Whidbey Island.
Canary rockfish	*Sebastes pinniger*	Threatened	
Yelloweye rockfish	*Sebastes ruberrimus*	Threatened	
Pacific Eulachon (Southern DPS)	*Thaleichthys pacificus*	Threatened	No suitable spawning streams occur on Whidbey Island. Populations may inhabit marine waters adjacent to Ault Field. There is no critical habitat surrounding Whidbey Island.
North American green sturgeon (Southern DPS)	*Acipenser medirostris*	Threatened	No suitable spawning streams occur on Whidbey Island. Adults may inhabit marine waters adjacent to Ault Field. Critical habitat includes the west side of Whidbey Island; however, designated military restricted areas along Ault Field are exempt.

Table 5-25 Federally Threatened and Endangered Species that May Occur at or in the Vicinity of NAS Whidbey Island's Ault Field

Common Name	Scientific Name	ESA Listing	Presence in the Study Area
Mammals			
Steller sea lion	*Eumetopias jubatus*	Threatened	Individuals have been observed in the Strait of Juan de Fuca and occasionally on the east side of Whidbey Island. No critical habitat has been designated in Washington State.
Humpback whale	*Megatera novaengliae*	Endangered	Low numbers of individuals are known to be present in marine waters adjacent to Ault Field and in the Strait of Juan de Fuca. No critical habitat has been designated.
Southern resident killer whale	*Orcinus orca*	Endangered	Individuals have been observed numerous times during spring, summer, and fall in the Strait of Juan de Fuca, including marine waters adjacent to Whidbey Island and Ault Field. Critical habitat includes Puget Sound, although waters within the boundaries of DoD-managed lands and waters are excluded, including NAS Whidbey Island.
Invertebrates			
Taylor's checkerspot	*Euphydryas editha taylori*	Endangered	No populations or individual occurrences have been identified on Ault Field. No suitable habitat to support this species occurs in the proposed construction areas.

5.8.5 Bald and Golden Eagles

Because of its reproductive success throughout the U.S., the bald eagle (*Haliaeetus leucocephalus*) was delisted under ESA, effective August 8, 2007. However, taking of bald eagles is still prohibited under the BGEPA of 1940, as amended in 1978, as well as the MBTA. The BGEPA prohibits anyone without a permit issued by the Secretary of the Interior from "taking" bald or golden eagles, including their parts, eggs, or nests. It defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (16 U.S.C. 668-668d). "Disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (50 CFR Part 22). Inactive eagle nests, which may become active again, are also protected under the act.

Recovery of the bald eagle has been successful in Washington State, where the number of occupied nests increased from 105 in 1980 to 840 in 2005 (Stinson et al. 2001). Washington State also supports the largest wintering population of bald eagles in the continental U.S. (Stinson et al. 2001).

Bald eagles are often observed along NAS Whidbey Island's shoreline, perched in trees on the top of shoreline bluffs. According to WDFW priority species habitat maps, a number of bald eagle territories are present in and around Ault Field. Three bald eagle nests are located on or immediately adjacent to Ault Field: one is in the southwest portion of the installation along the coastline at Rocky Point, and two are adjacent to the northern boundary of Ault Field (WDFW 2012). A study completed in 1996 (EDAW, Inc. 1996) found that eagles use most of the Ault Field shoreline bordering the Strait of Juan de Fuca. Five areas of concentrated bald eagle use were identified at Ault Field:

- The area immediately surrounding Rocky Point;
- The point north of Cliffside Park;
- The 1 mile of shoreline adjacent to the sewage treatment pond;
- The pilings/approach lights on and just offshore of the approach (northwest) end of Runway 15; and
- The area along the northern boundary of Ault Field near the North Gate.

Of the concentrated areas listed above, the two closest nests to the proposed construction area are located along the western shoreline of Whidbey Island, at the northwest end of Runway 15 and at Rocky Point (see Figure 5-6). However, none of the proposed construction areas at Ault Field are located within these bald eagle concentration areas. Bald eagles also nest on the Seaplane Base at Maylors Point and Polnell Point and along the Crescent Harbor shoreline, and they use many habitats on the property.

Golden eagles are foraging, transient visitors to NAS Whidbey Island during migration periods. No known nests of golden eagles are on the installation (NAS Whidbey Island 2014).

5.8.6 Other Species of Concern

Other species of concern evaluated in this SEIS include candidate species proposed for listing under the ESA. No other species of concern were identified as occurring in the vicinity of Ault Field.

5.8.7 Marine Mammals

The MMPA is administered by the USFWS and NMFS to protect and manage marine mammals. Common marine mammal species protected under the MMPA known to occur in the upper Puget Sound basin include the humpback whale, killer whale, California sea lion (*Zalophus californianus*), harbor seal (*Phoca vitulina*), and northern sea otter (*Enhydra lutris kenyoni*). As discussed above, humpback and killer whales have been observed in the Strait of Juan de Fuca. In 2000, the Washington Department of Fish and Wildlife identified the closest harbor seal haul-out site to Ault Field as being located near Oak Harbor, approximately 4 miles southeast of the installation (Jeffries et al. 2000). Furthermore, a group of California sea lion haul-out sites was located in the southern end of Whidbey Island, more than 20 miles south of Ault Field (Jeffries et al. 2000). However, the Navy has since recorded the California sea lion, harbor seal, and northern sea otter feeding in the waters near Ault Field and occasionally using beaches and rocks on the station as haul-out sites (NAS Whidbey Island 2014).

5.8.8 Essential Fish Habitat

Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), federal agencies are directed to consult with NMFS when any of their proposed activities may have an adverse effect on essential fish habitat (EFH). EFH consists of bodies of water and substrate required for fish spawning, breeding, feeding, and places they can grow to maturity. The Magnuson-Stevens Act defines an adverse effect as "any impact which reduces quality and/or quantity of EFH." The Magnuson-Stevens Act notes that "adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, or reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions."

There is no EFH within any surface water on NAS Whidbey Island or in any freshwater streams within the surrounding watershed. The marine waters of the Strait of Juan de Fuca bordering the installation to the west and Dugualla Bay, connected to the installation via a series of man-made ditches and a pump station to the east, are considered EFH. The marine waters adjacent to NAS Whidbey Island are EFH for three primary fisheries managed in the region: Pacific Coast Groundfish, Pacific Coast Salmon, and Coastal Pelagic Species.

5.9 Cultural Resources

Under NEPA, cultural resources include archaeological resources, architectural or built resources, and Native American resources. Under Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking must identify historic properties within a proposed project's APE and consider the effects of the proposed undertaking on these properties.

Implementing regulations for Section 106 at 36 CFR Part 800 define historic properties as any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP, including the artifacts, records, and remains that are related to and located within such properties and including properties of traditional religious and cultural importance to a federally recognized Indian tribe. Such properties must meet the NRHP criteria for eligibility (36 CFR Part 60). Eligibility determinations are based on NRHP (Table 5-26) and NPS criteria (Table 5-27) for architectural integrity.

Native American resources are cultural resources of interest or importance to federally recognized Indian tribes and may be archaeological, architectural, geographical, or biological. Such resources may also be considered historic properties or tangible or physical properties of traditional religious and cultural importance to an Indian tribe that meet the NRHP criteria (ACHP 2004, Parker and King 1990). Such resources may also include TCPs: properties that are eligible for inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continued cultural identity of the community (Parker and King 1990). Additionally, Native American resources may include culturally sensitive locations, such as sacred sites, or cultural items that are offered protection under the AIRFA, EO 13007, the NAGPRA, and other federal legislation and regulations.

Table 5-26 National Register of Historic Places Criteria for Historic Significance

36 CFR 60.4, Part I
The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and: A. That are associated with events that have made a significant contribution to the broad patterns of our history; or B. That are associated with the lives of persons significant in our past; or C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or D. That have yielded, or may be likely to yield, information important in prehistory or history.

Table 5-26 National Register of Historic Places Criteria for Historic Significance

36 CFR 60.4, Part II
Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories: A. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or C A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or D A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or F. A property primarily commemorative in intent if design, age, traditions, or symbolic value has invested it with its own exceptional significance; or G. A property achieving significance within the past 50 years if it is of exceptional importance.

Source: U.S. Department of the Interior, National Park Service 1995.

Table 5-27 National Park Service Criteria for Architectural Integrity

Criteria	Definition of Architectural Integrity
Location	Must not have been moved.
Design	Must retain historic elements that create the form, plan, space, structure, and style of the property.
Setting	Setting must retain its historic character.
Materials	Must retain the key exterior materials dating from the period of its historic significance.
Workmanship	Methods of construction from its time of significance must be evident.
Feeling	Physical features must convey its historic character.
Association	Must be the actual place where a historic event or activity occurred and must be sufficiently intact to convey that relationship to an observer.

Source: U.S. Department of the Interior, National Park Service 1995.

For the purposes of the identification and evaluation of cultural resources, the project area for the proposed action is considered the same as the APE. Implementing regulations for Section 106 define the APE for an undertaking as the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. For the purposes of compliance with Section 106, the APE for the proposed action is the footprint within which existing or new facilities are or would be located at NAS Whidbey Island, including Ault Field and a proposed wetland mitigation site at Seaplane Base (see Figures 5-7 and 5-8).

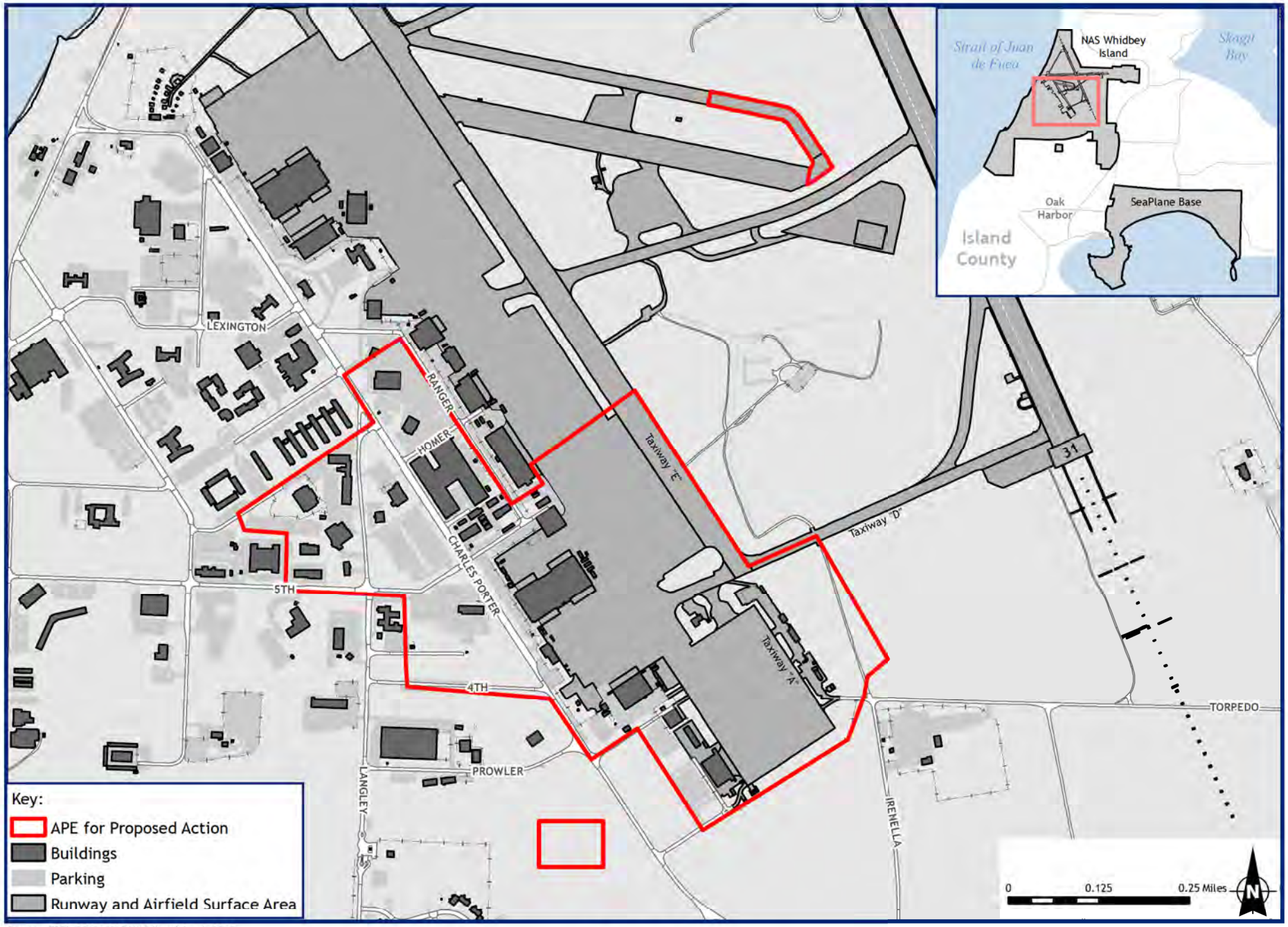
5.9.1 Architectural Resources

There are 34 architectural or built resources associated with the APE for the proposed action at Ault Field: 22 buildings and 12 structures or facilities (see Table 5-28). The Navy defines buildings and structures according to the definitions provided in *National Register Bulletin 16A: How to Complete the National Register Registration Form*. A building is a construction "...created principally to shelter any form of human activity." Structures are "...those functional constructions made usually for purposes other than creating human shelter" (NAVFAC 2013). No architectural or built resources are associated with the APE for the proposed action at Seaplane Base.

Table 5-28 Buildings and Structures within the Area of Potential Effects for the Proposed Action at Ault Field

Building, Structure, or Facility Number	Name
R-12	Shop Space
R-13	Shop Space at Building 2734
R-14	Shop Space
126	Applied Instruction Building (historically known as Administration and Instruction Building)
219	VAQ Storage/NADEP ISR Depot RPR (also known as Supply Servmart, Warehouse)
410	Hangar 6
2528	Air Start Building
2544	Hangar 7
2621	Liquid Oxygen/Nitrogen Facility
2621A	Liquid Oxygen Shelter
2635	Pumphouse for Rinse Facility
2666	Inert Storehouse
2681	Hangar 9
2704	POD Storage
2707	Chlorine/Acetylene Storage
2732	LOX Cart Shelter (HGR 9)
2738	Flight Simulator Building (historically known as Wing Simulator Center)
2740	Aircrew Academic Training Building
2771	Tactical Support Center
2786	Sonobuoy Issuing and Receiving
2800	Sonobuoy Storage
2836	P-3 Support Facility
201259	Aircraft Parking Apron
2635	Aircraft Rinse Facility
203047	Aircraft Ordnance Loading Area
2910-2911	Aircraft Ready Fuel Storage/Aircraft Defueling Facility
201255	POV Parking Lot
2888	Line Shack
2889	Line Shack
2890	Line Shack
201248	Taxiway E
203895	Taxiway A
203897	Taxiway G
204894	Taxiway D

Sources: Hampton 2008, *All Building Index* (n.d.)



Source: ESRI, 2012; NAS Whidbey Island, 2013

Figure 5-7
Area of Potential Effect at NAS Whidbey Island (Ault Field)
Whidbey Island, Washington

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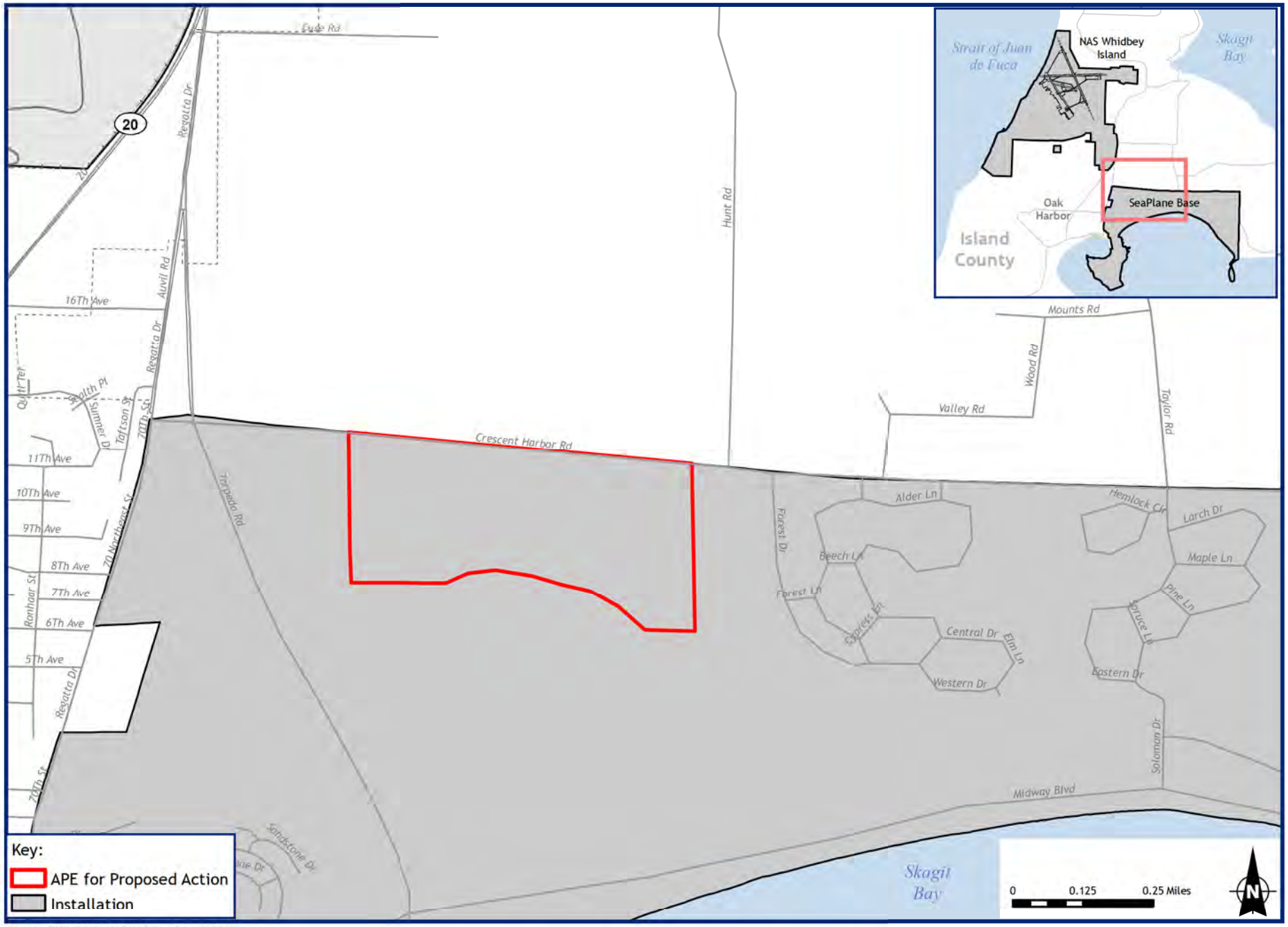

Source: ESRI, 2012; NAS Whidbey Island, 2013

Figure 5-8
Area of Potential Effect at NAS Whidbey Island (Seaplane Base)
Whidbey Island, Washington

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Eighteen of the 34 buildings or structures within the APE were inventoried as part of the NAS Whidbey Island Historic Property Inventory Report, as part of the Phase I Architecture Survey of NAS Whidbey Island, or as part of the Cold War Study for NAS Whidbey Island: Buildings 126, 219, 410 (Hangar 6), 2528, 2544 (Hangar 7), 2621, 2621A, 2681 (Hangar 9), 2738, 2740, 2771, 2786, 2800, 2836, 2910-2911, 2888, 2889, and 2890. Constructed at various times between 1942 and 1989, these buildings or structures were evaluated for NRHP eligibility, including eligibility as Cold War properties (Hampton 2008, Hampton and Burkett 2010, Thursby et al. 2013a, Thursby et al. 2013b). Seventeen were found not eligible: Buildings 126, 219, 2528, 2544 (Hangar 7), 2621, 2621A, 2681 (Hangar 9), 2738, 2740, 2771, 2786, 2800, 2836, 2910-2911, 2888, 2889, and 2890 (Hampton 2008, Hampton and Burkett 2010, Thursby et al. 2013b). One, Building 410 (Hangar 6), was determined eligible for listing in the NRHP under Criteria A and C (Hampton and Burkett 2010, Thursby et al. 2013b). The Navy has determined that the remaining 16 buildings or structures (R-12, R-13, R-14, 2635 (Pumphouse and Aircraft Rinse Facility), 2666, 2704, 2707, 2732, 201259, 203047, 201255, 201248, 203895, 203897, and 204894) are not NRHP-eligible (Campbell 2013, 2014; Crain 2014.)

Hangar 6 was constructed in 1955 and is located on the southern end of the Ault Field concrete flight line (see Figure 2-7 and the below photo).

Hangar 6, West and South Elevations, Looking Northeast
Source: Thursby et al. 2013b

It is a double hangar with a flat-roofed two-story office/administration/shop area located between the two hangars. The two hangars on each side of the central two-story portion are gabled, with the north and south walls dominated by six-leaf sliding hangar doors. Hangar 6 is NRHP-eligible for associations with the Cold War expansion of the Navy's aviation operations (Criteria A) and as Washington State's only known example of the steel-frame Brunswick hangar type of the 1950s (Criteria C). The Cold War Study for NAS Whidbey Island confirmed and upheld the NRHP-eligibility determination for Hangar 6 (Thursby et al 2013b).

5.9.2 Archaeological Resources

Areas of NAS Whidbey Island were surveyed in 1994, and a predictive model was generated designating archaeologically sensitive areas. The APE at Ault Field is not within an archaeologically sensitive area. An archaeological survey of the APE at Ault Field has never been conducted. Based on the results of the 1994 survey, no previously recorded archaeological sites or areas with potential archaeological sensitivity

(defined as places with a moderate to high probability of containing cultural deposits) were located within the APE at Ault Field. The APE at Seaplane Base was identified as an archaeologically sensitive area, but no previously identified archaeological sites were recorded within the APE at Seaplane Base (Dames and Moore 1994, Goetz 1997). The Washington State Historic Preservation Office (SHPO) concurred with the findings of the 1994 archaeological inventory and the 1997 archaeological survey (Griffith 1997).

In 2008, the Navy conducted archaeological investigations within the APE at Seaplane Base and identified two archaeological sites (Site 45IS237 and Site 45IS236) and one isolated find. Site 45IS237 is a historic site consisting of four related concrete features associated with the farming or dairy industry. Located on a parcel of land that was owned by Delbert Witterman before the Navy took over ownership of the land in 1941, cultural materials collected from the site include square cut nails, glass, ceramic, wire nail, and flat glass that pre-dated the Navy occupation of the property (pre-1941). Further testing and data collection (archival materials and oral interviews) were recommended to definitively determine the site's NRHP eligibility. Until further testing, the site was recommended potentially eligible for inclusion in the NRHP (Rudolph et al. 2008).

Site 45IS236 is a prehistoric site consisting of a small, low-density surface shell scatter with subsurface shells and a single basalt flake located on a very gently sloping upper terrace. Further testing was recommended to definitively determine the site's NRHP eligibility. Until further testing, the site was recommended potentially eligible for inclusion in the NRHP (Rudolph et al. 2008). The isolated find is a basalt flake. As an isolated artifact without associated cultural material, it is not considered eligible for the NRHP (Rudolph et al. 2008).

5.9.3 Native American Resources

No previously recorded Native American resources are present within the APE at Ault Field. As noted in Chapter 5.9.2, two prehistoric archaeological resources, Site 45IS236 and isolated find 45IS227, are located within the APE at Seaplane Base. Site 45IS236 is a prehistoric site recommended for additional investigations to determine the site's NRHP eligibility and, pending further investigations, has been recommended potentially eligible for inclusion in the NRHP. Site 45IS227 is an isolated prehistoric basalt flake and is not considered eligible for the NRHP (Rudolph et al. 2008).

5.10 Hazardous Materials and Waste Management

Hazardous materials are used at NAS Whidbey Island for airfield operations and industrial support activities, including petroleum, oils, and lubricants; solvents and thinners; caustic cleaning compounds and surfactants; cooling fluids (antifreeze); adhesives; acids and corrosives; paints; and herbicides, pesticides, and fungicides. Hazardous materials are also used for aircraft and vehicle repair and maintenance at NAS Whidbey Island. Activities at NAS Whidbey Island that generate hazardous wastes include painting, using solvents for cleaning and degreasing, mechanical and chemical paint and corrosion removal, fluids change-out, electroplating, metal casting, machining, and welding or soldering. The Navy monitors its operations to minimize the use of hazardous materials and reduce the generation of hazardous wastes. If not consumed during use, these materials and possibly their containers eventually may be disposed of as a solid or hazardous waste.

NAS Whidbey Island is classified as a large-quantity hazardous waste generator, as defined by the RCRA, because it has the potential to generate more than 2,200 pounds of hazardous waste every month. Hazardous wastes are accumulated at less-than-90-day accumulation points throughout the station before being transferred to and collected at less-than-90-day central processing facilities prior to transportation offsite and disposal at a permitted Treatment, Storage, and Disposal (TSD) facility. Collection, transportation, and disposal of wastes at NAS Whidbey Island are conducted by the DRMO (NAVFAC

Atlantic 2013). NAS Whidbey Island maintains a hazardous waste management plan that establishes procedures and provides guidance regarding hazardous waste generation, accumulation, and disposal at the installation (NAVFAC Atlantic 2013).

Environmental Restoration Program Sites

Hazardous waste disposal sites at NAS Whidbey Island have been investigated under the DoD's ERP, comprised of both the Installation Restoration Program and Munitions Response Program, in compliance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act for former waste sites and with RCRA for sites associated with continuing operations. The purpose of the ERP is to identify, assess, characterize, and clean up or control contamination caused by past hazardous waste disposal practices and hazardous material spills at Navy facilities. Past hazardous material use, and methods of disposal, although acceptable at the time, resulted in pollutants being released into soil and groundwater. The Navy has taken an aggressive and proactive approach to cleaning up its hazardous waste sites through the ERP.

NAS Whidbey Island has 23 sites in various stages of investigation and remediation under the ERP. A portion of one ERP site is located within the study area: Operable Unit 3, Area 16. This ERP site is located northeast of the existing aircraft parking apron and runways and is a complex of ditches consisting of approximately 9 miles of connected ditches and culverts draining the runway area and receiving discharges from many of the station's storm drains. Previous waste disposal and spills have contaminated the ditch sediments with total petroleum hydrocarbons, lead, arsenic, and pesticides. A ROD was signed in April 1995, and approximately 6,000 cubic yards of contaminated sediments were excavated from the ditch complex and properly disposed of before being capped. In May 1996, the Navy completed construction work, including restoration. The proposed construction area is outside Operable Unit 3, Area 16; however, the proposed storm water mitigation site where the Navy proposes to remove a portion of disused, former runway located within the airfield is situated within Operable Unit 3, Area 16.

5.11 Safety

Safety is a priority for the Navy. The Navy practices operational risk management as outlined in the Office of the Chief of Naval Operations Instruction 3500.9 A. Requirements outlined in this instruction provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. This chapter includes flight safety (Chapter 5.11.1) and BASH (Chapter 5.11.2).

5.11.1 Flight Safety

The FAA is responsible for ensuring the safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. In addition, the Navy has developed guidance on airfield safety zones, flight rules, ATC procedures, and safety procedures.

To complement flight training, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risks associated with mishaps due to pilot error. Additionally, highly trained maintenance crews routinely inspect each aircraft in accordance with Navy regulations, and maintenance activities are monitored by senior technicians to ensure aircraft are equipped to withstand the rigors of operational and training events safely.

The primary safety concern with regard to military aircraft training operations is the potential for aircraft mishaps to occur. Aircraft mishaps could be caused by mid-air collisions with other aircraft or objects, weather, mechanical failures, pilot error, or BASH (See Chapter 5.11.2). Mishaps are classified as Class A, B, or C according to the severity of injury to individuals and total property damage, with the most

severe being a Class A Mishap ($2 million or more in property damage, aircraft destroyed, or fatality or permanent total disability) and the least severe a Class C Mishap ($50,000 to $500,000 in property damage and/or nonfatal injury) (Naval Safety Center 2012).

NAS Whidbey Island maintains emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to mishaps, whether on- or off-station. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation.

5.11.2 Bird/Wildlife Aircraft Strike Hazards

The presence of resident and migratory birds creates a potential BASH risk at NAS Whidbey Island. NAS Whidbey Island comprises diverse habitat structures. When habitat diversity increases, the number of species attracted to an airfield also increases. This diverse habitat structure is desirable for many avian species but can be hazardous to flight operations. The greatest potential BASH risk occurs at Ault Field due to the presence of water-filled ditches, freshwater wetlands, marine shoreline, perch sites, tall brush, and short grass in the vicinity of the runways, all of which attract numerous bird species.

To reduce the potential for collisions between aircraft and birds or other animals, NAS Whidbey Island has prepared and implemented a BASH plan (Navy 2001). The BASH plan provides guidance to minimize bird wildlife strike hazards to military aircraft operating at NAS Whidbey Island. The plan includes procedures to decrease the attractiveness of the airfield to birds as well as operational procedures to avoid high-hazard situations. To reduce the attractiveness of the runway area to birds, the area is kept clear of most vegetation, except grasses. In addition, the grass is mowed periodically. Birds occurring in the runway area are dispersed from the flight line area by United States Department of Agriculture (USDA) Wildlife Services staff, under permits from the USFWS. The NAS Whidbey Island Airfield manager secures the appropriate permits from USFWS and ensures compliance by USDA Wildlife Services staff.

From a wildlife management perspective, diverse habitats provide all three of the essential items for birds: food, water, and shelter. Food is in the form of small mammals and/or fruit/seed-bearing vegetation. The existing shelter provides hiding, loafing, nesting, and thermal cover, as well as excellent habitat for a thriving prey base of insects, mice, voles, and rabbits. The prey base is the main attractant for many bird species, including several species of raptors, such as bald eagles, red-tailed hawks (*Buteo jamaicensis*), rough-legged hawks (*B. lagopus*), and northern harriers (*Circus cyaneus*), which can pose an airstrike hazard.

In FY 2011, a total of 64 birds were struck by aircraft during flight operations at NAS Whidbey Island, with the highest number of strikes (25) occurring in September (Queen 2012). Bird species struck included dark-eyed junco (*Junco hyemalis*), Vaux's swift (*Chaetura vauxi*), rock dove/pigeon (*Columba livia*), dunlin (*Calidris alpina*), various thrush, ring-billed gull (*Larus delawarensis*), MacGillivray's warbler (*Oporornis tolmiei*), American goldfinch (*Carduelis tristis*), mallards, barn swallow (*Hirundo rustica*), western meadowlark (*Sturnella neglecta*), mourning dove (*Zenaida macroura*), savannah sparrow (*Passerculus sandwichensis*), great horned owl (*Bubo virginianus*), Arctic tern (*Sterna paradisaea*), red-tail hawk, northern harrier, and numerous unknown species.

6 NAS Whidbey Island Environmental Consequences

Chapter 6 presents the affected environment and analysis of the potential direct and indirect effects of each alternative for each resource area described in Chapter 5. Chapter 9 presents the analysis of the potential cumulative effects of each alternative for each resource area. The level of significance is assessed according to NEPA implementing regulations in 40 CFR 1508.27, which requires consideration of both context (e.g., society as a whole [human, national], the affected region, the affected interests, and the locality) and intensity (i.e., the severity of an impact).

As defined in Chapter 1.5, the baseline for SEIS analysis is the existing conditions present at the time a new home basing decision is made, which is expected to be April 2014. The year 2020 is the end-state year used in this analysis, which represents a reasonable timeframe for the full complement of training crews to be in place and achieving a steady state of training events.

Tables 6-1, 6-2, and 6-3 are provided to guide the evaluation of proposed environmental impacts.

Table 6-1 2014 Baseline (No Action Alternative) and 2020 End-State[1] P-3C and P-8A Personnel Loading at NAS Whidbey Island

Activity	2014 Baseline (No Action Alternative)	2020 End-State[1] (P-8A Personnel)	
	P-3C Personnel	ALT 1	ALT 2
P-3C/P-8A Personnel	1,858	1,768	2,033
Net Change	**0**	**- 90[2]**	**+ 175[2]**

Notes:
1 2020 end-state reflects planned disestablishment of VQ-1.
2 The projected decrease in personnel at NAS Whidbey Island under Alternative 1 and slight increase under Alternative 2, despite an increase in aircraft loading under both alternatives, is the result of fewer personnel assigned to a P-8A squadron compared to a P-3C squadron.

Table 6-2 2014 Baseline (No Action Alternative) and 2020 End-State P-3C and P-8A Aircraft at NAS Whidbey Island

	2014 Baseline (No Action Alternative)	2020 End-State	
	P-3C	ALT 1	ALT 2
Fleet Squadrons	3	6	7
Authorized Aircraft per Squadron	8	7	7
Total Fleet Authorized Aircraft	**24**	**42 (+18)**	**49(+25)**

Table 6-3 Areas of Impact from New Construction at NAS Whidbey Island

	2014 Baseline (No Action Alternative)	2020 End-State	
		ALT 1	ALT 2
Facility Renovation (square feet)	0	73,739	73,739
New Construction (acres)	0	13.76	21.86
New Impervious Surface (acres)	0	9.16	15.76

6.1 Airspace and Airfield Operations

This assessment examines how the proposed action would affect airspace (Chapter 6.1.1) and airfield operations (6.1.2). Airspace within the vicinity of NAS Whidbey Island is assessed for changes in management or structure. Airspace is also assessed for impacts from changes to the number of annual operations that would occur from the transition of P-3C to P-8A aircraft, as well as the potential effects to civil aviation.

The airfield at NAS Whidbey Island is assessed for impacts from changes to the number of annual operations that would occur from the transition of P-3C to P-8A aircraft.

6.1.1 Airspace

Implementation of Alternatives 1 and 2 at NAS Whidbey Island would reduce total airfield operations by up to 10 percent (considering projected changes in other aircraft operations). Neither of the action alternatives would require any modification to the current airspace or operational procedures or any changes to the departure and arrival route structures. The proposed action would have no effect on local Whidbey Island area civil and commercial aviation airspace use because the P-8A would be operating within the same flight parameters currently used by the P-3C aircraft under existing conditions within NAS Whidbey Island airspace. As described in Chapter 6.1.2, while the number of aircraft home based at NAS Whidbey Island would increase, overall aircraft operations would decrease under Alternatives 1 and 2 compared to baseline operations. Neither of the action alternatives would have an adverse impact to civil aviation transiting airspace under NAS Whidbey Island ATC control. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced.

The No Action Alternative would not impact airspace because no changes would occur to current airspace or operational procedures, and overall aircraft operations would not change.

6.1.2 Airfield Operations

The projected number of annual P-8A aircraft operations for Alternatives 1 and 2 was calculated using the Patrol Reconnaissance Group Projected P-8A Syllabus Flight Operations. Based on this analysis, the number of annual operations at NAS Whidbey Island is projected to decrease under both of the action alternatives (see Tables 6-4 and 6-5). The 71,466 total annual airfield operations occurring under the 2014 baseline would decrease by 10 percent under Alternative 1 and by 8 percent under Alternative 2. Alternative 1 would result in 10,290 P-8A operations compared to 14,629 P-3C under the 2014 baseline, a 30-percent decrease in annual operations. Alternative 2 would result in 11,618 P-8A operations compared to 14,629 P-3C operations under the 2014 baseline, a 21-percent decrease in annual operations. The projected decrease in P-8A airfield operations is associated with an increased use of simulators for P-8A training operations. P-8A simulators offset the need to conduct flight operations and thereby decrease air emissions and enhance safety by allowing personnel to practice emergency procedures without putting pilot and aircraft at risk. During the transition to the P-8A when both P-3Cs and P-8As are present, the combined number of P-3C and P-8A operations will not exceed the number of P-3C operations under baseline conditions.

No change is proposed to existing types of flight operations or flight tracks to support home basing P-8A aircraft. Projected operations would include arrivals, departures, T&Gs, and GCA patterns. NAS Whidbey Island meets all the operational requirements under routine operating conditions to support the airfield operations of the P-8A squadrons. Based on the decrease in P-8A operations when compared to baseline P-3C operations, airfield operations at NAS Whidbey Island would not be adversely impacted under the proposed action alternatives.

Although there would be an increase in the number of aircraft at NAS Whidbey Island, P-8A operations at Ault Field under both action alternatives would be less than the P-3C operations under current baseline conditions. Based on the projected decrease in operations related to the P-8A transition, there would be no change to the number or tempo of EA-6B and EA-18G operations at OLF Coupeville. Consequently, airfield operations at OLF Coupeville would not be indirectly affected by the proposed action.

Table 6-4 Comparison of Modeled 2014 Baseline (No Action Alternative) and Alternative 1 2020 End-State Aircraft Operations at NAS Whidbey Island

	ALT 1[1]							
Aircraft Type	Departure	Straight-in/ Full-Stop Arrival	Overhead Break Arrival	FCLP	Touch-and-Go	GCA Box	Total[5]	2014 Baseline (No Action Alternative)
EP-3[2]	0	0	0	0	0	0	0	**4,870**
P-3C	0	0	0	0	0	0	**0**	**14,629**
EA-18G[3, 4]	9,942	4,191	5,747	16,975	6,270	7,452	**50,577**	**50,577**
P-8A	2,031	2,031	0	0	3,840	2,388	**10,290**	**0**
C-40	697	697	0	0	292	588	**2,277**	**0**
C-9A	0	0	0	0	0	0	**0**	**874**
Transient	695	695	0	0	0	0	**1,390**	**516**
Total Aircraft Operations[5]							**64,534**	**71,466**
Total Aircraft Operations Change							**-6,933 (-10%)**	

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 Since the 2008 ROD, the Navy has decided to disestablish the VQ-1 EP-3 squadron at NAS Whidbey Island.

3 The analysis assumes that all electronic attack operations in 2014 would be conducted by EA-18G aircraft. It is anticipated that one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014 and would contribute approximately 1,100 EA-6B operations, or about 2 percent of the total annual EA-18G operations, until fully transitioned to EA-18G aircraft.

4 EA-18G operations do not include the addition of two new expeditionary VAQ squadrons at NAS Whidbey Island. The addition of new EA-18G aircraft at NAS Whidbey Island and related impacts to airfield operations are being evaluated in a separate EIS.

5 Total air operations numbers may not sum exactly due to rounding.

Table 6-5 Comparison of Modeled 2014 Baseline (No Action Alternative) and Alternative 2 2020 End-State Aircraft Operations at NAS Whidbey Island

	ALT 2[1]							
Aircraft Type	Departure	Straight-in/ Full-Stop Arrival	Overhead Break Arrival	FCLP	Touch-and-Go	GCA Box	Total[5]	2014 Baseline (No Action Alternative)
EP-3[2]	0	0	0	0	0	0	**0**	**4,870**
P-3C	0	0	0	0	0	0	**0**	**14,629**
EA-18G[3, 4]	9,942	4,191	5,747	16,975	6,270	7,452	**50,577**	**50,577**
P-8A	2,347	2,347	0	0	4,258	2,666	**11,618**	**0**
C-40	697	697	0	0	292	588	**2,277**	**0**
C-9A	0	0	0	0	0	0	**0**	**874**
Transient	695	695	0	0	0	0	**1,390**	**516**
Total Aircraft Operations[5]							**65,862**	**71,466**
Total Aircraft Operations Change							**-5,605 (-8%)**	

Notes:

1 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

2 Since the 2008 ROD, the Navy has decided to disestablish the VQ-1 EP-3 squadron at NAS Whidbey Island.

3 The analysis assumes that all electronic attack operations in 2014 would be conducted by EA-18G aircraft. It is anticipated that one squadron of EA-6B aircraft may still be operating at NAS Whidbey Island in 2014 and would contribute approximately 1,100 EA-6B operations, or about 2 percent of the total annual EA-18G operations, until fully transitioned to EA-18G aircraft.

4 EA-18G operations do not include the addition of two new expeditionary VAQ squadrons at NAS Whidbey Island. The addition of new EA-18G aircraft at NAS Whidbey Island and related impacts to airfield operations are being evaluated in a separate EIS.

5 Total air operations numbers may not sum exactly due to rounding.

The No Action Alternative would not impact airfield operations because the 2014 baseline aircraft operations would not change.

Conclusion

Overall, the action alternatives would not result in adverse impacts to airspace and airfield operations at NAS Whidbey Island from the transition of P-3C to P-8A aircraft. The same training regime as currently used by P-3C aircraft would continue. P-8A operations would decrease under each action alternative when compared to baseline P-3C operations. The opportunity for civil aviation to transit existing airspace would not be reduced.

6.2 Noise

The noise analysis in this chapter is presented in six parts. Chapter 6.2.1 provides an assessment of the changes to the DNL noise zones for NAS Whidbey Island attributable to home basing the P-8A under Alternatives 1 and 2, as well as an analysis of the SEL for single-event aircraft overflights. Chapter 6.2.2 presents an analysis of noise impacts using the supplemental noise metrics (see Chapter 5.2.2 and Appendix D, Background Noise Information and Wyle Laboratories, Inc., Noise Report WR13-02, for a description of supplemental noise metrics). Chapter 6.2.3 includes a discussion of potential hearing loss, and Chapter 6.2.4 addresses other noise-related health impacts. Chapter 6.2.5 addresses potential impacts related to construction noise, and Chapter 6.2.6 addresses noise abatement measures. A full discussion of noise modeling and the background data for this analysis are included in Appendix D, Background Noise Information and Wyle Laboratories, Inc., Noise Report WR13-02.

The No Action Alternative would not impact the noise environment at NAS Whidbey Island because the 2014 baseline aircraft operations would not change.

6.2.1 DNL Noise Zones and SEL Noise

A composite of the projected noise zones for NAS Whidbey Island under Alternatives 1 and 2 is shown on Figure 6-1. An inset to Figure 6-1 is provided to illustrate the small difference between each of the alternatives.

The projected noise zones for Alternatives 1 and 2 would not be significantly larger than the modeled 2014 baseline noise zones. While total aircraft operations would decrease under both alternatives as a result of home basing the P-8A aircraft, the P-8A is a slightly louder aircraft than the P-3C, as discussed below. However, the effect of the introduction of the P-8A aircraft on the DNL noise zones would be masked by the EA-18G operations. The number of operations of the EA-18G squadrons would not change under Alternatives 1 or 2, and, as stated in Chapter 5.2, the EA-18G contributes approximately 98 percent of the acoustic energy to the noise environment at NAS Whidbey Island and is the loudest aircraft operating at the installation.

The off-station area and estimated population within projected DNL noise zones at NAS Whidbey Island for each of the alternatives are listed in Table 6-6. As shown, a slight increase would occur in the number of people within the modeled noise zones under both action alternatives. Under Alternatives 1 and 2, there would be a less than 1-percent increase in off-station area within the 65 dB DNL or greater noise contour. Although the projected noise zones for both alternatives would not be significantly larger than the modeled 2014 baseline noise zones, slight variations in the noise contours would occur due to the changes in the aircraft operations. These slight variations also result in a less than 1-percent increase in the number of people exposed to the 65 dB DNL or greater noise zone under Alternatives 1 and 2. Therefore, when compared to the 2014 baseline, implementation of the proposed action would result in negligible impacts to the DNL sound levels around NAS Whidbey Island. Further discussion of the

compatibility of land uses within the projected noise zones for both alternatives is included in Chapter 6.4.4.

Table 6-6 Off-Station Area (Acres) and Projected Population[1] within Modeled 2020 End-State DNL Noise Zones for NAS Whidbey Island

Noise Zone	2014 Baseline (No Action Alternative)		ALT 1 (2020 End-State)		ALT 2 (2020 End-State)	
	Area (acres)	Pop.[1]	Area (acres)	Pop.[1]	Area (acres)	Pop.[1]
65 to 70 dB DNL	8,581	5,198	8,599	5,203	8,598	5,206
70 to 75 dB DNL	7,293	2,890	7,291	2,893	7,290	2,894
75 dB DNL or greater	12,762	3,731	12,778	3,734	12,779	3,735
Total	**28,636**	**11,819**	**28,668**	**11,830**	**28,667**	**11,835**
Net Change	**0**	**0**	**+32 (<1%)**	**+11 (<1%)**	**+31 (<1%)**	**+16 (<1%)**

Source: Wyle 2013; U.S. Census Bureau 2010h.

Note:
[1] Population totals are based on 2010 U.S. Census data.

Key:
dB = Decibels.

Table 6-7 shows the comparative difference in SEL noise values for the P-3C and the P-8A aircraft. Noise values for the EA-18G aircraft are also shown in the table because of its influence on the noise environment at NAS Whidbey Island.

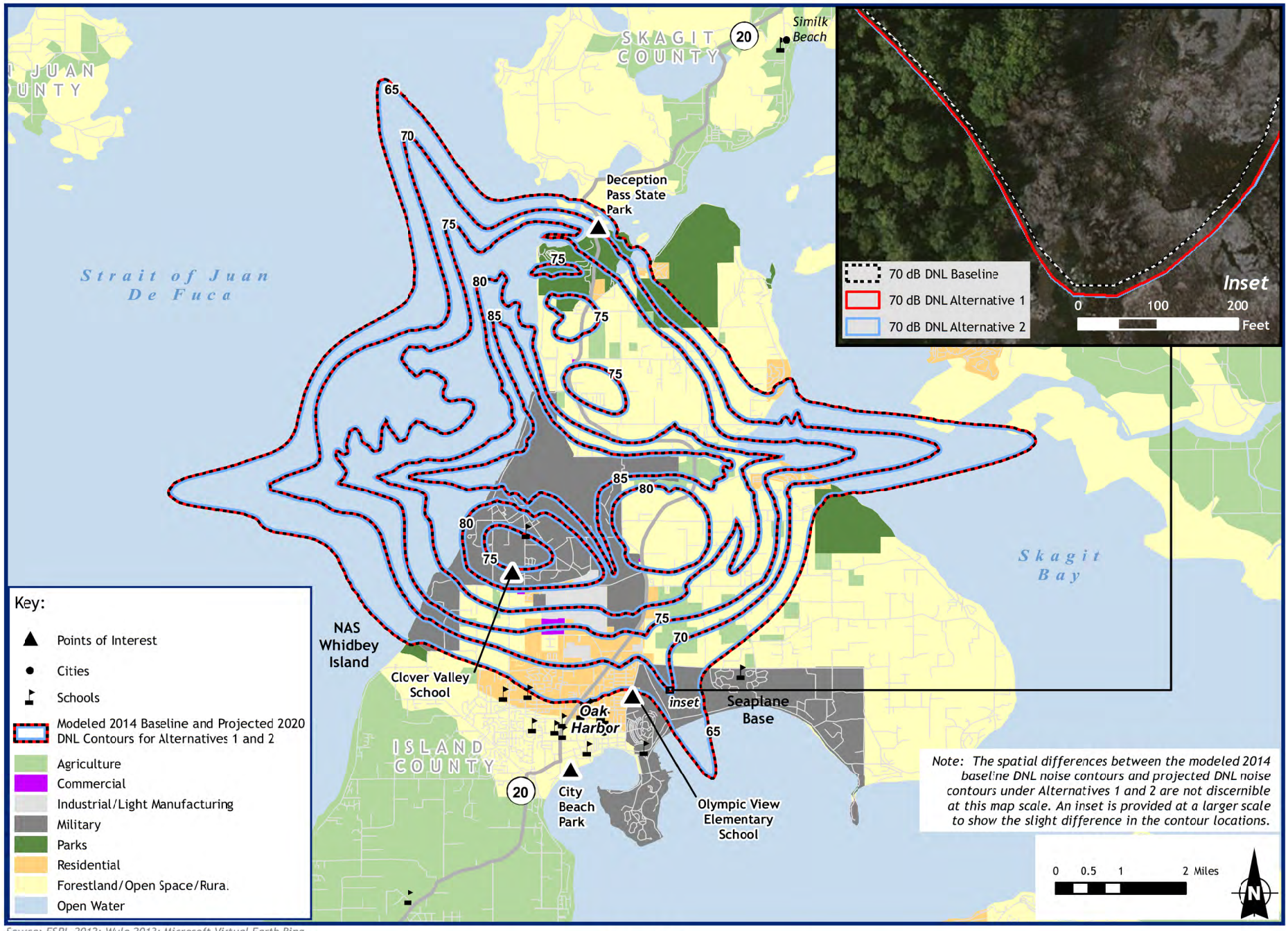
Table 6-7 Comparative Single-Event Noise Levels for the P-3C, P-8A, and EA-18G Aircraft

Event	SEL (dB) during Flyover at 1,000 feet AGL		
	P-3C	P-8A	EA-18G
Departure	94	95	117
Arrival	85	87	113
Touch-and-Go (Downwind)	86	94	113

Key:
AGL = Above ground level.

The P-3C, as a turboprop, and the P-8A, as a jet aircraft, generally have different noise characteristics. For example, the P-8A exhibits more noise in some higher frequency bands during approach (2,500 hertz [Hz] to 5,000 Hz) than the P-3C, and, as a result, while the overall sound energy of the two aircraft is similar, people on the ground will likely detect the "whine" from the P-8A turbofan engines during arrivals. However, the actual increase in total sound energy at a distance of 1,000 feet during arrivals for a P-8A would range from only 1 dB to 2 dB. A larger difference in SEL noise values can be found when comparing T&G operations. In this case, the P-8A is on average about 8 dB louder than the P-3C aircraft.

Noise exposures at the six selected POI locations identified in Chapter 5.2 in the vicinity of NAS Whidbey Island were analyzed for SEL and DNL. These locations and the modeled SEL and DNL are listed in Table 6-8. The POI locations are shown on Figure 6-2.



Source: ESRI, 2012; Wyle 2013; Microsoft Virtual Earth Bing Imagery 2009; Island and Skagit County 2010, 2012.

Figure 6-1
Comparison of Modeled 2014 Baseline DNL Noise Contours and 2020 End-State DNL Noise Contours Projected under Alternatives 1 and 2 at NAS Whidbey Island
Whidbey Island, Washington

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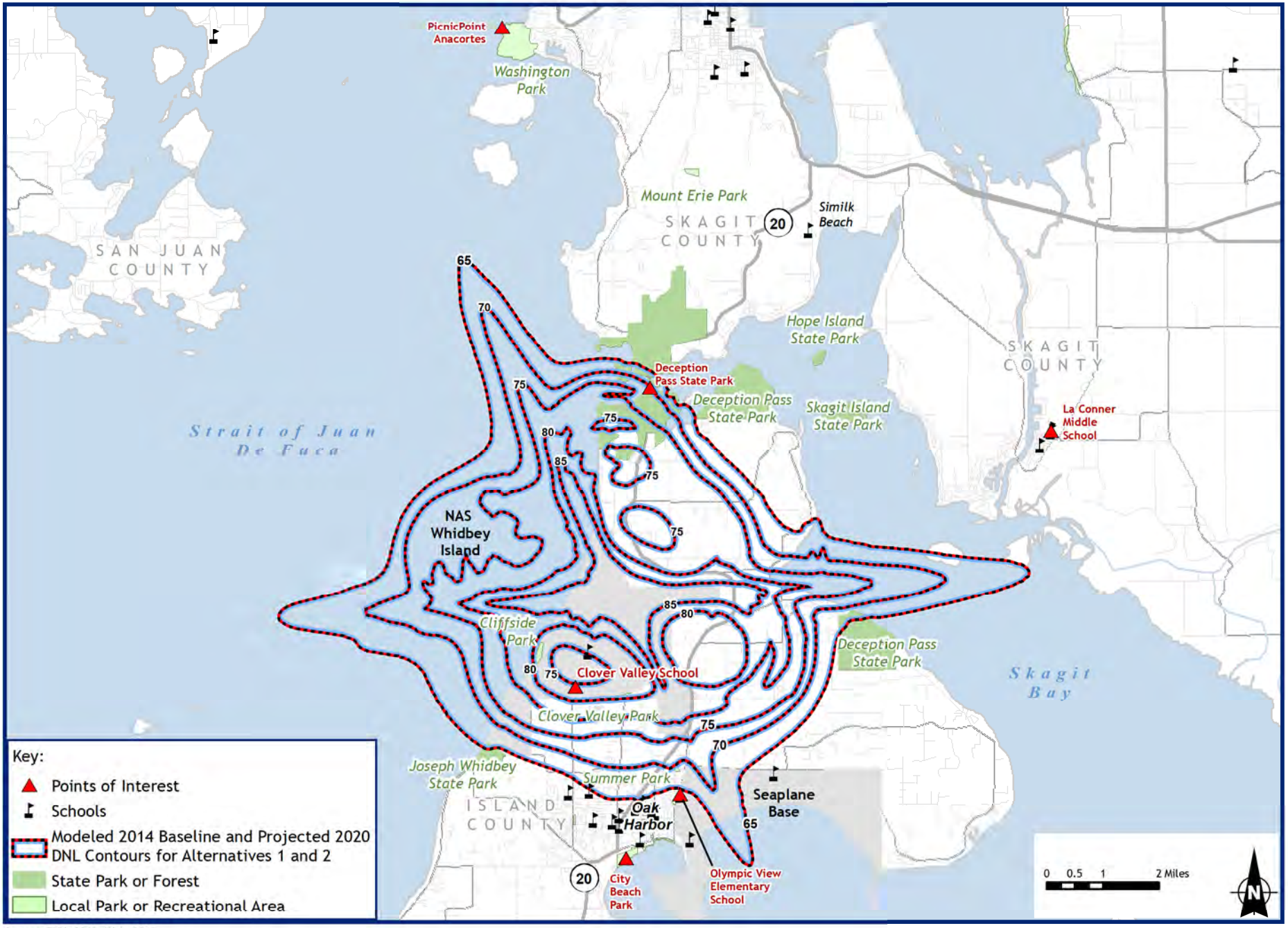

Source: ESRI, 2012; Wyle 2013.

Figure 6-2
Points of Interest in the Vicinity of NAS Whidbey Island
Whidbey Island, Washington

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Table 6-8 Outdoor SEL (dB) and DNL (dB) for Modeled Aircraft Operations at Points of Interest near NAS Whidbey Island for Alternatives 1 and 2[1]

Point of Interest	SEL			DNL	Change from 2014 Baseline (No Action Alternative)
	P-3C	P-8A	E/A-18G	All Modeled Aircraft	
Clover Valley Day School	74	98	111	75	0
City Beach Park	74	86	104	56	0
Olympic View Elementary School	76	89	109	66	+1
Deception Pass State Park	74	87	112	70	0
La Conner Middle School	68	85	92	47	0
Picnic Point, Anacortes	73	76	90	47	0

Source: Wyle 2013

Note:
[1] The modeled sound is representative only for each individual location and does not provide a representative measure of the sound heard during aircraft overflights in other areas.

The SEL provided at each location represents the loudest event (i.e., arrival, departure, and T&G) for the P-3C, P-8A, and EA-18G aircraft. The difference in SEL between the P-3C and the P-8A aircraft ranges between 3 dB to 24 dB. For most operations, the difference in the single-event sound level of the P-8A can be described as noticeably louder than the P-3C aircraft. At each modeled location, the operations conducted by the EA-18G are louder than the operations conducted by either the P-3C or the P-8A aircraft.

Because the number of operations of the EA-18G would remain the same, virtually no changes in DNL at any of the POIs would occur. Olympic View Elementary School indicates an increase of 1 dB; however, this is attributed to a much smaller increase that caused a rounding up of the value to the next whole number dB value. As described earlier for the DNL noise zones, the effect of the introduction of the P-8A aircraft on the DNL at these specific locations would be masked by the EA-18G operations because the EA-18G contributes approximately 98 percent of the acoustic energy to the noise environment at NAS Whidbey Island.

6.2.2 Supplemental Noise Analysis

The supplemental noise metrics used to describe the 2014 baseline noise environment were also used to evaluate the noise environment under Alternatives 1 and 2. These supplemental noise metrics include the PA for the potential for sleep disturbance; the number of events at or above an NA for speech interference, and the L_{eq} for classroom learning interference.

Sleep Disturbance

Tables 6-9 and 6-10 present the results of the sleep disturbance analysis for the six POIs. For both alternatives, the PA would range from 6 percent to 48 percent with windows open and would range from 1 percent to 34 percent with windows closed. Under Alternative 1, a maximum increase of 1 percent in PA would occur at Clover Valley Day School, City Beach Park, Deception Pass State Park, and Picnic Point, Anacortes. Alternative 2 would cause an additional increase of 1 percent in PA with windows open at Olympic View Elementary School. The increases are primarily attributable to the P-8A aircraft's T&G pattern operations. Although the P-8A would conduct approximately the same number of T&G operations during DNL nighttime as the P-3 aircraft under the 2014 baseline scenario, the SEL for the P-8A is up to 24 dB greater than that of the P-3C for the loudest event (i.e., arrival, departure, and T&G) (see Table 6-8).

Indoor Speech Interference

Tables 6-11 and 6-12 present the results of the speech interference analysis for Alternatives 1 and 2, respectively, for the six POIs. Under both alternatives, four of the six sites would have more than one speech-interfering event per daytime hour with windows open, with the maximum of seven events per hour occurring at Clover Valley Day School. Both alternatives would cause increases in interfering events at Clover Valley Day School and Olympic View Elementary School on a daily basis, but only Alternative 2, with the maximum proposed P-8A operations, would cause an increase on an average hourly basis for both windows-open and windows-closed scenarios. Speech-interfering events when the analysis is run with the windows closed would increase by one event per hour at Clover Valley Day School and Olympic View Elementary School. Although the P-8A would conduct fewer operations than the P-3C under the 2014 baseline scenario, the P-8A aircraft is up to 24 dB louder than the P-3C for the loudest event (i.e., arrival, departure, and T&G), causing operations on flight tracks further from the POIs to exceed the threshold for which the P-3C did not (see Table 6-8). The EA-18G aircraft would remain the primary contributor to speech-interfering events at all POIs.

Table 6-9 Analysis of Average Nightly (10:00 PM to 7:00 AM) Probability of Awakening for Representative Residential Receptors for Alternative 1

Point of Interest	ALT 1		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[1]	Windows Closed[1]	Windows Open	Windows Closed
Clover Valley Day School	48%	34%	+1	+1
City Beach Park	25%	13%	+1	0
Olympic View Elementary School	32%	21%	0	0
Deception Pass State Park	31%	16%	+1	0
La Conner Middle School	6%	1%	0	0
Picnic Point, Anacortes	6%	1%	+1	0

Note:
[1] NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Table 6-10 Analysis of Average Nightly (10:00 PM to 7:00 AM) Probability of Awakening for Representative Residential Receptors for Alternative 2

Point of Interest	ALT 2		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[1]	Windows Closed[1]	Windows Open	Windows Closed
Clover Valley Day School	48%	34%	+1	+1
City Beach Park	25%	13%	+1	0
Olympic View Elementary School	33%	21%	+1	0
Deception Pass State Park	31%	16%	+1	0
La Conner Middle School	6%	1%	0	0
Picnic Point, Anacortes	6%	1%	+1	0

Note:
[1] NLRs of 15 dB and 25 dB for windows open and windows closed, respectively.

Table 6-11 Analysis of Average Daily Indoor Speech Interference for Representative Residential Receptors for Alternative 1

Point of Interest	Number of Indoor Events per Daytime Hour[1]			
	ALT 1		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[2]	Windows Closed[2]	Windows Open	Windows Closed
Clover Valley Day School	6	5	0	+1
City Beach Park	2	0	0	0
Olympic View Elementary School	4	2	0	+1
Deception Pass State Park	4	1	0	0
La Conner Middle School	1	0	0	0
Picnic Point	0	0	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour	4	2	0	+1
Minimum Number of Intrusive Events per Hour if Exceeding 1	2	2	0	-2
Maximum Number of Intrusive Events per Hour if Exceeding 1	6	5	0	+1

Notes:
1 Number of Annual Average Daily DNL Daytime Events at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB.
2 NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Table 6-12 Analysis of Average Daily Indoor Speech Interference at Representative Residential Receptors for Alternative 2

Point of Interest	Indoor Number of Events per Daytime Hour[1]			
	ALT 2		Change from 2014 Baseline (No Action Alternative)	
	Windows Open[2]	Windows Closed[2]	Windows Open	Windows Closed
Clover Valley Day School	7	5	+1	+1
City Beach Park	2	0	0	0
Olympic View Elementary School	4	2	0	+1
Deception Pass State Park	4	1	0	0
La Conner Middle School	1	0	0	0
Picnic Point	0	0	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour	4	2	0	+1
Minimum Number of Intrusive Events per Hour if Exceeding 1	2	2	0	-2
Maximum Number of Intrusive Events per Hour if Exceeding 1	7	5	+1	+1

Notes:
1 Number of Annual Average Daily DNL Daytime Events at or above an indoor Maximum Single-Event Sound Level (L_{max}) of 50 dB.
2 NLRs of 15 dB and 25 dB for windows open and closed, respectively.

Classroom Learning Interference

Table 6-13 contains the results of the classroom learning interference analysis for Clover Valley Day School, Olympic View Elementary School and La Conner Middle School. For Alternatives 1 and 2, no change would occur relative to the 2014 baseline. Clover Valley Day School would continue to exceed the indoor $L_{eq(8h)}$ threshold of 35 dB for continuous noise by 22 dB with windows open and by 12 dB with windows closed. Olympic View Elementary School would continue to exceed the indoor $L_{eq(8h)}$ threshold of 35 dB for continuous noise by 16 dB with windows open and 6 dB for windows closed. The EA-18G departure and re-enter patterns would remain the primary cause for the $L_{eq(8h)}$, and the EA-18G departures would continue to drive the interfering events.

6.2.3 Potential Hearing Loss Analysis

No additional people would be exposed to noise levels greater than 80 dB DNL under Alternatives 1 or 2; the same population affected by noise levels above 80 dB DNL under 2014 baseline conditions would continue to be exposed to greater than 80 dB DNL noise levels under Alternatives 1 and 2. Therefore, no new populations would be at risk for PHL under Alternatives 1 or 2.

6.2.4 Nonauditory Health Effects

Results from studies of nonauditory effects of noise on humans are not as easily substantiated as the effects on hearing. Several studies have been conducted that examine potential relationships between aviation noise and potential health effects, including cardiovascular disease, birth weight, and mortality rates.

A recent study, published in October 2013, was conducted by the FAA and organizations and universities to examine the possible impact aviation noise has on cardiovascular disease in the elderly (Correia et al. 2013). The study controlled for individual demographics, socioeconomic status, air pollution, and roadway proximity. The research suggests that when averaged across all airports studied, a small but positive link exists between exposure to aircraft noise above 55 dB DNL and increased risk of hospitalization for cardiovascular disease. According to the study, this does not hold for every individual airport studied, and additional research should be conducted to determine why such variations are being seen at some individual airports. In addition, the study did not account for other local factors, such as the length of time living in the airport community. Also, the data utilized for the study were from the Medicare database, which has some data gaps and inconsistencies between different communities. Therefore, the results of this study are considered too preliminary to provide the basis for guidance or policy related to aviation noise.

Other studies that analyzed potential correlations between noise and cardiovascular disease were similarly inconclusive, contradictory, or required additional data or analysis. Cantrell (1974) and Kryter and Poza (1980) proposed that annoyance and/or interruption of everyday activities as a result of aviation noise can be a stress producer. In turn, prolonged stress has been known to be associated with several health disorders; however, the assertion remained that additional studies would be required.

Several studies examining potential health effects found that hearing protection being used to protect from auditory effects will also protect against potential nonauditory health effects, at least in workplace conditions. This conclusion was outlined at the National Institutes of Health Conference on Noise and Hearing Loss (Von Gierke 1990), where it was stated that studies typically identified potential health effects at higher noise levels and that establishing and enforcing exposure levels protecting against noise-induced hearing loss would solve not only the hearing loss problem but also any potential nonauditory health effects in the workplace (Von Gierke 1990).

Table 6-13 Analysis of Average Daily (8:00 AM to 4:00 PM) Indoor Classroom Learning Interference for Alternatives 1 and 2

School Point Of Interest	ALTs 1 and 2					Change to 2014 Baseline (No Action Alternative)				
		Indoor					Indoor			
		Windows Open[1]		Windows Closed[1]			Windows Open		Windows Closed	
	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour[1]	$L_{eq(8h)}$ (dB)	Events per Hour[2]	Outdoor $L_{eq(8h)}$ (dB)	$L_{eq(8h)}$ (dB)	Events per Hour[2]	$L_{eq(8h)}$ (dB)	Events per Hour[2]
Clover Valley Day School	72	57	7	47	5	0	0	0	0	0
Olympic View Elementary School	66	51	5	41	2	0	0	0	0	0
La Conner Middle School	47	32	1	22	0	0	0	0	0	0
Number of Sites Exceeding 1 Intrusive Event per Hour			2		2			0		0
Minimum Number of Intrusive Events per Hour if Exceeding 1			5		2			0		0
Maximum Number of Intrusive Events per Hour if Exceeding 1			7		5			0		0

Notes:

1 NLRs of 15 dB and 25 dB for windows open and closed, respectively.

2 Number of annual average busy day events per hour during an 8-hour school day (8:00 AM to 4:00 PM) at or above an indoor maximum single-event sound level (L_{max}) of 50 dB.

Although the above studies are generally inconclusive regarding nonauditory health effects of noise, the proposed action would not be expected to result in any significant nonauditory health effects from P-8A operations. This is based on the negligible change in DNL sound levels around NAS Whidbey Island under Alternatives 1 and 2.

6.2.5 Construction Noise

Construction under each action alternative would result in short-term noise impacts at and near Ault Field. Construction activities are described in Chapter 2.4.4.2.

Typical noise emission levels for construction equipment that may be used for each alternative are listed in Table 6-14. Noise impacts related to construction would be intermittent and temporary (over an approximately 24-month construction period). Furthermore, since the proposed construction is located at the NAS Whidbey Island airfield and approximately 4,500 feet from the nearest residential land use and other sensitive noise receptors, neither action alternative would result in a significant construction-noise-related impact on the existing environment.

Table 6-14 Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (derrick)	88
Delivery Truck	88
Diamond Saw	90
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-Driven Vibro-compactor	76
Hoist	76
Jackhammer (paving breaker)	88
Line Drill	98
Motor Crane	83
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Tug	85
Vibratory Pile Driver/Extractor	89

Source: Barnes et al. 1977.

Key:
dBA = A-weighted decibels.

6.2.6 Noise Abatement

The Navy is not proposing any noise mitigation as part of the proposed action at NAS Whidbey Island. NAS Whidbey Island will continue to make every attempt to minimize its noise impacts to nearby communities through the continued use of designated flight paths, procedures, and noise-abatement measures for military aircraft operating from NAS Whidbey Island.

Conclusion

Overall, the proposed action alternatives would not result in significant operational or construction noise impacts at NAS Whidbey Island because the acreage and population exposed to aircraft noise levels would change only slightly. Supplemental noise analyses indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. No new populations would be at risk for PHL under Alternatives 1 or 2. All proposed construction-related noise would be located at the airfield, approximately 4,500 feet from the nearest residence or other sensitive noise receptors.

6.3 Air Quality

Air emissions associated with the proposed action at NAS Whidbey include those from construction, flight operations from the P-8A, and POV commuting activities of station personnel. Other stationary sources, other aircraft, GSE, and other sources are assumed to remain constant under this action. The Conformity Rule does not apply to the implementation of this action because NAS Whidbey is located in a region that is in attainment for all NAAQS.

6.3.1 Construction Emissions

Construction may affect air quality primarily as a result of construction equipment emissions, paving and painting emissions, and fugitive dust from grading and earthmoving. These emissions are calculated separately from operational emissions because they are temporary and would occur before full implementation of the selected alternative.

Annual construction emissions were estimated using emission factors from multiple guidelines and references, including EPA's NONROAD emission modeling program (EPA 2008b); EPA420-F-08-024 (EPA 2008a), and the EPA AP-42 (1995). Emissions were based on estimates of equipment to be used 8 hours per day on average, and assuming 250 workdays per year. Construction of new facilities to support Alternatives 1 and 2 would occur over 2 years. Particulate emissions from site preparation and demolition are also considered. Total projected annual construction emissions in tpy at NAS Whidbey Island under both alternatives are listed in Table 6-15. The construction equipment, activities, emission factors, and calculations are detailed in Appendix E.

Table 6-15 Construction Emissions at NAS Whidbey Island, Alternatives 1 and 2

Activity	Emissions (tpy)				
	NO_x	VOCs	CO	SO_2	PM_{10}
ALT 1					
Construction equipment	12.64	1.24	6.27	0.03	1.02
VOCs from paving and painting	0	7.15	0	0	0
PM_{10} from site prep and demo	0	0	0	0	4.56
Worker and delivery traffic	0.20	0.12	1.11	0.002	0.37
Total[1]	**12.84**	**8.51**	**7.38**	**0.03**	**5.94**

Table 6-15 Construction Emissions at NAS Whidbey Island, Alternatives 1 and 2

Activity	Emissions (tpy)				
	NO_x	VOCs	CO	SO_2	PM_{10}
ALT 2					
Construction equipment	25.29	2.48	12.54	0.06	2.03
VOCs from paving and painting	0	11.83	0	0	0
PM_{10} from site prep and demo	0	0	0	0	4.69
Worker and delivery traffic	0.39	0.32	2.94	0.003	0.93
Total[1]	**25.68**	**14.62**	**15.48**	**0.06**	**7.65**

Note:
[1] Total air emissions may not sum to 100 percent due to rounding.

Key:
CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter less than 10 microns in diameter.
SO_2 = Sulfur Dioxide.
TPY = Tons per year.
VOCs = Volatile organic compounds.

6.3.2 Operational Emissions

Operational emissions considered in this analysis include those generated by P-3C and P-8A flight and maintenance operations and POVs operated by squadron personnel. Assumptions and emission factors from the baseline analysis were incorporated into this analysis (See Chapter 5.3). Existing emissions are discussed in Chapter 5.3 and summarized in Table 6-16. These emissions are the baseline for comparison of impacts with the proposed action alternatives. Annual aircraft operation and POV emission totals for each alternative and the change in emission totals that would result from this action are also listed in Table 6-16. Emission factors and calculations are detailed in Appendix E.

Table 6-16 Projected Operational Emissions at NAS Whidbey Island, Alternatives 1 and 2

Flight Operation	No. of Operations[1]	Emissions (tpy)				
		CO	NO_x	VOC	SO_2	PM_{10}
ALT 1 (42 P-8A Aircraft)						
Straight-In Arrival LTOs	2,031	17.9	27.1	2.4	2.7	0.9
Touch-and-Go	1,920	0.2	6.1	0.03	0.6	0.2
GCA Pattern	1,194	0.2	6.0	0.03	0.6	0.1
Maintenance Run Ups		0.010	0.064	0.001	0.015	0.002
Total P-8A Emissions		**18.3**	**39.2**	**2.5**	**3.8**	**1.2**
Baseline P-3C Emissions		52.5	43.5	33.7	12.3	21.0
Change in Aircraft Emissions		**-34.2**	**-4.3**	**-31.2**	**-8.5**	**-19.8**
Change in POV Emissions		**-6.6**	**-0.5**	**-0.7**	**0.000**	**-1.94**
Total Change in Operational Emissions[2]		**-40.8**	**-4.8**	**-31.9**	**-8.5**	**-21.7**
ALT 2 (49 P-8A Aircraft)						
Straight-In Arrival LTOs	2,347	20.7	31.3	2.8	3.1	1.0
Touch-and-Go	2,129	0.20	6.72	0.03	0.63	0.17
GCA Pattern	1,333	0.19	6.66	0.03	0.62	0.17
Maintenance Run Ups		0.011	0.074	0.001	0.017	0.002
Total P-8A Emissions		**21.1**	**44.8**	**2.9**	**4.4**	**1.4**

Table 6-16 Projected Operational Emissions at NAS Whidbey Island, Alternatives 1 and 2

Flight Operation	No. of Operations[1]	Emissions (tpy)				
		CO	NO_x	VOC	SO_2	PM_{10}
Baseline P-3C Emissions		52.5	43.5	33.7	12.3	21.0
Change in Aircraft Emissions		**-31.4**	**1.3**	**-30.8**	**-7.9**	**-19.6**
Change in POV Emissions		**12.8**	**1.0**	**1.4**	**0.00**	**3.8**
Total Change in Operational Emissions[2]		**-18.6**	**2.3**	**-29.5**	**-7.9**	**-15.9**

Notes:

1 Number of operations provided by Wyle 2013. An LTO includes a departure and an arrival, and T&G and GCA patterns also include two operations; therefore, total operations listed in Chapter 2.4.4.2 and in noise analysis will be double these air quality operations totals.

2 Total air emissions may not sum due to rounding.

Key:

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter less than 10 microns in diameter.
POV = Privately owned vehicle.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOC = Volatile Organic Compounds.

The Conformity Rule does not apply to the implementation of this action because NAS Whidbey Island is located in a region that is in attainment for all NAAQS. Estimates of projected operational emissions show a decrease in annual emissions for all criteria pollutants under all alternatives. GHG emissions would also decrease. Consequently, there would be no adverse impacts on air quality from operational emissions or changes in GHG emissions.

Several comments were received on the Draft SEIS from individuals in the communities near NAS Whidbey Island related to air quality and other natural resource impacts resulting from fuel dumping and use of lead in jet fuel. Unlike the P-3C, P-8A aircraft do not have the ability to dump fuel. Therefore, fuel dumping would not occur under any circumstance as part of the proposed action. It should also be noted that fuel dumping by aircraft rarely occurs. Navy aircrews are prohibited from dumping fuel below 6,000 feet, except in an emergency situation. Above 6,000 feet, the fuel has enough time to completely vaporize and dissipate. Lead is not used as an additive in military jet fuel. Consequently, there would be no impact from lead on public health or the environment.

Conclusion

In summary, the transition of P-3C to P-8A aircraft under the action alternatives would not result in significant impacts on air quality at NAS Whidbey Island. Construction emissions would be temporary, and projected operating emissions show a decrease in annual emissions for all criteria pollutants and GHGs under all alternatives, except for a slight increase in emissions of NO_x under Alternative 2. The No Action Alternative would not impact air quality because there would be no new construction and no change in baseline aircraft operations.

6.4 Land Use

The impact analysis for land use in this SEIS focuses on those off-station areas affected by aircraft noise. The compatibility of off-station land uses with modeled noise zones is assessed. Land uses are frequently regulated by management plans, land use plans, comprehensive plans, and local zoning regulations and ordinances. These plans and regulations assist in identifying where future development can occur so it is compatible with surrounding land uses and protective of specially designated or environmentally sensitive uses. This analysis relies not only on zoning designations but on APZs and noise zones as defined by the

Navy's AICUZ Program. As stated in Chapter 1.3.5, AICUZ studies provide recommendations to promote community development that is compatible with operations at an air station.

6.4.1 NAS Whidbey Island Land Use

The area of new construction required to support six or seven P-8A fleet squadrons under both home basing alternatives is provided in Table 6-3. The locations of the proposed construction projects are shown on Figure 2-6 in Chapter 2, Proposed Action and Alternatives.

Primary construction and renovation projects associated with all home basing alternatives would include new training and information facilities, a mobile operation center, equipment shop, and outdoor storage area; renovation of existing buildings for an operations center; and expansion of existing hangars. Alternatives 1 and 2 would require construction of a new POV parking lot, expansion of the existing aircraft parking ramp, and construction of taxiway connectors. Expanding the aircraft parking ramp would require demolishing five existing buildings and relocating an existing rinse facility. Alternative 2 additionally would require construction of a new P-8A hangar bay adjacent to Hangar 6. The total construction area would be 13.76 acres under Alternative 1 and 21.86 acres under Alternative 2. No new construction would be completed under the No Action Alternative.

Most of the new construction and facility renovation under the home basing alternatives would occur west of the flight line or at the southeastern end of the flight line, either on or adjacent to areas currently developed to support airfield operations. Land use in this portion of Ault Field has been designated as "Operations" and "Logistics/Industrial" (MAKERS Architecture and Urban Design 2004). Construction of new facilities in this area would be consistent with these current land use designations and would maximize the use of vacant or underused land close to the flight line. Consequently, land use at NAS Whidbey Island would not be adversely affected by the proposed action.

6.4.2 Regional Land Use

The construction and facility renovation projects proposed under the home basing alternatives would not be expected to result in direct or indirect impacts on regional land uses because they would be located entirely within NAS Whidbey Island. Direct and indirect impacts on regional land use from changes in the number of personnel at NAS Whidbey Island and noise zones off station represent the focus of this impact analysis. A land use compatibility analysis comparing the proposed noise zones to baseline noise zones is included in Chapter 6.4.4.

The proposed action alternatives would not result in indirect growth-induced development in Island County. The number of personnel at NAS Whidbey Island would decrease by 90 individuals under Alternative 1 and increase by 175 individuals under Alternative 2. Considering the 2.6-percent projected growth rate of Island County between 2010 and 2020, the slight increase or decrease in personnel that would occur under either of the proposed action alternatives would not be anticipated to change existing land use patterns or result in any growth-induced impacts. Consequently, regional land use would not be adversely impacted by the proposed action. There would be no change in the number of personnel at NAS Whidbey Island under the No Action Alternative, and thus no impacts related to growth-induced development or changes to existing land use patterns.

6.4.3 Land Use Consistency with Local Plans, Programs, and Policies

Implementation of the proposed action under all alternatives, including the No Action Alternative, would not affect the baseline APZs at NAS Whidbey Island; would be consistent with goals and objectives of the 2004 AOP; would have no effect on management practices currently implemented under the INRMP or HARP Plan; and is consistent with the objectives of the Island County and City of Oak Harbor comprehensive plans. The Navy will coordinate construction occurring within any sites listed in the Land

Use Controls Implementation Plan with the EPA to ensure institutional controls will remain in place. The Navy would continue to work with the City of Oak Harbor and Island County to plan for compatible land use development within the projected noise zones under all home basing alternatives, including the No Action Alternative.

6.4.4 Land Use Compatibility Assessment

Aircraft operations associated with home basing six or seven P-8A fleet squadrons at NAS Whidbey Island would result in a slight increase in the land area within the greater than 65 dB DNL noise zone when compared to 2014 baseline conditions. An analysis was conducted to compare projected noise zones with the 2014 baseline noise zones in terms of compatibility with land uses in Island and Skagit counties. This was accomplished by overlaying maps of the projected noise zones under both home basing alternatives on the Island and Skagit county zoning maps (see Figure 6-1).

Tables 6-17 and 6-18 show the types of land uses around NAS Whidbey Island that would be affected by Alternatives 1 and 2 and impacts resulting from the home basing alternatives compared to 2014 baseline conditions. In summary, when compared with baseline conditions, both of the alternatives would result in a less than 1-percent increase in the acreage of land and water within the projected greater than 65 dB DNL noise zone. Most of the additional area within the projected noise zones under both alternatives would occur over water. Consequently, land use in the vicinity of NAS Whidbey Island would not be significantly impacted from aircraft operations under either of the action alternatives.

Table 6-17 Net Change in Area within the Projected Greater than 65 dB DNL Noise Contours around Ault Field under Alternative 1

Land Use	2014 Baseline (No Action Alternative) Total Area (acres)	65 to 70 dB DNL (acres)	70 to 75 dB DNL (acres)	>75 dB DNL (acres)	ALT 1 Total Area (acres)	Net Change (acres)	% Net Change
Agriculture	1,001	134	178	689	1,001	0	0
Commercial	74		25	49	74	0	0
Forestland/Open Space	929	308	167	456	931	2	<1
Industrial/Light Manufacturing	471	1	77	393	471	0	0
Military	4,759	618	483	3,662	4,763	4	<1
Open Water	15,572	5,903	4457	5,235	15,595	23	<1
Parks	1,037	309	360	370	1,039	2	<1
Residential	1,310	607	483	221	1,311	1	<1
Rural	8,242	1,338	1,545	5,363	8,246	4	<1
Total Acres	**33,396**	**9,217**	**7,774**	**16,440**	**33,431**	**36**	**<1**

Source: Wyle 2013

Note: Some totals may not sum exactly due to rounding.

Key:
dB = Decibel.
DNL = Day-night average sound level.

Table 6-18 Net Change in Area within the Projected Greater than 65 dB DNL Noise Contours around Ault Field under Alternative 2

Land Use	2014 Baseline (No Action Alternative) Total Area (acres)	65 to 70 dB DNL (acres)	70 to 75 dB DNL (acres)	>75 dB DNL (acres)	ALT 2 Total Area (acres)	Net Change (acres)	% Net Change
Agriculture	1,001	134	178	689	1,001	0	0
Commercial	74		25	49	74	0	<1
Forestland/Open Space	929	307	167	456	930	1	<1
Industrial/Light Manufacturing	471	1	77	393	471	0	0
Military	4,759	618	483	3,663	4,764	5	<1
Open Water	15,572	5,904	4,457	5,236	15,596	24	<1
Parks	1,037	308	360	371	1,038	1	<1
Residential	1,310	607	483	221	1,311	1	<1
Rural	8,242	1,337	1,545	5,364	8,245	3	<1
Total Acres	**33,396**	**9,217**	**7,773**	**16,442**	**33,432**	**35**	**<1**

Source: Wyle 2013

Note: Some totals may not sum exactly due to rounding.

Key:
dB = Decibel.
DNL = Day-night average sound level.

There would be no change in the amount of land area within the noise zones at NAS Whidbey Island under the No Action Alternative.

Residential land use is incompatible in the greater than 65 dB DNL noise zone (OPNAVINST 11010.36C). The amount of residential land within the greater than 65 dB DNL noise zone would increase by 1 acre under Alternatives 1 and 2. This slight increase in residential land would primarily occur within the greater than 75 dB DNL noise zones.

Conclusion

In summary, implementation of the action alternatives at NAS Whidbey Island would not result in significant impacts to local and regional land use. The acreage of land and water within the projected greater than 65 dB DNL noise zone would increase by less than one percent under both of the action alternatives. Incompatible land use (i.e., residential land) within the noise zones would increase by 1 acre under both alternatives. Both of the action alternatives would be consistent with management plans, land use plans, comprehensive plans, and local zoning and ordinances designed to control growth and new development in the vicinity of NAS Whidbey Island.

6.5 Socioeconomics

This assessment examines how the proposed action would affect population and housing (Chapter 6.5.1), the economy (Chapter 6.5.2), taxes and revenues (Chapter 6.5.3), education (Chapter 6.5.4), and environmental justice (Chapter 6.5.5) for the study area populations.

This socioeconomic analysis focuses on impacts attributable to changes in military and civilian personnel levels and construction expenditures. Economic impacts are defined to include direct effects, such as changes to employment, payrolls, and expenditures that affect the flow of dollars into the local economy,

and secondary effects, which result from the "ripple effect" of spending and re-spending in response to the direct effects.

Socioeconomic impacts, particularly impacts such as those being evaluated in this SEIS, may be mixed: beneficial in terms of gains in jobs, expenditures, and tax revenues, but adverse in terms of reduction in station personnel and growth-management issues, such as demands for housing and community services. The analysis in this SEIS identifies potential environmental justice issues. Impacts to environmental justice populations are identified where high and adverse human health or environmental effects may disproportionately affect minority or low-income populations. Impacts to children would occur if there were an increased disproportionate environmental, health, or safety risk to children.

6.5.1 Population and Housing

6.5.1.1 Population

Implementation of Alternatives 1 and 2 would result in minor impacts on the personnel loading at NAS Whidbey Island and on total population in the region. Total P-8A personnel loading at NAS Whidbey Island would increase under Alternative 2 and decrease under Alternative 1 compared to baseline P-3C personnel loading. As shown on Table 6-19, 1,858 P-3C personnel (487 officers and 1,371 enlisted personnel) are assigned at NAS Whidbey Island under baseline conditions. Following implementation of Alternative 1, 1,768 P-8A personnel would be assigned at the station; under Alternative 2, 2,033 P-8A personnel would be assigned at the station. These personnel loading levels represent a decrease of 90 personnel under Alternative 1 (5-percent decrease) and an increase of 175 personnel under Alternative 2 (9-percent increase).

The baseline P-3C loading at NAS Whidbey Island would not change under the No Action Alternative.

Table 6-19 P-8A Personnel at NAS Whidbey Island under Each Alternative at End-State[1]

	2014 Baseline P-3C Personnel (No Action Alternative)[2]	ALT 1 (6 squadrons)		ALT 2 (7 squadrons)	
		P-8A Personnel	Change (+/-)	P-8A Personnel	Change (+/-)
Officers	487	488	+ 1	556	+ 69
Enlisted	1,371	1,280	-91	1,477	+ 106
Total	**1,858**	**1,768**	**-90**	**2,033**	**+ 175**

Notes:
1 The end-state for Alternatives 1 and 2 occurs in 2020 and reflects the planned disestablishment of VQ-1.
2 The 2014 baseline assumes three P-3C squadrons and no P-8A squadrons.

The population and demographic characteristics of Island County would be similarly impacted. As military personnel are relocated from or to NAS Whidbey Island, their dependents (e.g., spouses and children) would accompany them and also leave or move into the region. The number of military dependents affected by the proposed alternatives was calculated using a national Navy/USMC percentage of married enlisted personnel and officers, by rank, and the average number of dependents by parents' rank (see *Unified Facilities Criteria: Facility Planning for Navy and Marine Corps Shore Installations, Series 700 Housing and Community Facilities UFC-2-000-05N*). Personnel who were not married were assumed to have no dependents. These average percentages were applied to the number of enlisted personnel and officers who would be reassigned under each of the proposed alternatives to determine the corresponding number of dependents (see Table 6-20).

As shown on Table 6-20, the resulting changes in population would be expected to be minor relative to the size of the regional population. Implementation of Alternative 1 would result in the relocation of 191 personnel and dependents from the local area compared to 2014 levels. This decrease in population would represent a decrease of 0.2 percent of the projected population of Island County in 2020. Alternative 2 would increase the regional population by a projected 410 persons, an increase of 0.5 percent of the county's projected 2020 population. Therefore, no significant impacts to the regional population are anticipated to occur under either of the action alternatives.

Regional population would not be impacted under the No Action Alternative because baseline P-3C personnel loading at NAS Whidbey Island would not change.

Table 6-20 Regional Population Impacts[1] Resulting from the Changes in P-3C and P-8A Personnel Loading at NAS Whidbey Island Compared to the 2014 Baseline (No Action Alternative) Levels

Personnel	Change from 2014 Baseline (No Action Alternative)	
	ALT 1	ALT 2
Military Personnel	-90[2]	+175[2]
Military Dependents	-101	+235
Total Population/Total Population Change (+/-)	**-191**	**+410**
Island County's 2020 Projected Population	82,735	82,735
Total Population/Total Population Change as a Percentage of Island County's 2020 Projected Population	**-0.2%**	**0.5%**

Source: State of Washington 2012

Notes:

1 Population impacts were calculated for the change between the 2014 baseline levels and the time when all transitions would be completed, the 2020 end-state levels.

2 The projected decrease in personnel at NAS Whidbey Island under Alternative 1 and slight increase under Alternative 2, despite an increase in aircraft loading under both alternatives, is the result of fewer personnel assigned to a P-8A squadron compared to a P-3C squadron.

6.5.1.2 Housing

The relatively small change in personnel loading at NAS Whidbey Island that would occur under Alternatives 1 and 2 compared to the 2014 baseline levels would have only a minor impact on the overall housing market in Island County. Implementation of the proposed alternatives would result in 90 households leaving the region under Alternative 1 and 175 households moving into the region under Alternative 2. Assuming each household occupies one housing unit, 90 fewer housing units would be required under Alternative 1, and 175 more housing units would be required under Alternative 2. This change in demand for housing units would represent 1.5 percent or less of the total number of housing units in 2010 in Island County. Given the relatively small change in housing demand that would occur under both of the proposed alternatives, implementation of Alternatives 1 and 2 would have only a minor impact on the availability of housing and a negligible, if any, impact on the price of housing in the regional market.

The housing market in Island County would not be impacted by the No Action Alternative because baseline P-3C personnel loading at NAS Whidbey Island would not change.

6.5.2 Economy, Employment, and Income

Implementation of Alternatives 1 and 2 would have the potential to impact the regional economy in two ways. First, any additional construction that would be required to support the proposed action would

have a short-term positive economic effect as these funds were injected into the regional economy. Second, a long-term economic impact would occur on the Island County regional economy as a result of the change in employment and payroll at NAS Whidbey Island that would be associated with both alternatives. The impacts from construction would be one-time in nature, whereas the impacts from the change in employment and employee earnings would be annual and long term.

In order to quantify the total economic impacts each alternative would have on the regional economy, the Navy used the RIMS II designed by the U.S. Bureau of Economic Analysis. The multipliers utilized in this input-output model are based on regional information derived from databases analyzing commercial, industrial, and household spending patterns and relationships. These multipliers also estimate the potential number of jobs created or lost as a result of changes in earning and spending patterns. Both one-time, short-term construction-related economic impacts and annual, long-term operational spending impacts are discussed below.

Short-Term Construction-Related Impacts

Implementation of Alternatives 1 and 2 would require upgrading, renovating, or constructing new facilities at NAS Whidbey Island to accommodate the P-8A aircraft squadrons and personnel. Alternative 1 would require $111.1 million in construction expenditures; Alternative 2 would require $180.2 million. Major cost components under both alternatives include a new P-8A trainer facility, expansion of Hangar 6, expansion of the existing aircraft parking ramp, and a new Mobile Tactical Operations Center. Alternative 2 would additionally require construction of a new P-8A hangar bay.

The specific years of construction for various facility components would vary, but construction would be assumed to take place during FY 2014 and/or 2015. A number of jobs would be generated during the construction period and contribute to local income and indirect spending, as well as direct spending. The proposed construction projects would generate between 1,151 and 1,868 jobs, and $55.1 million and $89.4 million in employee earnings, depending on the alternative selected. Table 6-21 presents the total (e.g. direct, indirect, and induced) economic impacts associated with both alternatives.

Table 6-21 Total Direct, Indirect, and Induced Impacts Resulting from Construction Expenditures in Island County under Each Alternative

Construction Expenditures	ALT 1 ($millions)	ALT 2 ($millions)
Total Construction Expenditures	$111.1M	$180.2M
Total Direct, Indirect, and Induced Impacts		
Change in Regional Output[1]	$171.2M	$277.6M
Change in Value Added[1]	$94.7M	$153.7M
Change in Employee Earnings	$55.1M	$89.4M
Change in Employment (Jobs)	1,151	1,868

Note:
[1] The Terms "Regional Output" and "Value-Added" are measurements of economic activity.

Because these construction dollars represent a one-time expenditure, the resulting positive economic impacts would last only a short time. Once these funds leave the regional economy through savings, taxes, or purchases of goods and services outside the region, the positive effects would no longer be multiplied.

Long-Term Employee Earnings and Spending Impacts

As described above in Chapter 6.5.1, direct Navy employment at NAS Whidbey Island attributable to the proposed action would decrease by 90 personnel under Alternative 1 and expand by 175 personnel under Alternative 2 by 2020 compared to 2014 employment levels.

Changes in the amount of income that would be injected into the regional economy through NAS Whidbey Island's payroll expenditures would directly and indirectly affect employment and earnings in the regional economy. Every additional job created at NAS Whidbey Island would stimulate the regional economy and create more employment and business opportunities; conversely, every job lost would contract the regional economy and reduce local employment and business opportunities.

Personnel assigned to NAS Whidbey Island spend a portion of their disposable income in the regional economy, thus impacting the sales and profits of local merchants and suppliers. When personnel levels at the station fluctuate, these local merchants and suppliers may in response, change their employment levels or output as a direct result of the change in demand for their goods and services.

Table 6-22 summarizes projected changes in employment and payroll at NAS Whidbey Island under both of the alternatives and includes the estimated regional economic impact that would result from these annual increases or decreases. Payroll expenditures were calculated for all personnel relocating to the area under Alternative 2 or transitioning from the area under Alternative 1. The change in direct payroll for personnel stationed or employed at NAS Whidbey Island is also shown in Table 6-22. Alternative 1 would result in a decrease of approximately $5.3 million in direct military payroll in the region. Alternative 2 would result in an approximately $15.8 million increase in direct military employee earnings.

The indirect and induced impacts as well as the total impacts of the change in regional employment and employee earnings income is also presented in Table 6-22. These indirect, induced, and total effects were calculated using RIMS II Type II direct effect multipliers.

Table 6-22 Annual Direct, Indirect, and Induced Impacts on Employment and Employee Earnings in Island County under Each Alternative

	ALT 1	ALT 2
Annual Employment Impacts		
Direct Employment Changes	-90	175
Indirect and Induced Employment Impacts	-57	111
Total Annual Employment Impacts	-147	286
Annual Employee Earnings Impacts (2013 $millions)		
Direct Changes in Military Payroll	-$5.3	$15.8
Indirect and Induced Impacts	-$3.1	$9.3
Total Annual Employee Earnings Impacts	-$8.4	$25.2

Note: Columns may not sum to total due to rounding.

The increase in personnel and payroll expenditures at NAS Whidbey Island under Alternative 2 would have a positive regional economic impact, with a combined increase of 286 direct, indirect, and induced jobs and a total increase of employee earnings of approximately $25.2 million over 2014 baseline levels (see Table 6-22). Total employment in Island County in 2012 was 29,122 persons (U.S. Department of Labor 2013c; 2013d). Therefore, the addition of 286 new jobs resulting from the implementation of Alternative 2 would represent an increase of 1.0 percent in the total number of people employed in Island County.

In contrast, the decrease in personnel and payroll expenditures at NAS Whidbey Island under Alternative 1 would have a negative regional economic impact. As shown in Table 6-22, implementation of Alternative 1 would result in a decrease of 147 direct, indirect, and induced jobs and result in a reduction of $8.4 million in total employee earnings in the regional economy.

Long-term employee earnings and spending would not be impacted under the No Action Alternative because baseline P-3C personnel loading at NAS Whidbey Island would not change.

6.5.3 Taxes and Revenues

The additional personnel at NAS Whidbey Island under Alternative 2 would have a positive impact on the generation of tax revenues in Island County and the State of Washington as a whole. Property tax and sales tax receipts would all increase slightly as a direct result of the expanded regional economy. In contrast, property tax and sales tax receipts would all decrease slightly under Alternative 1 as a direct result of the contracted regional economy due to the relocation of personnel. However, the small reduction in regional population under this alternative (e.g., 0.5 percent) would also reduce the amount of government services and facilities that would be required, thereby reducing total government expenditures.

Taxes and revenues would not be impacted under the No Action Alternative because baseline P-3C personnel loading at NAS Whidbey Island would not change.

6.5.4 Education

The anticipated personnel movements at NAS Whidbey Island under Alternatives 1 and 2 would be expected to change the number of school-aged children living in the area. Assuming that all military personnel and their families who are no longer assigned at the station under Alternative 1 leave the area with their families, a net decrease of 44 school-aged children would occur under Alternative 1. In contrast, a net increase of 106 school-aged children would occur under Alternative 2 if the additional personnel assigned to NAS Whidbey Island relocate into the area.

If all of the projected changes in the school-aged population were experienced within the Oak Harbor School District, it would have a minor impact to total enrollment. The district served 5,766 students in school year 2011-12, and if the entire change in school-aged children were to be realized within its boundaries, the district's total enrollment would decrease by 0.7 percent under Alternative 1 and increase by 1.8 percent under Alternative 2.

The enrollment losses from school-aged military dependents would be expected to be concentrated in schools with a history of high enrollment from NAS Whidbey Island. Currently, the school district is operating with fewer students than is optimal and has excess capacity. Based on consultation with Oak Harbor School District officials, the district could easily accommodate the additional 106 students expected under Alternative 2. The loss of 44 school-aged children under Alternative 1 would not have a significant impact on the school district (Schulte 2013).

The change in "federally connected students" attending local district schools would result in a corresponding change in federal impact aid received by the district. However, federal impact aid typically does not cover the full per-pupil costs experienced by the district.

The number of school-aged children would not change as a result of the No Action Alternative because baseline P-3C personnel loading at NAS Whidbey Island would remain the same.

6.5.5 Impacts on Minority and Low-Income Populations and Environmental Health and Safety Risks to Children

Consistent with Executive Orders 12898 and 13045, and as discussed in Chapter 5.5.5, the Navy's policy is to identify any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations or that pose environmental health and safety risks to children. The potential for minority and low-income populations and children to be exposed to additional aircraft noise was identified as the most likely negative environmental and human health impact that could potentially result from the proposed action.

To identify potential impacts, the Navy compared the 2014 baseline noise zones to the projected noise zones under each of the alternatives to determine whether any additional area of census block groups or census tracts would fall partially or wholly within the noise zones for Alternatives 1 and 2 (see Table 5-24 in Chapter 5.5.5 for a list of census block groups and census tracts within the 2014 baseline noise zones; see Figure 6-1 for a comparison of modeled baseline noise zones and noise zones for Alternatives 1 and 2). The results of this analysis indicate that less than 1 percent of additional residents would be impacted by the greater than 65 dB DNL noise zone compared to the baseline conditions and that no additional area of census block groups or census tracts would be affected under both of the alternatives. As a result, no additional minority and low-income populations or children would be exposed to additional aircraft noise near NAS Whidbey Island under Alternatives 1 or 2. In addition, as described in Chapter 6.2., there would be no increase in classroom learning interference at any schools located near NAS Whidbey Island under each of the alternatives compared to 2014 baseline conditions. Consequently, there would be no disproportionately high and adverse environmental and human health impacts to minority and low-income populations, and the proposed action would not result in environmental health risks and safety risks that may disproportionately affect children.

Conclusion

Overall, as discussed above, implementation of the action alternatives at NAS Whidbey Island would not result in significant impacts to regional population from either the decrease in personnel levels under Alternative 1 or their increase under Alternative 2 at NAS Whidbey Island. The changes in personnel loading represent a decrease of 0.2 percent in the projected population of Island County in 2020 under Alternative 1 and an increase of 0.5 percent under Alternative 2. The local housing market would be expected to recover from any short-term impacts. Construction would have a short-term positive economic effect; changes in employment and payroll at NAS Whidbey Island associated with both alternatives would result in changes in employee earnings and spending in the region. These changes would not have significant impacts on the regional economy under the proposed action alternatives. There would be no disproportionately high and adverse environmental and human health impacts to minority and low-income populations, and the proposed action would not result in environmental health risks and safety risks that may disproportionately affect children in the NAS Whidbey Island area.

6.6 Topography and Soils

The analysis of topography and soils focuses on the area of proposed construction, where soils would be disturbed and where there would be potential for soil erosion. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into storm water.

Soils underlying the proposed parking apron expansion under Alternatives 1 and 2 are characterized by poor drainage and are ponded for part of the year. New construction in this area would require fill material to be placed over existing soils. Topography at the construction area (i.e., the parking apron) would be elevated approximately 2 to 3 feet. This elevation would not significantly impact the topography of the surrounding area as the site is relatively level, as would be the parking apron. Consequently, placement of the fill material would have a negligible effect on topography at NAS Whidbey Island.

Soils at the proposed construction sites would be affected by the proposed action. Impacts would include a potential for soil erosion during construction caused by compaction and rutting from vehicle traffic. Soils would also be exposed to erosion while removing a portion of former runway for storm water mitigation, as described in Chapter 6.7.2. The projected increase in impervious surface from approximately 9.16 acres under Alternative 1 to 15.76 acres under Alternative 2 would represent a long-term loss of useable soils. The new impervious surfaces also increase the quantity and velocity of storm water runoff, which would increase the susceptibility of surrounding soils to erosion.

The above impacts would be minimized or avoided by using standard soil erosion- and sedimentation-control techniques at the construction sites, such as silt barriers (filter fabric), and appropriate revegetation techniques upon completion of construction. Revegetation techniques would include replanting disturbed areas with native plants and specific seed mixtures approved through the NRCS (NAS Whidbey Island 2014). In addition, construction practices would meet the policies and objectives contained within OPNAVINST 5090.1D, which are to protect, conserve, and manage the vital elements of the natural resource program, including soils, as well as basing land use practices on scientifically sound conservation procedures and techniques. Construction practices would also be consistent with the goals of the INRMP, which directs identification of and appropriate use of soil in accordance with, and within the limits of, its physical characteristics while protecting it from uncontrolled storm water runoff to prevent and control soil erosion (NAS Whidbey Island 2014).

Conclusion

Overall, implementation of the proposed action at NAS Whidbey Island would not result in significant impacts to topography and soils from construction activities. The projected increase in impervious surface from approximately 9.16 acres under Alternative 1 to 15.76 acres under Alternative 2 would represent a long-term loss of useable soils. Standard soil erosion- and sedimentation-control techniques would be implemented to avoid and minimize erosion and sedimentation.

6.7 Water Resources and Wetlands

This assessment examines how the proposed action would affect surface water (6.7.1), water quality (6.7.2), floodplains (6.7.3), groundwater (6.7.4), and wetlands (6.7.5).

In this SEIS, the analysis of groundwater focuses on the potential for impacts to the quality, quantity, and accessibility of the water. For the purposes of this SEIS, water quality is considered in light of the statutory requirements that regulate water quality conditions and considers the potential for impacts that may change the water quality, including both improvements and degradation to it.

The analysis of floodplains considers whether any new construction is proposed within a floodplain or may impede the functions of floodplains in conveying floodwaters. The analysis of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland.

6.7.1 Surface Water

No naturally occurring water bodies would be directly affected by the proposed action at NAS Whidbey Island. However, the expansion of the existing parking apron under Alternatives 1 and 2 would disturb maintained drainage ditches that bisect the area (see Figure 5-6 in Chapter 5.7, Water Resources and Wetlands). In addition to conveying storm water, these artificial drainage features also convey spring water and water from the adjacent wetlands. The drainage ditch adjacent to Hangar 9 would be relocated to support the new apron construction. The Navy would incorporate a drainage system into the final design of the expanded parking apron to maintain the flow of storm water to Dugualla Bay. Other measures as required under a CWA Section 404 permit would also be implemented. The relocation of the

artificial drainage ditch under Alternatives 1 and 2 would not represent a significant impact to the conveyance of surface water at NAS Whidbey Island.

No surface waters would be directly impacted by the No Action Alternative.

6.7.2 Water Quality

Water quality for the eastern Straits of Juan de Fuca in the area of Ault Field is considered good. According to the 2012 CWA 303d list for Washington State, no impaired water bodies are listed on or near Ault Field (Washington Department of Ecology 2012a, 2012b).

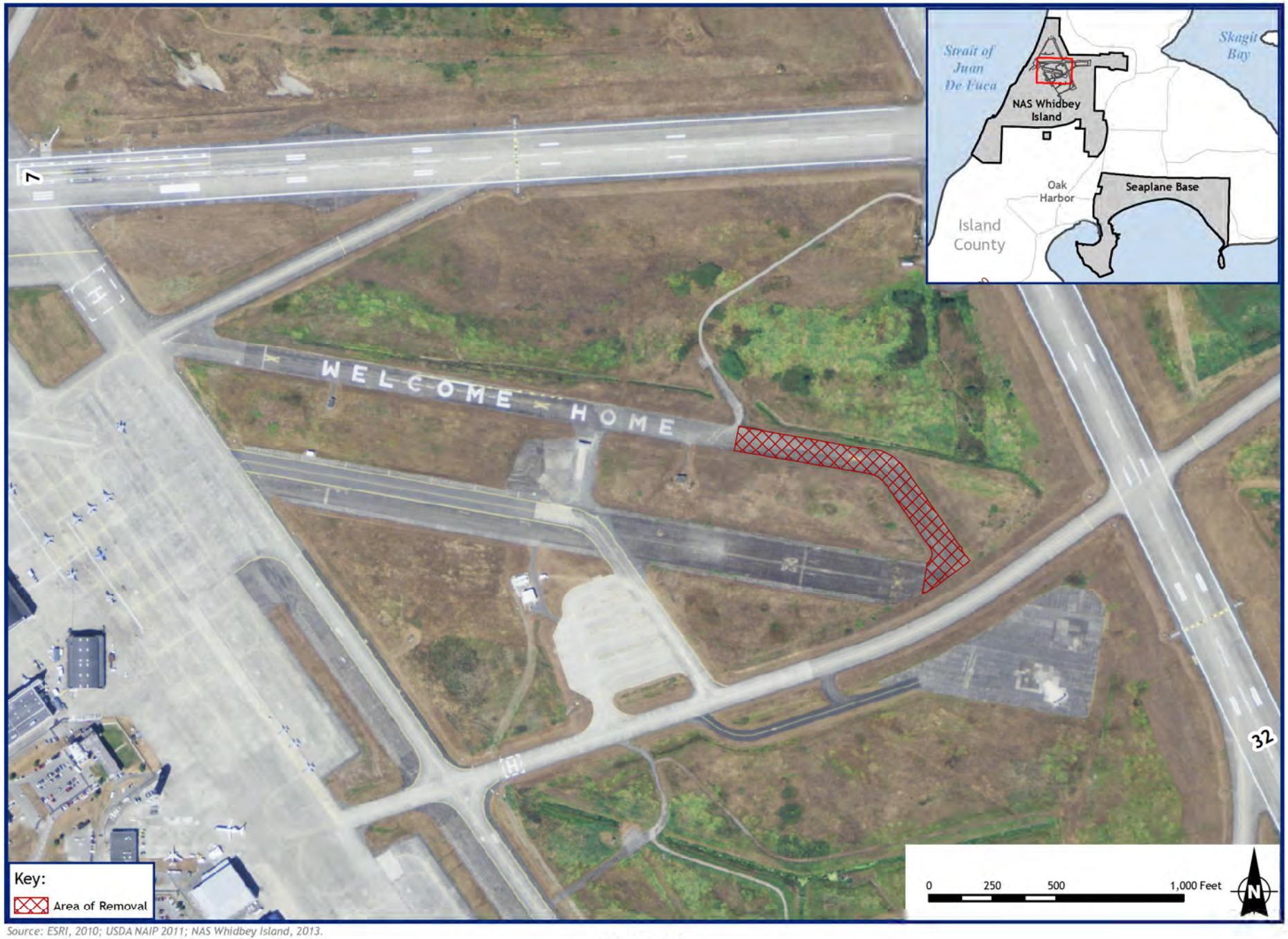
Construction of the facilities to support basing P-8A aircraft at NAS Whidbey Island would disturb approximately 13.76 acres under Alternative 1, and 21.86 acres under Alternative 2. Storm water runoff from the construction sites could potentially impact water quality in Dugualla Bay through the introduction of sediments, fuels, particulates, and various toxins. Because more than 1 acre would be disturbed during construction under all alternatives, a construction NPDES storm water permit will be obtained from the EPA through its water quality permit program. Under the permit, the Navy (NAS Whidbey Island) will develop a site-specific SWPPP for new discharges that will include a site plan for managing storm water runoff and describe the BMPs to be implemented to eliminate or reduce erosion, sedimentation, and storm water pollution. Examples of storm water BMPs that may be used include:

- **Grass swales.** Temporary or permanent features designed to filter and reduce storm water runoff from construction areas;
- **Silt fencing.** A temporary erosion and sediment control used to prevent dirt from entering waterways before bare soil is stabilized with vegetation; and
- **Berms.** A temporary erosion and sediment control that physically prevents polluted runoff from entering nearby storm drain inlets and waters.

With proper implementation of the SWPPP, impacts on water quality from erosion and off-site sedimentation during construction would not be significant.

Impervious surface covers approximately 600 acres (14 percent) of Ault Field. New construction would create approximately 9.16 acres of new impervious surface under Alternative 1, and 15.76 acres under Alternative 2. Without appropriate mitigation, the new impervious surface would generate additional storm water runoff to Dugualla Bay. To offset the additional runoff, the Navy proposes to remove a portion of former runway (2.67 acres) located within the airfield (see Figure 6-3). Storm water modeling of the runway conservatively assumed that the southern portion of the runway has an imperviousness of 90 percent (Philip Williams & Associates 2008). Based on this assumption and preliminary estimates, after removing 2.67 acres of the disused runway, the new impervious surface (6.49 acres under Alternative 1 and 13.09 acres under Alternative 2) would generate an additional 3.7 million gallons annually under Alternative 1 and 7.5 million gallons annually under Alternative 2.

Additional mitigation would be required to account for the excess runoff from new impervious surfaces under Alternatives 1 and 2. The Navy will install underground storm water retention infrastructure; infiltrate storm water via wet ponds, ditches, and swales; or employ a combination of these measures to meet the standards established by the Washington State Department of Ecology in its *Western Washington Stormwater Manual* (2012). These measures will be developed and incorporated into facility design based on existing site conditions. With the implementation of these measures and to the extent technologically feasible, the quantity and quality of storm water discharged to Dugualla Lagoon would be maintained at current levels.



Source: ESRI, 2010; USDA NAIP 2011; NAS Whidbey Island, 2013.

Figure 6-3
Proposed Stormwater Mitigation at
NAS Whidbey Island, Island County, Washington

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The current NPDES permit for NAS Whidbey Island includes storm water quality requirements for discharges to either the Strait of Juan de Fuca or Dugualla Bay. It would be expected that on-site water quality facilities would be incorporated into the design of the proposed new development to manage storm water runoff under each of the alternatives and would ensure that current water quality levels would be maintained for any storm water discharged from the station. As such, no revisions to the current NPDES permit would be expected to be required under any of the action alternatives.

6.7.3 Floodplains

The FEMA Flood Insurance Rate Map indicates that the proposed construction area under all the action alternatives is located outside of the 100-year floodplain (FEMA 2007). Furthermore, the proposed construction areas at NAS Whidbey Island are not prone to flooding from storm water flow in the airfield drainage ditch system. Therefore, there would be no impact on floodplains under any alternative.

6.7.4 Groundwater

The proposed action would not impact the three groundwater aquifers in the vicinity of NAS Whidbey Island, as none of the proposed construction projects would extend below surface at a depth that would impact the underlying water tables. Although fuel or other chemicals could be spilled during construction, immediate cleanup of these spills would prevent infiltration into the underlying groundwater. Furthermore, as the number of personnel employed or stationed at NAS Whidbey Island would either decrease or increase by a small amount under any of the alternatives, a negligible change would occur in the demand for groundwater from the regional aquifer system.

6.7.5 Wetlands

Wetlands would be impacted under both Alternatives 1 and 2 as a result of the proposed parking apron expansion. Wetlands would not be impacted by the No Action Alternative.

The estimated wetland impact area associated with Alternatives 1 and 2 was calculated using the jurisdictional determined wetland boundaries overlaid with the conceptual construction footprint identified in Figures 2-6 and 2-7. Construction of the parking apron expansion would result in the permanent filling of approximately 0.8 acre of palustrine emergent wetland under Alternative 1 and 2.44 acres of palustrine emergent wetland under Alternative 2. The impacted wetland was identified and described in Chapter 5.7.5 as WS-1 for Alternative 1 and WS-1 and WD-3 for Alternative 2. Wetland vegetation removed under both alternatives would mostly be homogenous stands of reed canary grass.

Under the authority of EO 11990, *Protection of Wetlands*, federal agencies are required to adopt a policy to avoid to the greatest extent possible the long- and short-term adverse impacts associated with the destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative. In addition, mitigation requirements under USACE guidelines follow the policy of wetland avoidance, minimization, and compensation.

Because complete wetland avoidance would not be feasible under either action alternative, a permit under the CWA Section 404 would be obtained from the USACE and a permit under CWA Section 401 would be obtained from the Washington Department of Ecology. These permits regulate the discharge of dredged and fill materials into waters of the United States, including wetlands. As part of the permitting process, methods of impact minimization and alternatives would be evaluated. Appropriate mitigation measures also can be used to minimize or offset adverse impacts resulting from construction of the proposed facilities. For example, short-term impacts could be mitigated by establishing proper erosion-control structures at the edge of the affected area to minimize sedimentation flow into adjacent wetland

areas. Appropriate construction mitigation techniques (e.g., erosion and sedimentation control) would be used to minimize impacts on wetlands.

Compensation would be required for long-term impacts resulting from lost wetland acreage that cannot be avoided or minimized. The Washington Department of Ecology, the USACE, and the EPA have developed guidelines and acre-for-acre mitigation ratios. These ratios are established in *Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans* (Washington Department of Ecology 2006). Mitigation is considered appropriate and acceptable if, based on an approved evaluation technique, the functions and values determined for the proposed mitigation or replacement wetland are greater than those of the affected wetland area.

The Navy prepared a conceptual wetland mitigation plan to identify mitigation for potential unavoidable wetland impacts at Ault Field as part of the 2008 ROD. The plan was designed to compensate for a maximum total wetland loss of 6.76 acres. A mitigation site at Crescent Harbor was selected to offset wetland impacts based on criteria outlined in Appendix L (Site Selection Checklist) of *Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans* (Washington Department of Ecology 2006).

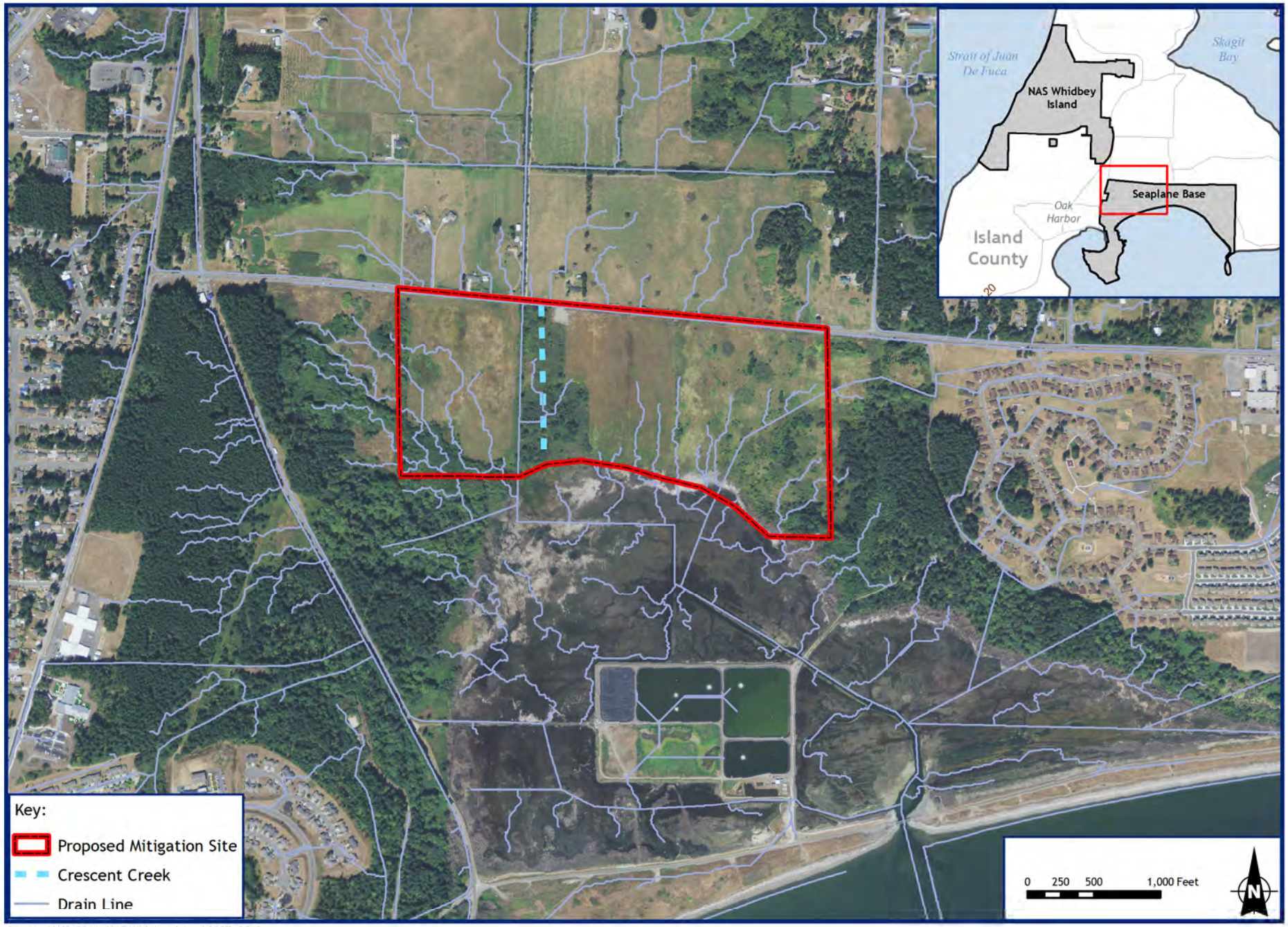
The Navy presented its conceptual mitigation options to the USACE and the Washington Department of Ecology during a meeting on September 10, 2007, and again at a follow-up meeting with the USACE on October 16, 2007. Based on comments received during both meetings, the Navy modified its conceptual wetland mitigation plan, incorporating the agencies' comments, to develop a final wetland mitigation plan.

The Navy again proposes to utilize the approximately 632-acre Navy-owned property located north of Crescent Harbor on the Whidbey Island Seaplane Base to mitigate either 0.8 acre or 2.44 acres of wetland impacts, depending on which alternative is selected as the preferred alternative.

Mitigation ratios would follow the ratios established in *Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans* (Washington Department of Ecology 2006). Any wetland that would be impacted by the proposed action is classified as a Category III wetland (Ecology and Environment, Inc. 2013). Based on the mitigation ratios for western Washington, rehabilitation requires a 4:1 mitigation ratio for all Category III wetland impacts, while enhancement is based on an approximately 8:1 mitigation ratio. Under Alternative 1, wetland mitigation design at Crescent Harbor would include either rehabilitation of 3.2 acres of a palustrine emergent wetland to the west of Crescent Bay Creek or, if not feasible, enhancement of approximately 6.5 acres of palustrine emergent wetland to the east of the creek. Under Alternative 2, the Navy would rehabilitate 6.5 acres of the palustrine emergent wetland to the west of the creek or, if not feasible, enhance 13 acres of palustrine emergent wetland to the east.

These mitigation ratios and acreages assume in-kind mitigation. Final mitigation ratios and acreages would be determined through discussions with the regulatory agencies (USACE and Washington Department of Ecology) during the final design and permitting phase of the proposed action.

To mitigate impacts to wetlands in the action area, an approximately 85-acre area of the 632-acre Navy-owned property would be used (see Figure 6-4). An updated conceptual wetland mitigation plan has been developed based on the acreage of wetland impacts associated with Alternatives 1 and 2 (see Appendix H).



Source: NAIP, 2011; NAS Whidbey Island 2007, 2013.

Figure 6-4
Proposed Wetland Mitigation Site
NAS Whidbey Island, Island County, Washington

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During the early 1900s, tidal inundation from Crescent Bay into the lower portion of the site was restricted by the construction of a dike parallel to Crescent Bay. The dike included a flap-gate connection from the tidal marsh to Crescent Bay that allowed limited tidal inundation throughout this marsh. In the upper portion of the site, the existing Crescent Bay Creek was channelized and deepened, filled in some locations, and ponds were created through partial damming. The associated marsh was also drained to improve site conditions for agriculture.

These disturbances to the lower and upper portions of the site significantly altered the natural hydrologic and geomorphic regime of the area, with Crescent Bay Creek disconnected from its natural floodplain. Because of the long history of farming on this site, most of the wetlands have been altered. Grassland vegetation is dominated by a combination of nonnative wetland and upland pasture vegetation.

This site has been the focus of restoration efforts. The Navy entered into a partnership with Skagit Cooperative, made up of the Swinomish and the Sauk-Suiattle tribes, to restore 200 acres surrounding the City of Oak Harbor's 30-acre wastewater treatment plant through the Crescent Bay Salt Marsh and Salmon Restoration Plan. As part of this restoration plan, the lower portion of the Navy-owned property was re-opened to tidal exchange in 2009, and a bridge was constructed over the inlet location. This re-opening effort was intended to reestablish full tidal action to the lower portion of the site.

The primary form of mitigation proposed is "rehabilitation" of the degraded wetlands in the upper portion of the 85-acre area, with "enhancement" of riparian wetlands adjacent to the salt marsh as an alternative if rehabilitation is deemed not feasible by USACE and/or Washington Department of Ecology. The aim of the rehabilitation would be to hydrologically connect a degraded wetland to the existing salt marsh area, creating one extensive landscape wetland system. The aim of the enhancement would be to expand the current riparian vegetation along the northern edge of the salt marsh.

As part of the rehabilitation effort, agricultural drainage ditches located in the margins of the mowed fields to the west of Crescent Bay Creek would be removed to restore local site hydrology. This would not require extensive soil excavation, but it may require the excavation of drainage tiles and filling of existing drainage ditches. These ditches (approximately 1 foot wide by 1 foot deep) were probably constructed to drain surface and subsurface water on the site in order to use the land for agricultural purposes. "Disconnecting" these ditches would likely reduce the drainage of shallow groundwater and raise groundwater levels.

With the implementation of appropriate mitigation measures as discussed above and in accordance with Section 404 permitting requirements, Alternatives 1 or 2 would not have significant impacts to wetlands.

Conclusion

Overall, implementation of the proposed action at NAS Whidbey Island would not result in significant impacts to water resources and wetlands from proposed facility development. All construction activities would be performed in compliance with state general construction storm-water permit requirements. Furthermore, a SWPPP and BMPs would be implemented to limit erosion and runoff into surface waters and wetlands. Groundwater and floodplains would not be directly impacted. Wetlands removed to construct new facilities under Alternatives 1 or 2 would be replaced at an approved mitigation site through the Section 404 permitting process.

6.8 Biological Resources

This assessment examines how the proposed action would affect vegetation (6.8.1), wildlife (6.8.2), threatened and endangered species (6.8.4), and marine mammals (6.8.7) at NAS Whidbey Island.

This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or are protected under federal or state law or statute. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

6.8.1 Vegetation

Construction of new facilities at Ault Field under Alternatives 1 and 2 would result in the permanent loss of up to approximately 9.16 acres and 15.76 acres of herbaceous upland and wetland vegetation, respectively, most of which is maintained grassland habitat comprising a mixture of grasses, rushes, sedges, and herbs. None of the affected vegetation communities under each of the alternatives are considered unique or regionally significant. The vegetation permanently removed for the proposed action would total less than 1 percent of the currently vegetated area at the station. The 2.67 acres of former runway to be removed for storm water mitigation (see Chapter 6.7.2) would be revegetated using grass seed mixtures approved through the NRCS (NAS Whidbey Island 2014); this revegetation would offset a portion of the loss of herbaceous vegetation to construct new facilities under Alternatives 1 and 2.

Based on the above analysis, impacts on vegetation under each of the action alternatives would not be significant.

Under the No Action Alternative, no additional facilities would be constructed at the station; therefore, there would be no impact to vegetation at Ault Field.

6.8.2 Wildlife

The maintained grasslands and emergent wetlands that would be affected by the proposed construction support a variety of wildlife species such as migratory waterfowl, songbirds, raptors, small mammals, reptiles, and amphibians. These species commonly use these habitats for foraging and occasional nesting. Construction in these areas would result in both direct and indirect impacts on resident wildlife. Direct effects could include mortality of less-mobile species such as small mammals, reptiles, and amphibians. The loss of between approximately 9.16 acres (Alternative 1) and 15.76 acres (Alternative 2) of herbaceous vegetation at NAS Whidbey Island would cause the permanent migration of species to other areas with suitable habitat, indirectly resulting in a decrease in the number of wildlife species in the area. However, the overall loss of wildlife species would be undetectable at a population level, given the relatively large amount of suitable habitat that would remain near the proposed facilities.

Since the proposed facilities are located either on existing developed areas or directly adjacent to them, limited impacts on wildlife as a result of habitat fragmentation would occur. Temporary, short-term displacement of wildlife may occur in peripheral areas during construction, when localized human activity levels increase. However, once construction has been completed, wildlife should return to these areas. Some wildlife species such as songbirds, small mammals, reptiles, and amphibians that are able to adapt to the landscaped conditions of urban environments can be expected to inhabit the developed areas. Therefore, the construction of the proposed facilities would not have a significant impact on wildlife.

As discussed in Chapter 6.7, storm water created as a result of the new impervious surfaces would be controlled through the implementation of BMPs to prevent the degradation of water quality in the marine waters surrounding the station, including Dugualla Bay, to the greatest extent possible. These BMPs employed during construction would prevent silt from entering the storm water system and impacting aquatic habitats in Dugualla Bay and other surface waters. Consequently, any impacts on aquatic species from additional storm water discharge during construction would be expected to be highly localized based on the implementation of on-site BMPs to reduce storm water run-off.

As discussed in Chapters 6.1 and 6.2, annual aircraft operations would decrease and there would be a negligible increase in noise levels compared to baseline conditions under both of the alternatives. Given the nature of the current NAS Whidbey Island operations, locally occurring wildlife species have likely become habituated to aircraft noise at NAS Whidbey Island. Studies that focus on investigating the impacts of aircraft noise on wildlife and domestic animal species have observed a variety of species, including waterfowl, shore birds, songbirds, terrestrial mammals, and domestic animals (cows, chickens, sheep, and horses). Overall, the studies suggest that species differ in their response to aircraft noise (Manci et al. 1988). All species not exposed to aircraft noise, however, seem to initially respond with some form of a startle response, the intensity and duration of which diminishes or disappears with subsequent exposures. Other general responses include running, stampeding, flying, circling, or becoming motionless. Several studies indicate that there is a strong tendency for species to acclimate or habituate to noise disturbances (Grubb and King 1991; Ellis et al. 1991; Manci et al. 1988; Fraser et al. 1985; Black et al. 1984). Consequently, given the nature of the current NAS Whidbey Island operations, the proposed action would have no long-term adverse impacts on wildlife at or in the vicinity of NAS Whidbey Island from aircraft noise.

Based on the above analysis, proposed construction and aircraft operations at NAS Whidbey Island under the proposed action alternatives would not have a significant impact on terrestrial or aquatic wildlife.

Wildlife would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

6.8.3 Migratory Birds

The paved surfaces, maintained lawn, and landscaped areas that would be affected by the proposed construction under all alternatives do not support a high diversity or abundance of birds, or suitable habitat to support large populations of nesting birds. While the proposed new construction would replace between approximately 9.16 acres (Alternative 1) and 15.76 acres (Alternative 2) of habitat potentially used by various species of neotropical migratory songbirds with impervious surface, removal of this habitat would not have a long-term adverse effect on migratory bird species populations at the station, based on the availability of remaining suitable habitat. In addition, management activities outlined in the station's INRMP to benefit migratory birds would continue to be implemented, offsetting any adverse impact associated with the proposed action. Such ongoing management activities may include conducting surveys to determine migratory bird and habitat use on the installation, providing nest boxes and platforms for birds, and leaving snags and downed logs for nesting, roosting, foraging, cover, and/or perching.

Direct mortality of migratory birds is unlikely to occur during construction because birds would be expected to relocate to other areas; however, some limited mortality could occur to nesting individuals depending on the timing of construction activities. As stated above, the impacted areas do not contain habitat that would attract large numbers of nesting birds, further reducing the potential for direct mortality of individual birds.

The P-8A aircraft would continue to operate in the same airfield environment and would continue to fly the same flight routes as the P-3 aircraft; therefore, the potential strike risk along these routes would remain the same. However, with annual aircraft operations at Ault Field reduced by 10 percent under Alternative 1 and by 8 percent under Alternative 2 compared to the 2014 baseline conditions, there would be an expected slight reduction in the overall potential for bird-aircraft strikes.

Given the nature of the current NAS Whidbey Island operations, locally occurring avian species have likely become habituated to aircraft noise. As such, the predicted minor change in noise levels as described in Chapter 6.2 would have no adverse or disruptive impacts on migratory birds. The NAS

Whidbey Island BASH Plan also provides project and operations guidance to aid in MBTA compliance. Based on the above analysis, the action alternatives would have no significant adverse or disruptive impacts to migratory birds.

Based on the above analysis, the proposed action alternatives would have no significant adverse or disruptive impacts to migratory birds.

Migratory birds would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

6.8.4 Threatened and Endangered Species

6.8.4.1 USFWS-Managed Species

Golden Paintbrush

No populations or individual occurrences of golden paintbrush have been identified on Ault Field during previous surveys. Furthermore, little, if any, suitable habitat to support the species occurs within the proposed construction areas (Ecology and Environment, Inc. 2013). Consequently, the Navy has determined that the proposed action alternatives and No Action Alternative would have no effect on the threatened golden paintbrush.

Marbled Murrelet

No suitable marbled murrelet breeding habitat is within 2 miles of the proposed construction area at Ault Field. In addition, no foraging habitat is present within or immediately adjacent to the construction area, and this species has not been observed in terrestrial habitats on NAS Whidbey Island (NAS Whidbey Island 2014, WDFW 2012). Therefore, construction activities associated with the proposed action would have no impact on nesting or foraging habitat of the marbled murrelet.

As murrelets occur year-round in Crescent Harbor approximately 3.5 miles south of the project area, the P-8A aircraft departing or landing at Ault Field could affect them. Previously, the USFWS has expressed concerns about a trend of a decreasing population of murrelets. Two stressors that may occur as a result of the P-8A operations are noise and the risk of a bird/aircraft strike. Of the two stressors, noise impact is a greater concern.

Surrounding noise sources may impact hearing and predator detection, vocalization, and response behavior of the marbled murrelet. As a result, changes in noise in an area may alter an individual's survival ability by decreasing its predator-detection capabilities or effectiveness at foraging. Assessing potential impacts of noise on murrelets involves a complex interaction of several factors such as location of nearby noise sources, predators, foraging habitat, and habituation of birds to an area.

Impacts on Murrelet Hearing and Predator Detection. The hearing frequency of marbled murrelets is unknown, as is the level of physical hearing damage from aircraft noise. Hearing may play a less important role in predator detection for the murrelet than vision. In the marine environment, where murrelets spend virtually their entire lives, vision is typically unobstructed. Murrelets are also often associated with other seabirds in the marine environment, which likely enhances early predator detection for all species. Any murrelets with diminished hearing sensitivity would be expected to continue to forage without a significant reduction in their predator-detection capabilities.

Vocalization. Vocalization plays an important role for murrelets in foraging in the marine environment (Strachan et al. 1995), so the proposed changes in noise from the increase in flight operations could inhibit or disrupt this behavior. Murrelets may respond with an increase in scanning (head turning), a

raised vocal output, and changed singing location. It is not expected that intermittent masking periods of short duration (e.g., aircraft takeoff or landing) would alter the murrelet's daily or seasonal foraging activities.

Response Behaviors. In general, response behaviors that could indicate disturbance of murrelets in the marine environment include aborted or delayed feeding, reduced foraging success (exhibited through more foraging dives or longer foraging bouts), and avoidance of foraging areas. Crescent Harbor is considered to be a murrelet foraging site, and these behaviors, if chronic, could result in a fitness reduction in adults or nestlings (Frid and Dill 2002; Romero 2004; USFWS 2010c), the outcome of which could affect survival and fertility of individuals.

Habituation appears to be an important consideration in measuring bird response in terms of whether or not a stressor, such as exposure to P-8A operations, causes a disturbance. Currently, there are no studies documenting behavioral responses of marbled murrelets to aircraft noise or whether the species is habituated to such noise. However, studies assessing habituation of waterfowl to aircraft noise have typically shown limited response of the birds to aircraft overflights (Manci et al. 1988; Ward et al. 1987, 1988; Fleming et al. 1996; Conomy et al. 1998). For example, the responses of the American black duck (*Anas rubripes*), American wigeon (*A. americana*), gadwall (*A. strepera*), and American green-winged teal (*A. crecca carolinensis*) to exposure to low-level flying military aircraft at Piney and Cedar islands, North Carolina, were assessed. Investigators determined that impacts to each species were minor because disruptions represented a low percentage of their time-activity budgets, only a small proportion of birds reacted to disturbance (approximately 2 percent), and the likelihood of resuming the activity disrupted by an aircraft disturbance event was high (64 percent) (Conomy et al. 1998). Investigators concluded that levels of aircraft disturbance recorded were not adversely affecting the time-activity budgets of selected waterfowl species wintering at these islands. Based on these previous studies, it is assumed that murrelets have become habituated to the noise of NAS Whidbey Island air operations.

Marbled murrelets forage in the marine waters around Whidbey Island and would therefore be exposed to P-8A aircraft operations. No detailed studies of the effect of airborne noise on marbled murrelets or that evaluate the response of marbled murrelets (or other alcids) to elevated in-air sound in the marine environment have been conducted. It is assumed for projects in the marine environment that marbled murrelet response to above-ambient sound levels on the water would be similar to those expected in the terrestrial environment. Historically, surrogate species studies, such as examination of the emperor penguin's (*Aptenodytes forsteri*) hearing, have established 92 A-weighted decibels (dBA) SEL as the disturbance threshold for airborne noise for the marbled murrelet (USFWS 2010c, 2011c). As such, and per the direction of the USFWS, the Navy used the 92 dB SEL contour for air operations at Ault Field as well as for analysis of the frequency and duration of aircraft operations at a greater-than-92-dBA SEL as part of its assessment of impacts.

The frequency, duration, and intensity of the murrelet's exposure to the noise signature of the P-8A aircraft depends upon the flight profile being performed. The greater-than-92-dB noise created by a P-8A would be intermittent and range between 20 and 60 seconds in duration, with the longer time period occurring when aircraft are arriving at the airfield. The 92-dB contour created by the P-8A would have a slightly larger geographic extent than the contour created by the P-3C. This short-term, intermittent disruption could briefly change an individual murrelet's behavior. However, the alteration is comparable to that currently caused by the P-3C operations.

Depending on the operation being performed, the P-8A can be 8 dB louder than the P-3C during T&G operations (see Table 6-7). Regardless of the brief behavioral response discussed above, even under the worst-case conditions, the impact would occur for a relatively short duration (up to 60 seconds) for both the P-3C and P-8A aircraft. The P-8A aircraft would continue to operate in the same airfield environment

as the P-3C. This installation has been in operation since the 1940s, so it is likely that individual birds in waters adjacent to Ault Field are habituated to ongoing aircraft activity.

Assessing the strike risk for birds involves measuring a complex interaction of several factors, such as aircraft speed and altitude, time of day, weather conditions that affect visibility, and the seasonal or daily flight behavior of the species in question. Murrelets spend a considerable amount of time on top of the water (not foraging) in any given day. While there is no nesting habitat on Whidbey Island, murrelets could fly over Whidbey Island from more distant marine waters to inland nesting sites. Their flight behavior is predominantly associated with foraging and flights to nest sites. When flying, murrelets generally fly at lower altitudes (less than 500 feet) and at slower speeds in marine areas, similar to those around Whidbey Island. Murrelets likely have adapted this behavior of low flight altitudes in the marine environment to optimize energy expenditure (by gaining increased lift from the interaction of air currents and wave action) or to maintain proximity to the surface of the water for escape from aerial predators through diving.

Although data are lacking, it is assumed that a marbled murrelets flight altitude over water is generally less than 500 feet. As such, the likelihood of collision between a marbled murrelet and a P-8A on any given flight is largely determined by jet speed, the flight duration within 500 feet of the water, and the number of individual birds present. Unlike the P-3C, the P-8A aircraft departing from Ault Field typically ascend more rapidly at takeoff, thereby taking less time than the P-3C to pass through the 0- to 500-foot range of highest collision risk. Given the very short duration and rapid ascent of the P-8A, the risk of collision would be expected to be lower for departing flights than current operations of the P-3C.

Approaching aircraft spend comparatively more time in murrelet airspace (less than 500 feet) than departing aircraft because they maintain lower flight altitudes and a more horizontal trajectory. Aircraft approaching Runway 25 typically do not descend below 1,000 feet above ground level (agl) until they are over Whidbey Island itself. However, aircraft would descend to 1,000 feet agl or less over the Strait of Juan de Fuca when approaching Runway 13, increasing the potential risk of collision with murrelets in this area. However, murrelets in the vicinity of Ault Field are primarily located at Crescent Harbor and are likely to fly well below the flight paths of aircraft approaching Ault Field. Because both the P-8A and P-3C have similar arrival flight profiles and operate at similar speeds, altitudes, and descent rates while approaching Ault Field, the potential for bird strike upon arrival would not increase compared to current conditions.

There have been no documented murrelet aircraft strikes at Ault Field. Furthermore, with annual aircraft operations at Ault Field reduced by up to 10 percent under the alternatives compared to the baseline conditions, there would be an expected slight reduction in the already infrequent potential for marbled murrelet interaction with aircraft within the P-8A airspace.

Based on the above analysis, the Navy determined that the proposed action may affect but is not likely to adversely affect the marbled murrelet. The USFWS has concurred with these findings (see Appendix C). In addition, under NEPA, no significant impacts would occur on the marbled murrelet at NAS Whidbey Island.

The marbled murrelet would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

Coastal Washington-Puget Sound Bull Trout

The bull trout could potentially forage in proximity to the Whidbey Island shoreline and therefore be indirectly affected by changes in water quality related to storm water discharge. The proper implementation of measures to control storm water runoff from between 9.16 acres (Alternative 1) and

15.76 acres (Alternative 2) of new impervious areas would prevent the degradation of water quality in the marine waters surrounding the station. Mitigation measures may include removal of impervious surface in other parts of the airfield; installing underground storm water retention infrastructure; infiltrating storm water via wet ponds, ditches, and swales; or a combination of these measures. The implementation of on-site BMPs during construction would reduce storm water runoff to a point where any impacts would be highly localized.

Storm water would continue to be directed through approximately 20 miles of drainage ditches toward Clover Valley stream, which drains into Skagit Bay on the northeastern side of the island. Storm water mitigation measures would be designed to result in a net zero change in the amount of runoff that is pumped from Dugualla Lagoon into the marine environment. Therefore, it is extremely unlikely that bull trout would be exposed to storm water pollutants that could be harmful to this species or its prey.

The change in P-8A aircraft operations would not result in measurable change in underwater sound levels. Thus, indirect effects to bull trout or its prey from P-8A operations would be considered discountable.

As all construction impacts would be on NAS Whidbey Island and no in-water work would be conducted as part of the proposed action, no direct impacts to either freshwater spawning, rearing, or marine foraging habitats would occur. Consequently, there would be no direct effects to the bull trout or its critical habitat from construction activities.

Based on the above analysis, the Navy determined that the proposed action may affect but is not likely to adversely affect the Coastal Washington-Puget Sound bull trout. The USFWS has concurred with these findings (see Appendix C). In addition, under NEPA, no significant impacts would occur on the Coastal Washington-Puget Sound bull trout in the vicinity of NAS Whidbey Island.

Bull trout would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

Streaked Horned Lark

No streaked horned lark populations have been identified on Whidbey Island. Furthermore, the only grasslands/prairies suitable for the species that were identified at NAS Whidbey Island are those at the Seaplane Base and OLF Coupeville (NAS Whidbey Island 2014). There is no suitable streaked horned lark habitat within 0.25 mile of the project area. If, for some reason, this species were to occur on NAS Whidbey Island during construction, it would be only a transient visitor to the construction areas because the herbaceous vegetation cover within the construction areas does not provide suitable breeding, foraging, or nesting habitat. As this species is mobile, it would likely avoid the work areas during construction, so no direct impacts would be anticipated. Therefore, the proposed action alternatives would have no effect on the streaked horned lark.

The streaked horned lark would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

Taylor's Checkerspot

No Taylor's checkerspot butterfly populations have been identified on Whidbey Island. Furthermore, the only grasslands/prairies suitable for the species that were identified at NAS Whidbey Island are those at the Seaplane Base and OLF Coupeville (NAS Whidbey Island 2014). There is no suitable Taylor's checkerspot habitat within 0.25 mile of the project area. If, for some reason, this species were to occur on NAS Whidbey Island during construction, it would be only a transient visitor to the construction areas because the herbaceous vegetation cover within the construction areas does not provide suitable breeding, foraging, or nesting habitat. As this species is mobile, it would likely avoid the work areas during

construction, so no direct impacts would be anticipated. Therefore, the proposed action alternatives would have no effect on the Taylor's checkerspot.

The Taylor's checkerspot would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

6.8.4.2 NMFS-Managed Species

The NMFS is responsible for 10 of the 13 federally threatened and endangered species identified as potentially occurring on or in the immediate vicinity of NAS Whidbey Island. These species are either aquatic species or species closely associated with the marine environment and include the Puget Sound Chinook salmon, Puget Sound steelhead, Puget Sound/Georgia Basin bocaccio, canary rockfish, yelloweye rockfish, Pacific eulachon (Southern DPS), southern North American green sturgeon, humpback whale, Steller sea lion, and southern resident killer whale.

Puget Sound Chinook salmon and Puget Sound steelhead may use Dugualla Bay for foraging and rearing and could therefore be indirectly affected by changes in water quality related to storm water discharge. As discussed in Chapter 6.7.2, the Navy is evaluating several options to manage storm water from newly constructed areas that would avoid potential impact to water quality from the increase in storm water discharges. The implementation of on-site BMPs during construction would reduce storm water runoff to a point where any impacts would be highly localized. Mitigation measures implemented in accordance with a SWPPP would control storm water runoff during operation. Consequently, the proposed action would have no effect on Puget Sound Chinook salmon and Puget Sound steelhead.

Considering the rarity of the Puget Sound/Georgia Basin bocaccio, canary rockfish, yelloweye rockfish, southern eulachon, and southern North American green sturgeon in Dugualla Bay and the highly localized storm water impacts that would occur from construction, the Navy has determined that the proposed action would have no effect on these species.

Potential impacts to the listed marine mammal species in the vicinity of NAS Whidbey Island (Steller sea lion, humpback whale, and southern resident killer whale) have been evaluated for aircraft noise and water quality. The production and reception of certain sounds are critical in various aspects of marine mammal life history; certain sounds (both natural and man-made) have the potential to interfere with these functions (Southall et al. 2007). In a summary by the NPS (1994) on the effects of noise on marine mammals, it was determined that gray whales showed no outward physical behavior response to aircraft noise or overflights. Other man-made noise in the marine environment may have more of an effect on marine mammals than aircraft noise (U.S. Air Force 2000). The effects of noise on cetaceans appear to be somewhat attenuated by the air/water interface. The U.S. Air Force (2000) concluded that there are very few and limited cases for which there could be any risk of injury to or harassment of a marine mammal from underwater noise generated by subsonic flight of Air Force aircraft.

Based on the above studies, and considering that the number of annual aircraft operations would decrease by 8 percent to 10 percent under the alternatives compared to the 2014 baseline conditions, the proposed operations would not disturb any critical aspects of marine mammal life history or interfere with the foraging activity of any of the protected aquatic species in the vicinity of NAS Whidbey Island. Thus, there would be no indirect effect on foraging habitat or a reduction in the primary food stocks of humpback whales (krill, herring, sand lance, and capelin), southern resident killer whales (salmon), or Steller sea lions (fish and cephalopods) from changes in aircraft noise.

Considering the rarity of the Steller sea lion, humpack whale, or Southern resident killer whale in Dugualla Bay and the highly localized storm water impacts that would occur from construction, none of these species would be indirectly affected by construction activities under both alternatives.

Based on the above analysis, the Navy has determined that the proposed action would have no effect on the Steller sea lion, humpack whale, or Southern resident killer whale.

As all construction impacts would be on NAS Whidbey Island and not directly impact either freshwater or marine spawning, rearing, or foraging habitats, there would be no impact to designated critical habitats of the Puget Sound Chinook salmon, Puget Sound steelhead, Steller sea lion, and southern resident killer whale.

The Navy previously determined in the 2008 FEIS that home basing the P-8A at NAS Whidbey Island would have no effect on the humpback whale, the southern resident killer whale, Steller sea lion, and green sea turtle, and may affect but is not likely to adversely affect the Puget Sound Chinook salmon and Puget Sound steelhead. NMFS, in a letter dated August 4, 2008, concurred with the Navy's findings (NMFS 2008).

It was concluded by NMFS that the effects to the identified federally listed species would be insignificant or discountable. Changes in construction and air operations planned under the proposed action alternatives do not represent a significant project change sufficient to cause new or additional impacts to any of the above NMFS-managed species. Specifically, the maximum construction footprint is up to approximately 22 acres smaller than what was considered and consulted on in 2008. Consequently, there would be no increase in storm water quantity and/or decrease in water quality being discharged into Dugualla Lagoon over what was previously evaluated. The number of P-8A aircraft operations is also less than what was considered in the 2008 consultation. Consequently, the Navy has determined that the changes reflected in the proposed action alternatives do not trigger any consultation re-initiation criteria with NMFS. In addition, under NEPA, no significant impacts would occur on NMFS-managed species in the vicinity of NAS Whidbey Island.

NMFS-managed species would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

6.8.5 Bald and Golden Eagles

Given the historical occurrence of bald eagles in the vicinity of NAS Whidbey Island, there is the potential for bald eagles to be in the general vicinity of the proposed action. However, none of the individuals are likely to be present in the proposed construction areas because of the absence of preferred foraging or nesting habitat.

The bald eagle or golden eagle would not be affected by aircraft noise because noise levels would increase negligibly compared to the current baseline conditions under both alternatives. A study by Grubb and King (1991) on the reactions of bald eagles to human disturbances showed that pedestrians and helicopters elicited far greater responses than aircraft. Ellis et al. (1991) showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 300 feet, rather than the noise level.

Construction under both of the alternatives would not impact bald eagles or golden eagles at or near NAS Whidbey Island. Based on bald eagle response to human disturbances and the slight increase in noise of the P-8A, along with ongoing aircraft operations at NAS Whidbey Island, aircraft operations would not impact bald and golden eagles.

Based on the above analysis, a take permit as authorized under the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978) is not applicable. In

addition, under NEPA, there would be no significant impact on bald and golden eagles at NAS Whidbey Island under the proposed action alternatives and No Action Alternative.

6.8.6 Other Species of Concern

As stated in Chapter 5.8.6, no other species of concern are present in the vicinity of NAS Whidbey Island.

6.8.7 Marine Mammals

Species protected under the MMPA known to occur in the marine waters adjacent to NAS Whidbey Island (i.e., Puget Sound and the Strait of Juan de Fuca) include the humpback whale, southern resident killer whale, Steller sea lion, California sea lion, harbor seal, harbor porpoise, Dall's porpoise, and northern sea otter (Carretta et al. 2012). Based on the analysis presented in Chapter 6.8.4.2, the same impact assessment applies to the California sea lion, harbor seal, and northern sea otter as described for ESA-listed marine mammals (i.e., the humpback whale, Steller sea lion, and southern resident killer whale) that may occur in adjacent marine waters. Consequently, the Navy has determined that the proposed action would not result in reasonably foreseeable "takes" of a marine mammal species by harassment or injury or mortality as defined under the MMPA. In addition, under NEPA, there would be no significant impact on marine mammals in the vicinity of NAS Whidbey Island under the proposed action alternatives.

Marine mammals would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

6.8.8 Essential Fish Habitat

As discussed in Chapter 5.8.8, there is no EFH within any surface water on NAS Whidbey Island or in any freshwater streams within the surrounding watershed, and the drainage ditch in the construction area does not flow directly to a body of water containing EFH. Storm water from new construction under Alternatives 1 and 2 would be managed such that no increase in storm water discharge or decrease in storm water quality entering Dugualla Bay via Dugualla Lagoon would occur. Consequently, the proposed action would have no direct or indirect impacts on EFH in the marine waters surrounding NAS Whidbey Island, and, therefore, implementation of these alternatives would not adversely affect EFH.

EFH would not be impacted under the No Action Alternative because no additional facilities would be constructed, and storm water discharge would not change; therefore, implementation of the No Action Alternative would not adversely affect EFH.

Conclusion

Overall, implementation of the proposed action at NAS Whidbey Island would not result in significant impacts to biological resources. Proposed construction activities would primarily impact previously disturbed or actively managed areas; no unique or critical vegetation habitats would be impacted. Short-term noise increases from construction would temporarily displace wildlife and migratory birds. Noise levels associated with aircraft operations under both of the action alternatives would not result in significant impacts to wildlife and migratory birds because overall noise levels at NAS Whidbey Island would not significantly increase compared to baseline conditions. There would be no significant impacts to ESA-listed species, EFH, or marine mammals under either of the action alternatives.

6.9 Cultural Resources

The potential effects of the proposed action were assessed by considering any changes to historic structures (Chapter 6.9.1), archaeological resources (Chapter 6.9.2), and Native American resources (Chapter 6.9.3).

Under NEPA, the evaluation of impacts of a proposed action on cultural resources, including archaeological resources, architectural or built resources, and Native American resources, is considered in terms of direct or indirect impacts that are permanent or temporary (long-term or short-term). Where appropriate, impacts on cultural resources were also considered in terms of beneficial or negative impacts.

Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800 require the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking to consider the effects of the proposed undertaking on historic properties. The effects of the impacts of the proposed action on historic properties were evaluated in accordance with 36 CFR 800.4(d) and 800.5(d), including the ACHP's *Criteria of Adverse Effect* in 36 CFR 800.5(a)(1). The criteria of adverse effect are listed in Table 6-23.

Table 6-23 Criteria of Adverse Effects on Historic Properties

Criteria of Adverse Effect
"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or cumulative" (36 CFR 800.5[a][1]).
Examples of Adverse Effect
"Adverse effects on historic properties include but are not limited to: ■ Physical destruction of or damage to all or part of the property ■ Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines ■ Removal of the property from its historic location ■ Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance ■ Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features ■ Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization ■ Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance" (36 CFR 800.5[a][2]).

Source: ACHP 2004.

6.9.1 Architectural Resources

As discussed in Chapter 5.9.1, all of the 34 architectural or built resources associated with the APE for the proposed action alternatives were evaluated for NRHP eligibility. Thirty-three were found not eligible: Buildings R-12, R-13, R-14, 126, 219, 2528, 2544 (Hangar 7), 2621, 2621A, 2635 (Pumphouse and Aircraft Rinse Facility), 2666, 2681 (Hangar 9), 2704, 2707, 2732, 2738, 2740, 2771, 2786, 2800, 2836, 2910-2911, 2888, 2889, 2890, 201259, 203047, 201255, 201248, 203895, 203897, and 204894 (Hampton 2008; Hampton and Burkett 2010; Thursby et al. 2013b; Campbell 2013, 2014; Crain 2014). One was recommended individually eligible (Building 401 – Hangar 6) (Hampton and Burkett 2010, Thursby et al. 2013b).

The Navy has determined that proposed renovations to Hangar 6 would have an adverse effect on this historic property. Both Alternatives 1 and 2 would require the footprint of the hangars to be increased to accommodate the larger P-8A aircraft (as noted in Chapter 5.9.1, Hangar 6 is a double hangar). The expansion would result in the removal of the hangar's sliding doors, placing an addition on either side of the hangars, and raising the center door height. New doors would consist of vertical-lift fabric doors. These proposed changes adversely affect the characteristics that make Hangar 6 eligible for inclusion in the NRHP.

The Navy notified the Washington SHPO of the proposed adverse effect via a finding of effect letter dated September 19, 2013. The Washington SHPO concurred with the effect determination on October 21, 2013 (Vann 2013). The Navy notified the Advisory Council on Historic Preservation (ACHP) of the proposed adverse effect, and the ACHP indicated in a letter dated January 10, 2014, that they believed they did not need to participate in consultation to resolve the adverse effects (Wallace 2014). The Navy consulted with the Washington SHPO to develop an MOA addressing the adverse effects the proposed action would have on Hangar 6 (Nortier 2014, Vann 2014). Copies of this correspondence are provided in Appendix C. On April 17, 2014, the Navy and the Washington SHPO executed the MOA. A copy of this executed MOA is included in Appendix C.

Architectural resources at NAS Whidbey Island would not be affected by the No Action Alternative because no construction would take place.

6.9.2 Archaeological Resources

As discussed in Chapter 5.9.2, the APE at Ault Field is not within an archaeologically sensitive area. Although an archaeological survey of the APE at Ault Field has never been conducted, the Navy does not expect archeological resources within the APE will be impacted by construction based on the absence of archaeologically sensitive features. If any unanticipated archaeological resources are discovered during construction, the Navy would stop construction immediately and take appropriate steps to avoid further disturbance. NAS Whidbey Island's cultural resources program manager would be notified immediately, and he or she would then contact the Washington SHPO. If the discovery may be related to Native American interests, the appropriate tribal officer would be contacted.

Two archaeological sites (Sites 45IS237 and 45IS236) and one isolated find are located within the APE at Seaplane Base. However, the proposed wetland mitigation would not impact sites 45IS237 and 45IS236 or the isolated find.

Archaeological resources at NAS Whidbey Island would not be affected by the No Action Alternative because no construction would take place.

6.9.3 Native American Resources

Potential impacts to Native American resources at Ault Field are not expected based on the absence of archaeologically sensitive features. No impacts on Native American resources at Seaplane Base would be expected under any of the alternatives because proposed wetland mitigation activities at Seaplane Base will not affect the archaeological resources within the APE. Native American tribal nations in proximity to NAS Whidbey Island were provided notification of the availability of the Draft SEIS and were invited to review the document and provide comments. No comments were received from any Native American tribal nations during the Draft SEIS public comment period.

Native American resources at NAS Whidbey Island would not be affected by the No Action Alternative because no construction would take place.

Conclusion

Adverse effects on archaeological and Native American resources at Ault Field are not expected based on the absence of archaeologically sensitive features in the APE. Proposed wetland mitigation activities would not impact archaeological or Native American resources within the APE at Seaplane Base. The Navy and the Washington SHPO executed an MOA to address the adverse effects on a historic property (e.g., Hangar 6 renovation).

6.10 Hazardous Materials and Waste Management

The analysis of hazardous materials, hazardous waste, and contaminated sites focuses on the potential for these substances to be introduced into the environment from aircraft operations and maintenance, or during construction/demolition activities. Potentially affected areas consist of the airfields and aircraft support and maintenance facilities. Factors considered in the analysis include the potential for increased human health risk or environmental exposure, as well as changes in the quantity and types of hazardous substances transported, stored, used, and disposed. The methodology for evaluating contaminated sites compares the proximity of proposed facility development to contaminated sites and considers the operational uses of the facilities to determine potential impacts to or from the sites.

Operation and maintenance of the new P-8A aircraft under all alternatives would not introduce any new hazardous materials and/or waste streams that cannot be managed by existing hazardous material and waste management functions and facilities at NAS Whidbey Island. The addition of 42 P-8A aircraft under Alternative 1 and 49 P-8A aircraft under Alternative 2, coupled with the decommissioning of 24 P-3C aircraft under each alternative (a maximum net gain of 25 aircraft), would not result in significant impacts with regard to the handling, use, storage, or disposal of fuel, oils, and lubricants at NAS Whidbey Island. All wastes would continue to be collected and managed on site in accordance with NAS Whidbey Island's Hazardous Waste Management Plan (NAVFAC Atlantic 2013). With new aircraft requiring less maintenance, incorporation of the appropriate procedures for handling of hazardous materials, and the application of BMPs for the management of hazardous substances and spill response at NAS Whidbey Island, the proposed action would have no impacts to hazardous materials and the waste management program.

Hazardous materials and waste would not be impacted by the No Action Alternative because baseline P-3C aircraft loading and operations at NAS Whidbey Island would not change.

Environmental Restoration Program Sites

The proposed action would not interfere with any ongoing remedial programs at NAS Whidbey Island, and none of the proposed construction projects under any of the alternatives would result in potentially hazardous exposure of on-site personnel. No proposed construction projects would require large-scale removal or disturbance of surface soil, subsurface soil, groundwater, or existing groundcover near or within any ERP site. However, the proposed storm water mitigation site where the Navy proposes to remove a portion of disused, former runway at the airfield is located within Operable Unit 3, Area 16. Removal of runway pavement would likely involve portions of Area 16 soils. Prior to commencing any construction activities at this location and in accordance with the Land Use Controls Implementation Plan, the Navy would notify the EPA at least 10 days prior to start of the work. The site would continue to be maintained within required land use controls for non-residential use as an active airfield, post runway removal. The Navy would oversee disposal of sediments (soil) that adhere to runway pavement as it is demolished and removed. Pavement could be washed at the site to reduce the amount of soil leaving the area. Collected debris and sediments would need to be treated and disposed of as hazardous waste or non-hazardous waste as determined by sampling. For debris/sediment determined to be non-hazardous waste, the Navy would remove and dispose of the debris/sediments at the NAS Whidbey Island landfill. Debris/sediments determined to be hazardous waste would be removed to a permitted off-site

facility for appropriate treatment and disposal. Per state and federal regulations, all on-site personnel would follow required safety protocols with respect to protective clothing and equipment. Therefore, exposure to potentially contaminated media is not likely.

Conclusion

Overall, as discussed above, implementation of the action alternatives at NAS Whidbey Island would not result in significant impacts to public health and safety from hazardous materials and waste related to proposed P-8A operations. Hazardous waste management activities would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste.

6.11 Safety

This assessment examines how the proposed action would affect flight safety (Chapter 6.11.1) and BASH (Chapter 6.11.2). Environmental health and safety risks to children are analyzed in Chapter 6.5.5.

Potential impacts due to changes in BASH potential are analyzed by considering changes in aircraft frequency and profiles (e.g., altitudes and airspeeds) of proposed training operations in and around NAS Whidbey Island.

6.11.1 Flight Safety

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these measures are implemented, risks are minimized, even though they can never be eliminated. Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization.

Implementation of Alternatives 1 and 2 at NAS Whidbey Island would reduce total airfield operations by up to 10 percent (considering projected changes in other aircraft operations). This reduction in total airfield flight operations would reduce the potential for aircraft incidents at Ault Field and in the community. In addition, current airspace safety procedures, maintenance, training, and inspections discussed previously would be implemented, and airfield flight operations would adhere to established safety procedures.

Modeling, simulation, and ground tests of new aircraft reduce the uncertainties of flight testing, and the subsequent flight-test program includes efforts to ensure flight safety and to reduce risks associated with the operation of new aircraft. In all cases, each new aircraft type has met all required standards prior to certification. While it is generally difficult to project future safety/mishap rates for any new aircraft, the P-8A is a military variant of the commercial Boeing 737 aircraft, which has a well-documented and established safety record as one of the most reliable aircraft currently in operation.

No changes to established clear zones, APZs, or other established airfield safety features would be required. Therefore, with more simulator training, and new P-8A replacing older P-3C aircraft, the potential for aircraft mishaps would be similar if not improved compared to existing conditions.

Because the P-8A would be a new airframe at the station, it would require an update to response plans specific to the P-8A and associated equipment, including the emergency and mishap response plans. With development and implementation of these plans, no increase in the potential safety risk from the P-8A

operational training actions would be expected for NAS Whidbey Island airfield and surrounding airspace.

6.11.2 Bird/Wildlife Aircraft Strike Hazards

No aspect of the action alternatives or the No Action Alternative would create attractants with the potential to increase the concentration of birds in the vicinity of the airfield. In addition, considering the decrease in annual air operations for both of the action alternatives and use of existing flight tracks, the BASH risk would remain the same, if not decrease at NAS Whidbey Island.

Conclusion

Overall, as discussed above, implementation of the action alternatives at NAS Whidbey Island would not result in adverse impacts to safety from the transition of P-3C to P-8A aircraft. P-8A operations would decrease under both action alternatives when compared to baseline P-3C operations, and extensive use of flight simulators would minimize the risk associated with aircraft mishaps due to pilot error.

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7 MCB Hawaii Kaneohe Bay Existing Environment

This chapter provides a description of the existing environment that could be affected by the proposed action at MCB Hawaii Kaneohe Bay. As directed by NEPA, Navy procedures for implementing NEPA (32 CFR Part 775), and Navy environmental instructions, the description of the affected environment focuses on those resources potentially subject to impacts. Therefore, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. As discussed in Chapter 1.3.2, three resource areas (infrastructure and utilities, community services, and transportation) are not discussed in this SEIS for MCB Hawaii Kaneohe Bay because the proposed action would not result in noticeable effects to these resources. Resources at and in the vicinity of MCB Hawaii Kaneohe Bay would be affected by changes to aircraft operations, changes in personnel levels, and new development on the base. Therefore, the affected environment analyses include airspace and airfield operations, noise, air quality, safety, land use, socioeconomics, topography and soils, water resources and wetlands, biological resources, and cultural resources.

7.1 Airspace and Airfield Operations

This chapter describes the existing airfield operations at MCB Hawaii Kaneohe Bay and the airspace in which the P-8A would operate. The study area for airspace is the MCB Hawaii Kaneohe Bay airfield and airspace surrounding the base. This chapter does not address the operations or airspace at the training ranges that MCB Hawaii Kaneohe Bay aircraft utilize as those training activities would not change as a result of the proposed action. As noted in Chapter 1.3.4, the HSTT EIS/OEIS analyzes existing P-3C and future P-8A training requirements at existing range complexes, OPAREAs, and testing ranges.

7.1.1 Airspace

Airspace management is defined as the direction, control, and handling of flight operations in the "navigable airspace" that overlies the geopolitical borders of the U.S. and its territories. Navigable airspace is considered to be airspace above the minimum altitudes of flight prescribed by regulations under U.S.C. Title 49, Subtitle VII, Part A, and includes airspace needed to ensure safety in the takeoff and landing of aircraft (49 U.S.C. § 40102). Congress has charged the FAA with responsibility for developing plans and policy for the use of the navigable airspace and assigning by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of the airspace (49 U.S.C. § 40103(b); FAA Order 7400.2 2004). The FAA considers multiple and sometimes competing demands for airspace in relation to civil, commercial, and military aviation. Specific rules and regulations concerning airspace designation and management are listed in FAA Order 7400.2.

Under the National Airspace System, the airspace for MCB Hawaii Kaneohe Bay is designated as Class D airspace. The Class D airspace is a cylinder-shaped airspace from the surface to 2,500 feet above msl within a 4.3-NM radius of the airfield. ATC services to all aircraft operating within it and en-route traffic control service are provided by Kaneohe Terminal Radar Approach Control (NAVFAC Hawaii 2006).

Aircraft flying patterns at, approaching, or departing from MCB Hawaii Kaneohe Bay normally fly specific routes, i.e., flight tracks. These routes were established on the basis of land use and obstacle clearance, civil air traffic routes and available airspace, and navigational aid coverage, as well as current aircraft operational characteristics of the aircraft operating at MCB Hawaii Kaneohe Bay. Flight tracks are represented as single lines on maps and other graphics and depict the average route of the aircraft over the ground. These tracks are affected by aircraft performance, pilot technique, other air traffic, and weather conditions such that the actual flight path (or track) is an airway corridor up to 8 nautical miles wide rather than a single line, as depicted on the maps. Baseline P-3C flight tracks associated with the MCB Hawaii Kaneohe Bay airfield are depicted on Figure 7-1.

7.1.2 Airfield Operations

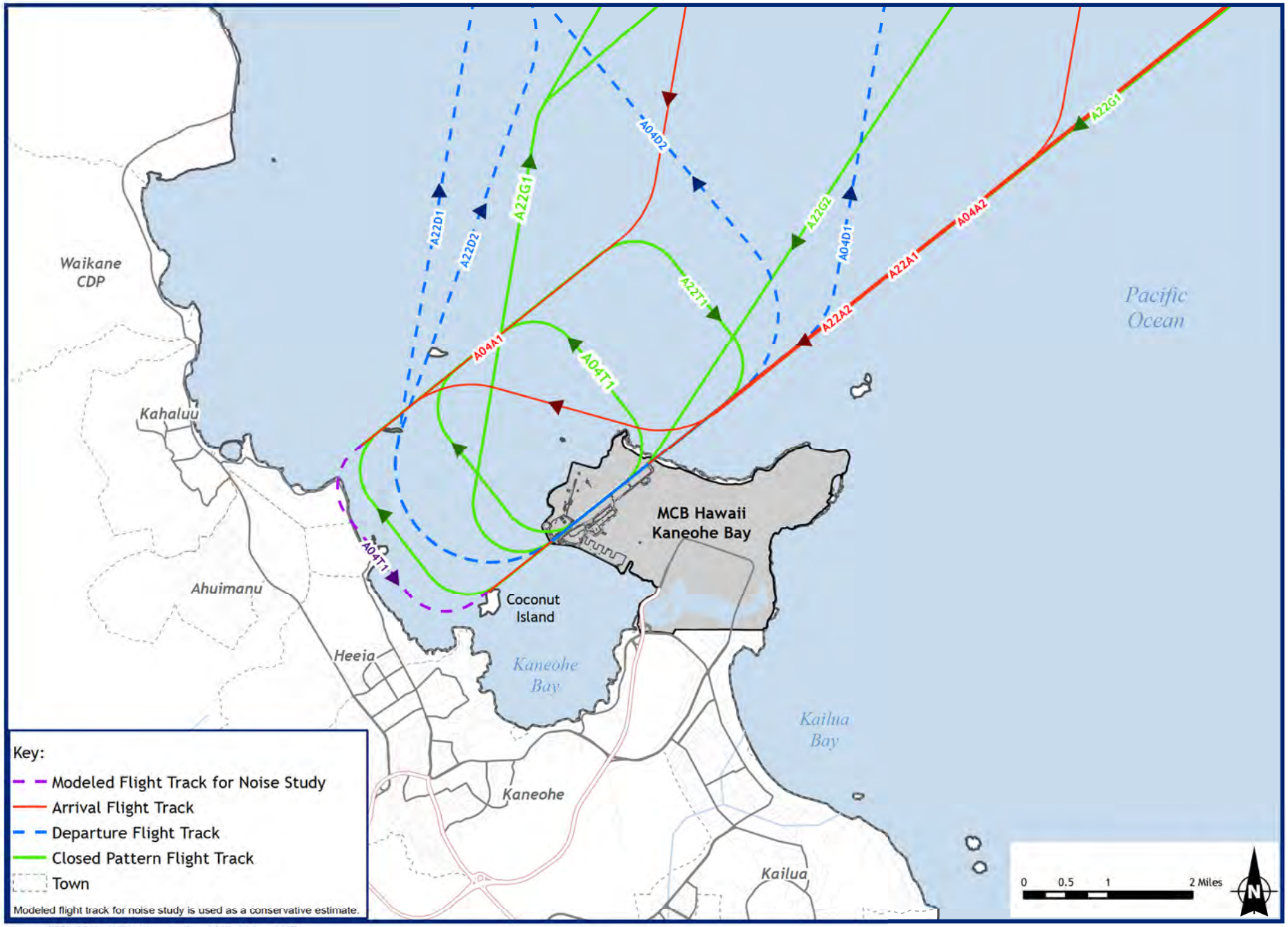
The airfield at MCB Hawaii Kaneohe Bay includes a single runway, Runway 04/22. This runway is a Class B runway that is 7,767 feet long and 200 feet wide. Four helipads and helicopter landing zones are located to the west of the runway.

A flight operation refers to any takeoff or landing. The takeoff and landing may be part of a training maneuver (or pattern) associated with the air base runway or may be associated with a departure or arrival of an aircraft.

Basic flight operations at MCB Hawaii Kaneohe Bay are:

- **Departure.** An aircraft taking off to a local training area, a non-local training area, or as part of a training maneuver (e.g., T&G).
- **Visual Arrival.** An aircraft arrival using visual flight rules. The aircraft lines up on the runway centerline, descends gradually, lands, and then taxis off the runway.
- **Tactical Air Navigation (TACAN) Arrival.** The TACAN approach is flown using instruments in the cockpit that receive bearing and distance information from a ground unit.
- **Ground-Controlled Approach Box.** A radar or "talk down" approach directed from the ground by ATC personnel. ATC personnel provide pilots with verbal course and glide-slope information, allowing them to make an instrument approach during inclement weather. The GCA Box is counted as two operations—the landing is counted as one operation, and the takeoff is counted as another.
- **Touch-and-Go Operation.** An aircraft lands and takes off on a runway without coming to a full stop. After touching down, the pilot immediately goes to full power and takes off again. The T&G is counted as two operations—the landing is counted as one operation, and the takeoff is counted as another.

Baseline (2014) flight operations at MCB Hawaii Kaneohe Bay for this SEIS are represented by the baseline operations from the *Final EIS for Basing MV22 and H1 Aircraft in Support of III MEF Elements in Hawaii*, Baseline Annual Flight Operations, as reported in Appendix D (Noise Analysis Report). Under this baseline, P-3C pilots perform approximately 20,189 flight operations annually at MCB Hawaii Kaneohe Bay, while total annual airfield operations are 52,669 (Wyle 2013). As shown on Table 7-1, under baseline conditions, the majority of operations at the airfield are conducted by CH-53D and H-60 helicopters, and P-3C aircraft, which collectively account for approximately 82 percent of all aircraft operations at the airfield (Wyle 2013).



Source: ESRI, 2012; MCBH Kaneohe Bay, 2007; Wyle , 2007.

Figure 7-1
P-3C Flight Tracks at
MCB Hawaii Kaneohe Bay, Oahu, Hawaii

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Table 7-1 Annual 2014[1] Baseline (No Action Alternative) Operations at MCB Hawaii Kaneohe Bay

Aircraft Type	Departure	Visual/TACAN Arrival	Overhead Break Arrival	Touch-and-Go	GCA Box	Total
P-3C	3,220	3,220	0	12,799	949	20,189
H-60	597	597	0	8,139	99	9,432
P-8A	0	0	0	0	0	0
CH-53	1,639	1,639	0	9,905	401	13,584
C-20	939	939	0	216	168	2,262
Transient	1,316	1,316	16	4,310	254	7,202
Total Airfield Operations[2, 3]	**7,711**	**7,711**	**16**	**35,369**	**1,871**	**52,669**

Notes:

1 2009 baseline operations from the *Final EIS for Basing MV22 and H1 Aircraft in Support of III MEF Elements in Hawaii*, Baseline Annual Flight Operations, as reported in Appendix D (Noise Analysis Report) were used to support the 2014 baseline data for this SEIS. MV-22 aircraft are scheduled to arrive at MCB Hawaii Kaneohe Bay beginning in 2014.

2 Total air operations numbers may not sum exactly due to rounding.

3 Since the 2012 Marine Corps MV-22 EIS ROD H-1 helicopters have transitioned to and are operating at MCB Hawaii Kaneohe Bay.

7.2 Noise

Noise is generally described as unwanted sound. A sound is regarded as noise when it interferes with normal activities, such as sleep or conversation, or when it is subjectively judged to be annoying. Noise analysis thus requires a combination of the physical description of sound produced by an activity and an identification of the potential responses to it.

Aircraft noise is associated with flight operations and ground engine-maintenance run ups. Aircraft noise exposure is typically calculated using the DNL, which is the noise metric based on the number of operations that occur on an average annual day or average busy day over a 24-hour period. The DNL metric includes a 10-dB penalty for nighttime operations (10:00 PM to 7:00 AM) because people are more sensitive to noise during normal sleeping hours, when ambient noise levels are lower. The DNL has been determined to be a reliable measure of community annoyance with aircraft noise and has become the standard metric used by many federal and state governmental agencies and organizations in the United States, such as the EPA and the FAA, for assessing aircraft noise.

The DNL for the community is depicted as a series of contours that connect points of equal value, usually in 5 dB increments. Calculated noise contours do not represent exact scientific measurements. The area between two specific contours is known as a noise zone. The noise zones used in this study are:

- 65 to 70 dB DNL;
- 70 to 75 dB DNL; and
- Greater than 75 dB DNL.

Navy guidance on incompatible land uses begins with the 65 to 70 dB DNL noise zone. DNL noise zones have historically been used as the noise metric for MCB Hawaii Kaneohe Bay. For a detailed discussion of noise and noise modeling, please refer to part one of Appendix D, Background Noise Information and Wyle Laboratories, Inc., Noise Report WR13-02.

Flight operations are the primary source of noise generated at MCB Hawaii Kaneohe Bay, a majority of which are conducted by the CH-53D and H-60 helicopters, and P-3C aircraft (see Table 7-1). Pre-flight engine run ups generally are not conducted for the types of aircraft stationed at MCB Hawaii Kaneohe Bay.

As discussed in Chapter 7.1, the 2014 baseline flight operations at MCB Hawaii Kaneohe Bay for this SEIS are represented by the 2009 baseline operations from the *Final EIS for Basing MV22 and H1 Aircraft in Support of III MEF Elements in Hawaii.* The existing DNL noise contours are also shown in the Final EIS for the MV-22 home basing.

The dominant noise contributors at MCB Hawaii Kaneohe Bay are the transient, large, heavy jet aircraft (e.g., C-5, C-17) and transient FA-18C/D aircraft. P-3C aircraft, while conducting approximately 37 percent of the annual operations, contribute less than 10 percent to the noise environment at MCB Hawaii Kaneohe Bay. The P-3C aircraft flight tracks are shown in Figure 7-1. Typically, P-3C aircraft remain offshore or over Kaneohe Bay and do not fly inland to the south or west of the base.

MCB Hawaii Kaneohe Bay periodically reviews ongoing operational procedures to ensure noise impacts can be minimized whenever and wherever practicable while maintaining flight safety. Noise abatement procedures are contained in the current air operations manual for MCB Hawaii Kaneohe Bay. MCB Hawaii Kaneohe Bay's policy is to conduct required training and operational flights with a minimal impact on surrounding communities. All aircrews using MCB Hawaii Kaneohe Bay facilities are responsible for the safe conduct of their mission while complying with published course rules, noise abatement procedures, and good common sense. Each aircrew must be familiar with the noise profiles of their aircraft and must be committed to minimizing noise impacts without compromising operational and safety requirements. Additionally, as noted in Marine Corps AICUZ and land use compatibility guidance MCO 11010.16, the Marine Corps updates AICUZ studies to address noise-reduction strategies and can conduct interim noise studies. Such studies could include, as appropriate, monitoring and a review of operational procedures in response to changes in training requirements and/or changes in land uses in the vicinity of the installation. The Marine Corps provides recommendations on land use compatibility in noise and safety zones; however, it is the local community's responsibility for ensuring compatible land uses within these zones.

MCB Hawaii Kaneohe Bay has a dedicated noise complaint hotline (808-257-8832). This number is manned during working hours and has voicemail after hours. Each call is logged and investigated, and a follow-up call will be made. An on-line form will also be accessible from the MCB Hawaii Kaneohe Bay website. In addition, MCB Hawaii Kaneohe Bay leadership has met several times with community leadership, including state legislators and local city officials, to discuss community concerns. Because MCB Hawaii Kaneohe Bay strives to be the best neighbor possible to its surrounding communities, following a meeting in February 2012 with local legislators and constituents, the base evaluated its Standard Operating Procedures (SOPs) to ensure it is properly balancing the training of its Marines and sailors with community impact. MCB Hawaii Kaneohe Bay adjusted the hours of maintenance engine-turns and the helicopter flight paths in order to minimize noise.

7.3 Air Quality

7.3.1 Air Quality Regulations

National Ambient Air Quality Standards

The CAA is the primary federal statute governing the control of air quality. The CAA designates pollutants as "criteria pollutants" for which NAAQS have been established to protect public health and welfare. These include particulate matter less than 10 microns in diameter (PM_{10}) and less than 2.5 microns in diameter ($PM_{2.5}$), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and ozone O_3 (see Table 7-2). O_3 is not an emission; it is created in the atmosphere primarily from the emissions of its precursors, i.e., NO_2 and VOCs.

Table 7-2 National Ambient Air Quality Standards

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 μg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution [78 FR 3086, January 15, 2013](5)	$PM_{2.5}$	primary	Annual	12 μg/m^3	Annual mean, averaged over 3 years
		secondary	Annual	15 μg/m^3	Annual mean, averaged over 3 years
			24-hour	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: EPA 2013

Notes:

1 Final rule published November 12, 2008. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

2 The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here to allow comparison to the 1-hour standard.

3 Final rule published March 27, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

4 Final rule published June 22, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

5 The EPA is revising the annual primary $PM_{2.5}$ standard by lowering the level to 12.0 micrograms per cubic meter (μg/m^3) and maintaining the 15.0 (μg/m^3) $PM_{2.5}$ standard as a secondary standard. The final rule became effective on March 18, 2013.

Key:

μg/m^3 = Micrograms per cubic meter.
mg/m^3 = Milligrams per cubic meter.
PM_{10} = Particulate matter less than 10 microns in diameter.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
ppb = Parts per billion.
ppm = Parts per million.

Areas that do not meet NAAQS for criteria pollutants are designated "nonattainment areas" for that pollutant. Areas that achieve the air quality standard after being designated nonattainment areas are redesignated as "attainment areas" following EPA approval of a maintenance plan. The CAA prohibits federal agencies from engaging in, supporting, providing financial assistance for licensing, permitting, or approving any activity that does not conform to an applicable SIP. Federal agencies must determine that a federal action conforms to the SIP before proceeding with the action. This determination is conducted in accordance with the General Conformity Rule (40 CFR 93).

MCB Hawaii Kaneohe Bay is under the jurisdiction of the Hawaii Department of Health. The State of Hawaii is designated as in attainment for all criteria pollutant standards. Because the region is in attainment, the CAA General Conformity Rule does not apply, and a General Conformity Determination is not required.

Hazardous Air Pollutants

In addition to the ambient air quality standards for criteria pollutants, national standards exist for HAPs, which are regulated under Section 112(b) of the 1990 CAA Amendments. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR Part 61). HAPs emitted from mobile sources are called MSATs, which are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. In 2001, the EPA issued its first MSATs Rule, which identified 21 compounds as being HAPs that required regulation. A subset of six of these MSAT compounds were identified as having the greatest influence on health and included benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter (EPA 2013). The EPA issued a second MSAT Rule in February 2007, which generally supported the findings in the first rule and provided additional recommendations for compounds having the greatest impact on health. The rule also identified engine emission certification standards for automobiles, trucks, and off-road vehicles (40 CFR parts 59, 80, 85, and 86; FR 72 No. 37, pp. 8427-8570, 2007).

Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants in mobile sources are to reduce their content in fuel and alter the engine operating characteristics to reduce the volume of pollutant generated during combustion. Because there is a minimal change (or reduction) to all emissions from ground sources and aircraft, and HAPs represent a small percentage of combustion emissions, HAPs were not considered in the 2008 FEIS and are not further evaluated in this SEIS.

Greenhouse Gases

GHGs are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe. Climate change refers to any significant change in measures of climate lasting for an extended period. Global climate change threatens ecosystems, water resources, coastal regions, crop and livestock production, and human health (EPA 2012). Many scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere. Worldwide use of fossil fuels is the primary cause of that increase (EPA 2012).

GHG emissions occur locally, but GHG impacts are both global in scale and cumulative over time. Further discussion of GHG emissions for the baseline and the proposed actions are discussed in Chapter 9, Cumulative Impacts.

7.3.2 Existing Emissions

Sources of air pollutants at MCB Hawaii Kaneohe Bay include mobile emissions from aircraft, ground service equipment and vehicles, privately and government-owned vehicles, and emissions from stationary sources.

Existing P-3C emissions under 2014 baseline conditions are summarized in Table 7-3. Emissions of criteria pollutants result from aircraft flight operations and maintenance run ups of the aircraft. Aircraft emissions were calculated using emission factors provided by the Navy's AESO and existing P-3C operations information from the *Final EIS for Basing MV22 and H1 Aircraft in Support of III MEF Elements in Hawaii*, as reported in Appendix D, Noise Analysis Report, (D-1.1, Table 1.1-1).

Emissions also result from the operation of POVs used by base personnel to commute to work. Emissions from POVs were estimated based on 2014 baseline P-3C personnel loading levels, assuming an average daily commute of 25 miles, completed 250 days per year. VMT emission factors were obtained "Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks (EPA420-F-08-024)" (EPA 2008a) (see Table 7-3). Emission factors and calculations are detailed in Appendix E.

Table 7-3 Baseline Emissions at MCB Hawaii Kaneohe Bay

Flight Operation/Activity	No. of Operations	Emissions (tpy)				
		CO	NO_x	VOC	SO_2	PM_{10}
P-3C Operations						
Straight-In Arrival LTO	3,220	60.4	34.1	39.6	10.9	17.4
Touch-and-Go	6,400	2.5	18.1	0.5	3.9	7.7
GCA Pattern	475	0.3	2.1	0.1	0.4	0.9
Maintenance Run Ups		15.32	5.62	10.41	2.05	3.25
Total P-3C Emissions		**78.4**	**60.0**	**50.6**	**17.3**	**29.2**
P-3C Personnel POV Emissions		**105.4**	**8.1**	**11.2**	**0.00**	**31.1**
Total 2014 Baseline Annual Emissions[1]		**183.8**	**68.1**	**61.8**	**17.3**	**60.3**

Note:
[1] Total baseline emissions numbers may not sum to 100 percent due to rounding.

Key:
CO = Carbon monoxide.
GCA = Ground control approach.
LTO = Landing and takeoff operation.
NO_x = Nitrogen oxide.
PM_{10} = Particulate matter less than 10 microns in diameter.
POV = Privately owned vehicle.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOC = Volatile organic compound.

7.4 Land Use

The study area for land use includes MCB Hawaii Kaneohe Bay and portions of the City and County of Honolulu. Land use designations encompass undeveloped and developed land in the study area. Developed land uses range from airfield operations and administrative areas on base to residential and commercial land off base. Undeveloped land is commonly classified as open space or natural areas.

7.4.1 MCB Hawaii Kaneohe Bay Land Use

MCB Hawaii Kaneohe Bay occupies approximately 2,951 acres on the Mokapu Peninsula on the east, or windward shore of Oahu, Hawaii (see Figure 2-3 in Chapter 2, Alternatives). The base is bordered by the

Pacific Ocean on the north, Kailua Bay on the east, Kaneohe Bay on the west, and residential housing on the south. The USMC enforces a 500-yard buffer zone in a band extending seaward from the approximately 11 miles of base shoreline into the surrounding marine environment. Approximately 2,220 acres, or 75 percent, of the base has been developed. Development is constrained on the remainder of the base by various environmental factors, including the presence of wetlands, wildlife management areas (WMAs), cultural resources, and steeply sloping terrain.

The primary land uses at MCB Hawaii Kaneohe Bay are the runway and related aircraft operational facilities in the western and southwestern portion of the base and the ground operations and training facilities in the eastern portion of the base. The USMC airfield has one runway, 7,771 feet long and 200 feet wide, oriented southwest to northeast. Aircraft operational facilities next to the runway include aircraft parking ramps, taxiways, aircraft maintenance hangars, the ATC tower, and various other support facilities. Ground operations and training facilities include several ground maintenance buildings and weapons training ranges. Other developed areas include housing and administrative support and community service facilities, primarily in the center of the base.

The approximately 730 acres of undeveloped land on the base consists mostly of open space and WMAs. The WMAs include the 517-acre Nu‘upia Ponds WMA along the southern boundary of the base, which provides a protective buffer zone between operational areas on the base and the civilian community, and the 25-acre Ulupa’u Head WMA along the northeastern shoreline. Both WMAs are managed by MCB Hawaii Kaneohe Bay as sensitive ecological and cultural resource areas.

A fence runs along the Nu‘upia Ponds WMA at the southern border of MCB Hawaii Kaneohe Bay. Access to the base is restricted to military and civilian personnel and authorized visitors.

7.4.2 Regional Land Use

MCB Hawaii Kaneohe Bay is located within the Koolaupoko planning region of the City and County of Honolulu. The Koolaupoko region covers the windward coastal and valley areas of Oahu from Makapuu Point at the region’s eastern boundary to Kaoio Point at the northernmost end of Kaneohe Bay. The City of Honolulu is approximately 18 miles southwest of the base. The two nearest communities are Kaneohe and Kailua, located approximately 2 miles to the southwest and 5 miles to the southeast, respectively, from the base. Both communities primarily comprise residential land uses.

Predominant land uses in the immediate vicinity of MCB Hawaii Kaneohe Bay include:

- Low-density, single-family residential development along the southern boundary of the base and continuing to the southwest and southeast in the towns of Kaneohe and Kailua.
- Commercial developments located mainly along Kamehameha Highway from Likelike Highway north to Haiku Road in Kaneohe and around the intersection of Oneawa Street and Kailua Road in Kailua.
- Institutional uses, including several elementary schools, the Samuel Wilder King intermediate school and James B. Castle high school in Kaneohe. The Kailua wastewater treatment plant is located south of the base. Additionally, Hawaii State Hospital and Hawaii Pacific University (secondary campus) are located in Kaneohe. Moku O Loe (or Coconut Island), the only inhabited island in Kaneohe Bay, is home to the University of Hawaii Institute of Marine Biology.
- Light industries in Kaneohe, located on Kamehameha Highway.

- Large areas of open space, preserved land, and agricultural areas, located between Kailua and Kaneohe, to the west of Kaneohe, and on the slopes of the Koolau Mountain Range.

7.4.3 Land Use Consistency with Local Plans, Programs, and Policies

Development within and around MCB Hawaii Kaneohe Bay is controlled, guided, or influenced by the following plans, programs, and policies:

- The 2008 Marine Corps Base Hawaii AICUZ Update;
- The 2012 Marine Corps Base Hawaii Final Plus Up Development Plan;
- The 2011 Marine Corps Base Hawaii INRMP Update;
- The 2013 Marine Corps Base Hawaii ICRMP; and
- The 2000 Koolaupoko Sustainable Communities Plan and Land Use Ordinance of the City and County of Honolulu.

Refer to Chapter 10 for further information on the CZMA and consistency with the Hawaii Coastal Zone Management Program.

2006 MCB Hawaii AICUZ Update

The Navy's AICUZ Program is described in Chapter 1.3.5. The *2006 Air Installations Compatible Use Zones Study Update* serves to balance the need for aircraft operations with community concerns over aircraft noise and accident potential (NAVFAC PAC 2006). The AICUZ Program was developed in response to growing incompatible urban development around military airfields.

APZs are areas where an aircraft mishap is most likely to occur, if a mishap were to occur, and are delineated based on historical data and departure, arrival, and pattern flight tracks on and near the airfield runways. The USMC makes recommendations to local planning agencies that developments that concentrate large numbers of people, such as apartments, churches, and schools, be constructed outside of APZs.

APZ configurations and dimensions are derived from the AICUZ Instruction. APZs are, in part, based on the number of operations conducted at the airfield—more specifically, the number of operations conducted for specific flight tracks. The three APZs include:

- **Clear Zone.** The Clear Zone extends 3,000 feet beyond the end of the runway; it measures 1,500 feet wide at the end of the runway and 2,284 feet wide at its outer edge.
- **APZ I**. APZ I extends 5,000 feet beyond the Clear Zone, with a width of 3,000 feet at its outer edge. APZ I is typically rectangular, although it may curve to conform to the predominant flight track.
- **APZ II.** APZ II extends 7,000 feet beyond APZ I, with a width of 3,000 feet. This zone is typically rectangular, although it, too, may conform to the curve of the predominant flight track.

The MCB Hawaii APZs are included in the 2006 AICUZ update and are shown on Figure 7-2. As shown, all of the clear zones and APZs are located on base or offshore in the Pacific Ocean or Kaneohe Bay.

Marine Corps Base Hawaii Final Plus Up Development Plan

The Marine Corps Base Hawaii Final Plus Up Development Plan was published in August 2012. The plan is based on the 2006 Master Plan for MCB Hawaii, as well as the 2011 Aviation Plan for MCB

Hawaii Kaneohe Bay. The plan contains the laydown strategies and directives for implementation of the Grow the Force initiative (see Chapter 1.3.4).

Integrated Natural Resources Management Plan

In January 2006, the DoD, the USFWS, and the AFWA entered into a Memorandum of Understanding for a cooperative program of INRMP development. Under this program, the INRMP is updated on a continuous basis to achieve mutually agreed upon fish and wildlife conservation objectives in compliance with the Sikes Act (16 U.S.C. 670a *et seq*.). The USMC prepared and published an updated INRMP/EA for MCB Hawaii in 2011. The updated INRMP fulfills the requirements of DoD Instruction 4715.3 and the Sikes Act, as well as other pertinent laws (e.g., the ESA). The overall goal of the MCB Hawaii INRMP is to identify and implement strategies to help maintain quality training lands and quality of life for the military population while also ensuring that land use and natural resources management are integrated and consistent with federal and state stewardship requirements.

The MCB Hawaii Kaneohe Bay Environmental Compliance and Protection Department is responsible for the programmatic oversight, management, and supervision of natural resource management at the base.

Integrated Cultural Resources Management Plan

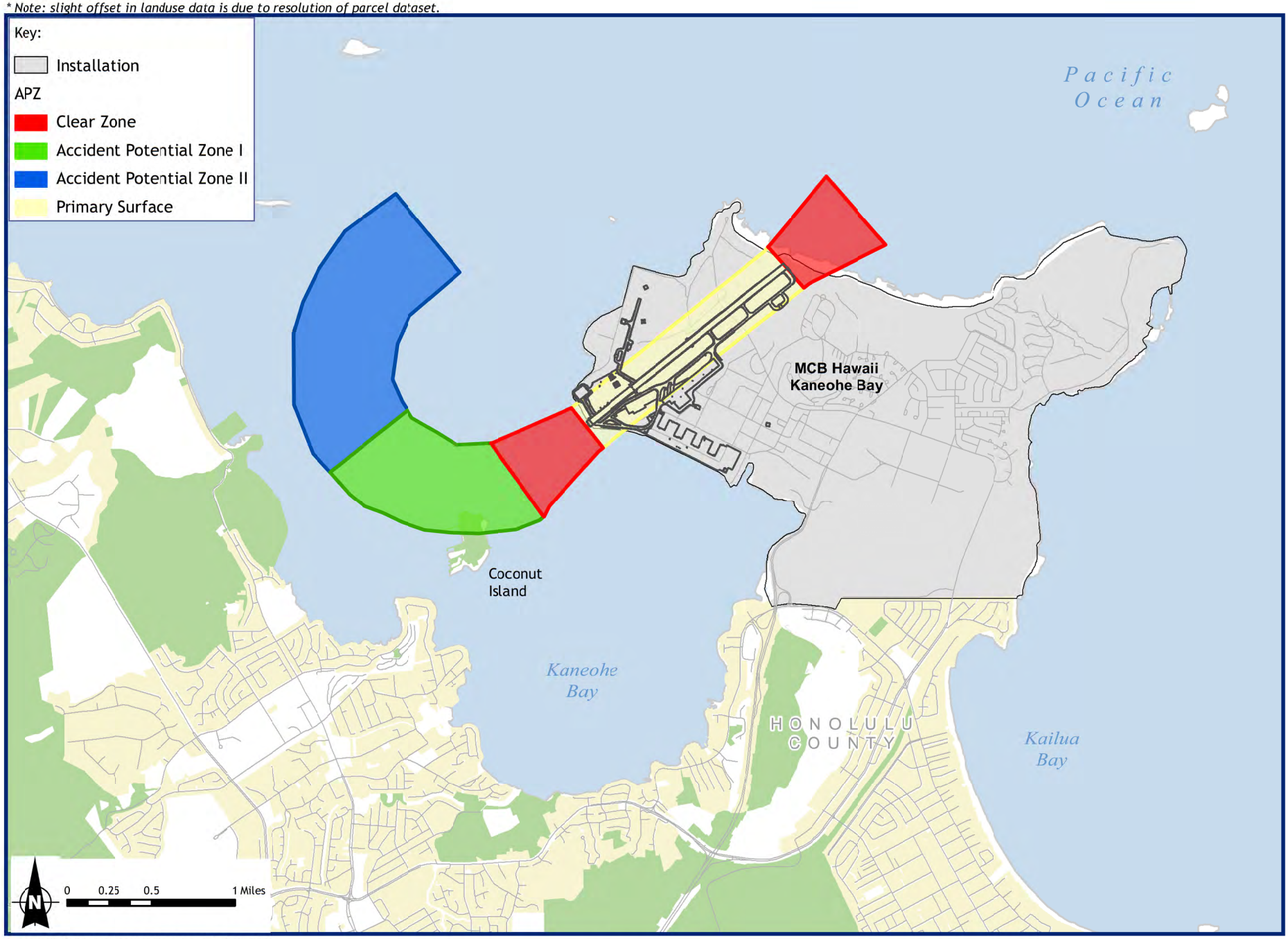
MCB Hawaii must manage its cultural resources in compliance with the requirements of the NHPA. The purpose of MCB Hawaii Kaneohe Bay's ICRMP is to advance the protection, enhancement, and contemporary use of the cultural and historic properties owned by the USMC (Tomanari-Tuggle 2013). The ICRMP applies to seven MCB Hawaii properties, including Kaneohe Bay. The plan identifies management actions that should be completed in compliance with Section 106 and Section 110 of the NHPA.

Koolaupoko Sustainable Communities Plan and Land Use Ordinance of the City and County of Honolulu

The Koolaupoko Sustainable Communities Plan is one of eight community-oriented plans on the island of Oahu intended to help guide public policy, investment, and decision making through the 2019 planning horizon. The plan assumes a long-term commitment to a military presence in Koolaupoko and sets forth principles of environmental compatibility and public shoreline access and guidelines for military facilities. The plan also reaffirms the region's role in Oahu's development pattern by establishing the following principles for future land use and development in Koolaupoko:

- Limit the potential for new housing in the region so that significant residential growth is directed instead to primary urban centers located closer to Honolulu.
- Revitalize existing commercial centers and limit the expansion of commercial centers and economic activity in the region to promote the development and growth of employment in the primary urban centers located closer to Honolulu.
- Maintain the predominantly low-rise, low-density, single-family form of residential development in the region.
- Maintain the northern and southern portions of the region as predominantly agricultural and preservation land uses.
- Maintain the towns of Kaneohe and Kailua as urban fringe areas with limited future population growth.

** Note: slight offset in landuse data is due to resolution of parcel dataset.*



Source: ESRI, 2012; Honolulu Real Property BTS, 2007; MCBH Kaneohe Bay, 2003, 2007.

Figure 7-2
AICUZ APZs at
MCB Hawaii Kaneohe Bay, Oahu, Hawaii

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The Land Use Ordinance of the City and County of Honolulu is the primary land use control used by the city and county to control development on non-federal land. The majority of parcels under city and county jurisdiction south of MCB Hawaii Kaneohe Bay are zoned P-2 (Preservation General), R-7.5 (Residential), and R-10 (Residential); Coconut Island is zoned P-1 (Preservation Restricted). The primary purpose of lands zoned P-1 and P-2 is to preserve open space and recreation areas that have scenic or natural value. Development within these zones is restricted and in the P-1 zone requires approval by the appropriate state agencies. R-7.5 and R-10 are residential zones that allow for a range of densities. The R-10 zone allows for large-lot, low-density, single-family development, whereas the R-7.5 zone allows for more dense urban residential development (City and County of Honolulu 2010).

7.5 Socioeconomics

The study area for socioeconomic resources includes MCB Hawaii Kaneohe Bay as well as surrounding municipalities with the strongest economic ties to the base (e.g., Honolulu County, Honolulu City, and the communities of Kaneohe and Kailua). This chapter on the affected socioeconomic environment discusses population and housing in Chapter 7.5.1, the economy in Chapter 7.5.2, taxes and revenues in Chapter 7.5.3, education in Chapter 7.5.4, and environmental justice in Chapter 7.5.5.

7.5.1 Population and Housing

7.5.1.1 Population

MCB Hawaii Kaneohe Bay

MCB Hawaii Kaneohe Bay is home to USMC and Navy personnel, including the Navy's CPRW 2, and a variety of other tenants. In 2010, an estimated 11,177 military and civilian personnel were assigned to or employed by the base. More than half of the USMC and Navy personnel living off base resided in the nearby communities of Kailua and Kaneohe, with the remaining personnel relatively evenly dispersed in communities throughout the island of Oahu (Navy 2012).

During baseline year 2014, 1,443 P-3C personnel are stationed at MCB Hawaii Kaneohe Bay, comprising 358 officers and 1,085 enlisted personnel. No civilians or contractors are assigned to the P-3C aircraft squadrons.

City of Honolulu and Region

MCB Hawaii Kaneohe Bay is located on the island of Oahu, which is comprised entirely of the city and county of Honolulu. The areas immediately adjacent to MCB Hawaii Kaneohe Bay include the primarily residential communities of Kaneohe and Kailua. Many of the individuals living in these communities are either associated with the military base or commute daily to work in the City of Honolulu.

Table 7-4 presents population totals for Honolulu County, Honolulu (City), Kaneohe, and Kailua in 2000 and 2010. The Honolulu government is a combined city/county entity; there is no separate city government. Therefore, census data reported for Honolulu (City) relate to data collected for the Honolulu Census-Designated Place (CDP), which encompasses the majority of the urban area in Honolulu County. The communities of Kaneohe and Kailua also do not have a separate town government, so census data correspond to the Kaneohe CDP and Kailua CDP.

Table 7-4 Regional Population around MCB Hawaii Kaneohe Bay (2000 and 2010)

Jurisdiction	2000	2010	% Change from 2000 to 2010
Honolulu County	876,156	953,207	8.8
Honolulu (City)	371,657	390,738	5.1
Kaneohe	34,970	34,597	-1.1
Kailua	36,513	38,635	5.8

Sources: U.S. Census Bureau 2000k; 2010i.

The populations in Honolulu County, Honolulu (City), and Kailua all experienced population growth of between 5.1 percent and 8.8 percent between 2000 and 2010. During the same time period, the population of Kaneohe declined slightly, by 373 residents, or 1.1 percent of its total population (see Table 7-4). Honolulu County as a whole is projected to continue to grow for the next decade. By 2020, the county's total population is expected to increase by 5.3 percent and reach a total of 1.0 million residents (State of Hawaii 2012a).

7.5.1.2 Housing

MCB Hawaii Kaneohe Bay

The USMC and Navy personnel stationed at MCB Hawaii Kaneohe Bay may be housed either in military-controlled bachelor/family housing units or in private accommodations in the local community. Under the Office of the Secretary of Defense Housing Requirement Determination Process Policy Guidance, the construction, operation, and maintenance of government housing is considered only if the private sector is not capable of providing military members with appropriate housing.

As of December 2010, the base supported 3,398 unaccompanied (bachelor) enlisted and officer quarters and 2,216 military-controlled family housing units (Navy 2012). The total number of military-controlled family housing units at MCB Hawaii Kaneohe Bay is expected to increase to 2,592 units by the end of 2014 due to the planned construction of 376 additional units. Aside from the 376 units, no other additional housing units are currently planned to be built at the base (Navy 2012).

City of Honolulu and Region

The regional housing market around MCB Hawaii Kaneohe Bay has experienced moderate growth over the past decade. Between 2000 and 2010, the total number of housing units in Honolulu County increased by 6.6 percent, or 20,911 units. The community of Kailua also experienced a similar rate of growth in housing to that of the county, while Honolulu (City) and the community of Kaneohe experienced a much lower rate of growth between 2000 and 2010 (see Table 7-5).

As shown on Table 7-5, Kaneohe and Kailua, the two communities closest to the base, had higher owner-occupancy rates and lower vacancy rates than Honolulu (City) and Honolulu County as a whole. In 2010, the vacancy rates in the region ranged from a low of 3.6 percent in Kaneohe to a high of 9.2 percent in Honolulu (City) and were, with the exception of Kailua, lower than they had been in 2000 (U.S. Census Bureau 2000k; 2010i).

Table 7-5 Regional Housing Availability around MCB Hawaii Kaneohe Bay (2000 and 2010)

Jurisdiction	Housing Units				Percent Owner-Occupied[1]	Percent Renter-Occupied[2]	Percent Vacancy Rate[3]
	Owner-Occupied	Renter-Occupied	Vacant	Total			
2000							
Honolulu County	156,290	130,160	29,538	315,988	54.6	45.4	9.3
Honolulu (City)	65,861	74,476	18,326	158,663	46.9	53.1	11.6
Kaneohe	7,473	3,503	496	11,472	68.1	31.9	4.3
Kailua	8,521	3,708	551	12,780	69.7	30.3	4.3
2010							
Honolulu County	174,387	136,660	25,852	336,899	56.1	43.9	7.7
Honolulu (City)	71,218	76,713	14,917	162,848	48.1	51.9	9.2
Kaneohe	7,790	3,348	415	11,553	69.9	30.1	3.6
Kailua	9,346	3,575	729	13,650	72.3	27.7	5.3

Source: U.S. Census Bureau 2000k; 2010i

Notes:

1 Percent Owner-Occupied is calculated as the number of owner-occupied housing units divided by the sum of owner-occupied and renter-occupied housing units.

2 Percent Renter-Occupied is calculated as the number of renter-occupied housing units divided by the sum of the owner-occupied and renter-occupied housing units.

3 Percent Vacancy Rate is defined as vacant housing units divided by total housing units.

The importance of the tourism industry in Honolulu County is reflected in the housing market. In 2010, more than a third (34 percent to 40 percent) of all vacant housing units in Honolulu County, Honolulu (City), and Kailua were units designated as being "for seasonal, recreational, or occasional use." In contrast, in 2010, approximately 13 percent of the vacant housing units in Kaneohe were "for seasonal, recreational, or occasional use" (U.S. Census Bureau 2010i).

7.5.2 Economy

7.5.2.1 MCB Hawaii Kaneohe Bay

The military has a large impact on the economy of the State of Hawaii and on Honolulu County, in particular. According to the *2011 State of Hawaii Data Book*, Hawaii was home to 19,388 DoD employees, including 10,601 Navy and USMC personnel (State of Hawaii 2012b). In 2011, DoD accounted for approximately 8.9 percent of total employment in the Honolulu MSA (see Table 7-6).

Table 7-6 Percent Employed by the Military in Honolulu MSA (2001, 2005, and 2011)

Year	Percent Employed by the Military
2001	9.0
2005	8.4
2011	8.9

Source: U.S. Department of Commerce 2013g.

MCB Hawaii Kaneohe Bay is one of the major employers in Honolulu. In addition to direct employment, the base also contributes significantly to the local economy through the purchase of goods and services from the local area.

The National Defense Research Institute at the RAND Corporation analyzed the economic impact of the armed forces in Hawaii. Between FY 2007 and FY 2009, annual expenditures by the DoD in the state averaged $6.5 billion, including labor and procurement. Approximately 62 percent of annual expenditures were for payroll and personnel benefits, and 38 percent of expenditures were for procurement. In 2009, these expenditures resulted in a total (direct and indirect) economic impact of approximately $12.2 billion on the State of Hawaii's economy, an amount equivalent to just over 18 percent of the state's gross state product (i.e., the final value of all goods and services produced in the state). In addition, these expenditures directly and indirectly supported the employment of more than 101,000 persons (RAND Corporation 2011).

7.5.2.2 Kaneohe Bay Region

In addition to the military sector described above, the tourism sector is one of the other important economic drivers in the Hawaiian and Honolulu economies. In 2010, more than 7 million people visited Hawaii. Of the almost 66 million visitor days spent by air travelers in the State of Hawaii during that time, almost half (i.e., 32 million) were spent on Oahu (Honolulu County) (Hawaii Tourism Authority 2011). A study of the economic contribution of the tourism industry to the State of Hawaii's economy estimated that the industry had a total (direct and indirect) economic impact of approximately $10.9 billion in 2010 (Tian et al. 2011).

Service industries, particularly health-related services, and arts, entertainment, recreation and accommodations and food service are important economic sectors in the State of Hawaii as a whole and in Honolulu County in particular. In the period from 2009 to 2011, the largest single industrial sector in Honolulu County was the education, health, and social services sector, which employed an estimated 22.4 percent of the employed civilian labor force. Other major employment sectors included the arts, entertainment, recreation and accommodations and food service sector, which employed 14.1 percent of the employed civilian labor force; the retail trade sector, which employed 11.4 percent of the employed civilian labor force; and the professional, scientific, and management services sector, which employed 10.0 percent of the employed civilian labor force (see Table 7-7).

Annual employment statistics and unemployment rates for the State of Hawaii and the Honolulu MSA for the years 2010 to 2012 are shown on Table 7-8. As shown on the table, the 2012 unemployment rates in the State of Hawaii and Honolulu were markedly below the national average monthly unemployment rate of 8.1 percent (U.S. Department of Labor 2013g). Between 2010 and 2012, the unemployment rates in the Honolulu MSA have been consistently lower than Hawaii's statewide average (see Table 7-8).

In the period from 2009 to 2011, Honolulu County had an estimated median household income level of $70,166; a median family income of $82,792; and a per capita income of $29,276. These household, family, and per capita income levels were higher than the average levels for the State of Hawaii as a whole (see Table 7-9).

Table 7-7 2009-2011 Percent of Total Civilian Employment by Industrial Sector for Honolulu County and the State of Hawaii (3-Year Estimates)

Sector	Honolulu County (%)	State of Hawaii (%)
Agricultural, Forestry, Fishing, and Mining	0.7	1.6
Construction	6.6	7.2
Manufacturing	3.5	3.2
Wholesale Trade	2.5	2.4
Retail Trade	11.4	11.6
Transportation and Warehousing	5.8	5.5
Information	1.8	1.6
Finance, Insurance, and Real Estate	6.8	6.5
Professional, Scientific, and Management Services	10.0	10.0
Education, Health, and Social Services	22.4	21.1
Arts, Entertainment, Recreation and Accommodations and Food Service	14.1	16.4
Other Services	4.5	4.5
Public Administration	9.9	8.4

Source: U.S. Census Bureau 2013n

Note: Totals may not add to 100 percent due to rounding.

Table 7-8 Total Employment and Unemployment Rate in the State of Hawaii and the Honolulu MSA (2010-2012)

	2010		2011		2012[1]	
Jurisdiction	Employment	Unemployment Rate (%)	Employment	Unemployment Rate (%)	Employment	Unemployment Rate (%)
Honolulu MSA	426,357	5.8	434,211	5.7	429,726	5.4
State of Hawaii	604,522	6.9	616,453	6.7	610,329	6.0

Source: U.S. Department of Labor, 2013f

Note:
[1] Employment totals and the unemployment rates for the Honolulu MSA were calculated using data that did not include December, for which data were unavailable at the time of publication, and included provisional data for November.

Table 7-9 2009-2011 Income Levels for Honolulu County and the State of Hawaii (3-Year Estimates)

Income	Honolulu County	State of Hawaii
Median Household Income	$70,166	$64,909
Median Family Income	$82,792	$77,385
Per Capita Income	$29,276	$28,330

Source: U.S. Census Bureau 2013n

7.5.3 Taxes and Revenues

According to the *FY 2012 Comprehensive Annual Financial Report for the City/County of Honolulu*, the total revenue for the city/county government was $2.09 billion in that year. The largest individual revenue sources were charges for services and property taxes, which together accounted for 78 percent of total revenues. Other sources of revenue for the city/county included operating and capital grants and

contributions and other taxes. County expenses incurred for FY 2012 totaled $2.0 billion, and the three largest expense items were general government (24.8 percent), public safety (20.3 percent), and sewers (11.9 percent). Other expenses accounting for 5 percent or more of total expenses were public transportation, solid waste, cultural and recreational activities, and highways and streets (City and County of Honolulu 2012). Based upon the FY 2012 financial data and the 2010 census population total for Honolulu County, local per capita government revenues were $2,193, and per capita government expenditures were $2,102 in FY 2012.

7.5.4 Education

Public schools serving families living in military-controlled housing units at MCB Hawaii Kaneohe Bay are all within the Windward School District and include Mokapu Elementary, Aikahi Elementary, Kailua Elementary, Kailua Intermediate, Kailua High, Kainalu Elementary, and Kalaheo High School. Mokapu Elementary is located on base, while the others are all located off base (USMC Life 2013). An estimated 4,663 students were enrolled in these seven schools during the 2012-2013 school year (State of Hawaii 2012c).

The Windward School District is divided into complexes, or sub-districts. Mokapu Elementary, Aikahi Elementary, Kailua Elementary, Kainalu Elementary, Kailua Intermediate, and Kalaheo High School are all located in the Kalaheo Complex, while Kailua High is located in the Kailua Complex. In 2011, Kalaheo Complex had 237 teachers, and the Kailua Complex had 233 teachers (State of Hawaii 2012d). In a typical year, the State of Hawaii is granted approximately $40 million in Federal Impact Aid by the federal government for military family members attending local public schools (Hawai'i Free Press 2012).

In addition to these public schools, a number of independent, private schools are also available in the Kaneohe/Kailua area. Some of these independent schools, which have a large number of military-connected students from MCB Hawaii Kaneohe Bay, include Le Jardin Academy; St. Anthony Parish School; St. John Vianney; St. Anne's Model Schools; Trinity Christian; St. Mark Lutheran; and Koolau Baptist Academy (Navy 2012).

7.5.5 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations. In addition, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* issued in 1997, directs federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children.

In this analysis, minority and low-income populations and children were defined as follows:

- **Minority.** Individuals who are Black or African American, American Indian and Alaska Native, Asian[17], Native Hawaiian and other Pacific Islander[18], or persons of two or more races (a separate distinction has been made for people of Hispanic or Latino[19] origin).

[17] Asian includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, and Other Asian alone, or two or more Asian categories.

[18] Native Hawaiian and other Pacific Islander includes Native Hawaiian, Guamanian or Chamorro, Samoan, and other Pacific Islander alone or two or more Native Hawaiian and other Pacific Islander categories.

- **Low-Income.** Individuals living below the poverty level as defined by the U.S. Census Bureau.
- **Children.** Individuals under the age of 18.

Statistics pertinent to the study area surrounding MCB Hawaii Kaneohe Bay are summarized in Table 7-10. The geographic areas compared for this environmental justice analysis are the State of Hawaii, Honolulu County, Honolulu (City), Kaneohe, and Kailua.

Table 7-10 Environmental Justice Statistics for MCB Hawaii Kaneohe Bay (2010)

Jurisdiction	Total Population	Percent Minority	Percent Hispanic or Latino	Percent Low Income[1]	Percent Children
State of Hawaii	1,360,301	75.3	8.9	10.2	22.3
Honolulu County	953,207	79.2	8.1	9.3	22.1
Honolulu (City)	390,738	80.5	5.3	10.5	17.9
Kaneohe	34,597	79.5	8.4	5.9	20.8
Kailua	38,635	56.0	6.5	6.6	20.5

Source: U.S. Census Bureau 2013i, 2013j, 2013k, 2013l, 2013m, 2010i.

Note:
[1] Percentage not available from the 2010 Census, estimate provided from the 2007-2011 American Community Survey for all but Honolulu City for which only an estimate from the 2005-2009 American Community Survey was available.

"Minority" groups constitute a majority of the population in all of the areas. In all of the areas except Kailua, people describing themselves as Asian form the largest racial group. In Kailua, residents describing themselves as White form the largest sub-population. In Kaneohe and Kailua, people describing themselves as being from two or more races form the second-largest racial group. Honolulu City and Kailua have a lower percentage of Hispanic or Latino residents than the State of Hawaii, Honolulu County, and Kaneohe. The percentage of low-income individuals is lower in Kaneohe and Kailua than in the State of Hawaii, Honolulu County, and Honolulu (City). The percent of children is lower in Honolulu (City) and slightly lower in Kaneohe and Kailua than in the State of Hawaii and Honolulu County as a whole.

7.6 Topography and Soils

MCB Hawaii Kaneohe Bay comprises the study area for topography and soils. The following discussion describes base-wide topography and soils for context.

The topography at MCB Hawaii Kaneohe Bay is generally flat, with elevations ranging from sea level to approximately 20 feet above sea level (asl) throughout much of the base. The relatively flat topography is interrupted by three remnant volcanic features: Kuau (Pyramid Rock), Puu Hawaii Loa, and Ulupa'u crater (Drigot et al. 2001). Pyramid Rock is an outcropping of an a'a lava flow on the northwest shore of the base, with steep slopes and an elevation of approximately 40 feet asl. Puu Hawaii Loa, a cinder cone located near the center of the base, also has steep slopes and an elevation of 200 feet asl. The highest point on the base is along the ridgeline of the 600-foot Ulupa'u crater, which covers most of the northeast portion of Mokapu Peninsula (Drigot et al. 2001; NAVFAC Hawaii 2006).

[19] Hispanic or Latino (of any race) includes Mexican, Puerto Rican, Cuban, and other Hispanic or Latino composed of people whose origins are from the Dominican Republic, Spain, and Spanish-speaking Central or South American Countries.

Sixteen soil types are mapped within the MCB Hawaii Kaneohe Bay boundary (NRCS 2012). Three additional features, quarry, rockland, and water, have also been mapped within the base boundary. Soils on the base range from dense silty clay to fine beach sand (Drigot et al. 2001). The most prominent soils are Mamala stony silty clay loam, 0 to 12 percent slopes, which encompasses approximately 22 percent of the base; and fill land, mix, which encompasses approximately 21 percent of the base (NRCS 2012). Each of the remaining soil types covers approximately 6 percent or less of the base. The aircraft runway and maintenance areas are developed on fill land, a non-native soil. The fill was obtained between 1939 and 1941 by dredging a large section of the adjacent Kane'ohe Bay (Drigot et al. 2001). The existing aircraft rinse facility is constructed on Molokai silty clay loam, 7 to 15 percent slopes (NRCS 2012).

7.7 Water Resources and Wetlands

MCB Hawaii Kaneohe Bay is the study area for water resources and wetlands. The following discussion describes base-wide water resources and wetlands for context.

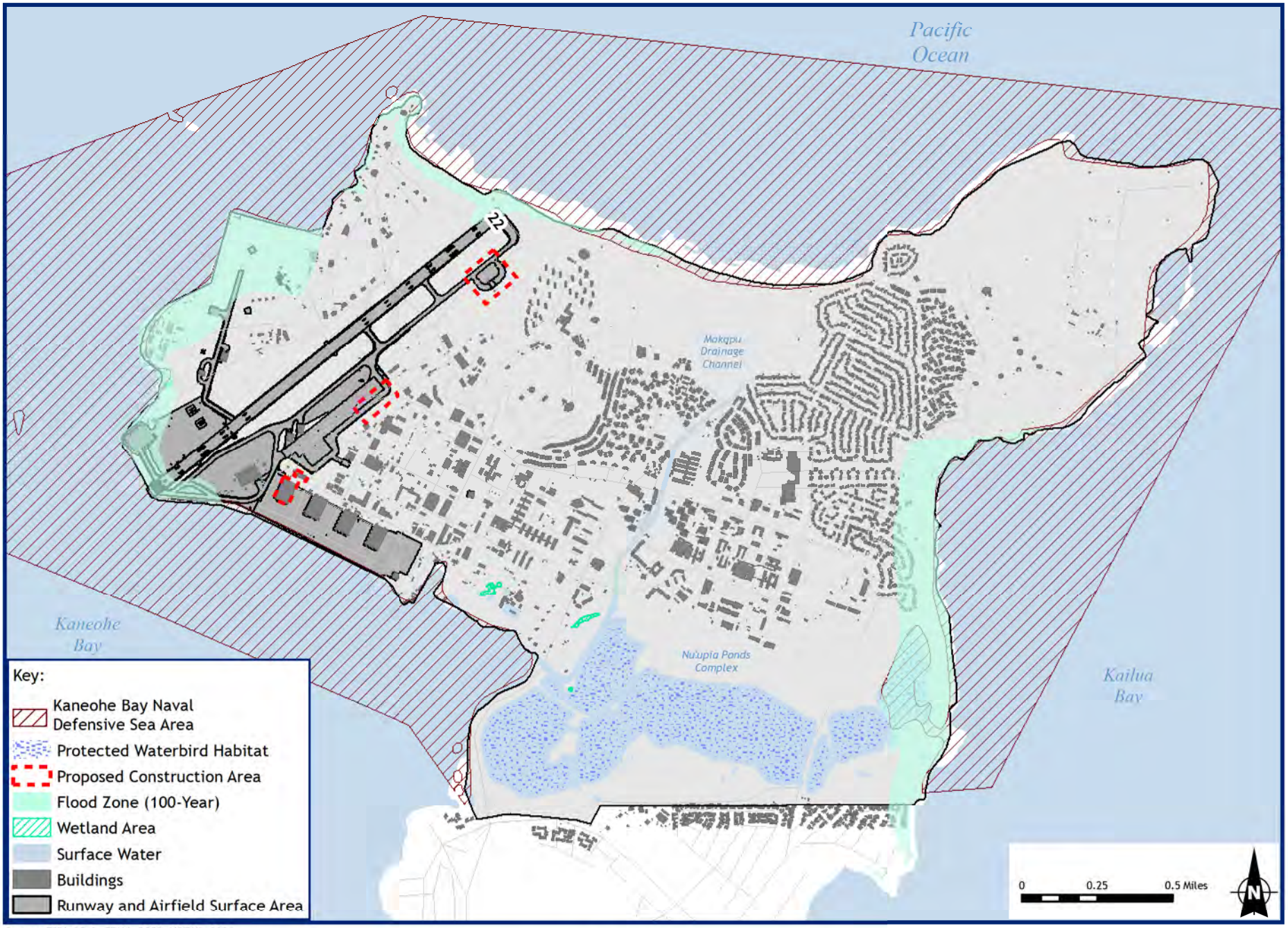
The Federal Water Pollution Control Act, as amended by the CWA, restores and maintains the chemical, physical, and biological integrity of the nation's waters. The CWA regulates the discharge of pollutants from point sources into waters of the U.S. The CWA, as amended in 1987, requires each state to establish water quality standards for its surface waters derived from the amount of pollutants that can be assimilated by a body of water without deterioration of a designated use. The CWA prohibits spills, leaks, or other discharges of oil or hazardous substances into the waters of the U.S. in quantities that may be harmful. The CWA limits any discharge of pollutants to a level sufficient to ensure compliance with the state water quality standards. Direct discharges of effluents are regulated under the NPDES permits issued by the EPA or under state NPDES programs approved by EPA.

7.7.1 Surface Water

MCB Hawaii Kaneohe Bay is bound by Kaneohe Bay to the west, Kailua Bay to the east, and the Pacific Ocean to the north. Kaneohe Bay is the largest sheltered water body in the Hawaiian archipelago, encompassing a surface area of approximately 11,000 acres and having a maximum depth of approximately 40 feet. The bay is unique for its intact barrier reef and patch reef network, biological diversity, cultural heritage, and recreational value (Shafer et al. 2002). Kailua Bay is bordered by a broad sandy beach extending along the MCB Hawaii Kaneohe Bay eastern shoreline. A submerged coral reef extends across much of the bay at a depth of approximately 20 feet (Shafer et al. 2002).

No perennial water bodies are located on MCB Hawaii Kaneohe Bay; freshwater flow is primarily restricted to artificial drainage channels during and shortly after rainstorms. The most prominent surface water features on the base are the Nu'upia Ponds complex and Mokapu central drainage channel (Figure 7-3). The Nu'upia Ponds complex, which borders the southern boundary of the base, consists of eight shallow interconnected ponds, each with a depth of 2 feet or less. Four of the ponds are directly connected to either Kaneohe Bay or Kailua Bay (Drigot et al. 2001). The Mokapu central drainage channel, which roughly bisects the base north to south, was excavated in a former area of tidally influenced estuarine wetlands in what is now the central portion of MCB Hawaii Kaneohe Bay. The channel extends for approximately 1.25 miles from its upper reaches near the southern edge of Klipper golf course to its outlet at Kaneohe Bay. It has an average width of 37 feet, receives fresh water and groundwater runoff from the developed area of the base, and is subject to saltwater intrusion from tidal currents (Drigot et al. 2001).

The western portion of the base is mostly developed and contains the runway and aviation facilities. No natural surface water features occur in this area. Box culverts and pipes drain the runway area southward and westward to Kaneohe Bay (Navy 2012).



Source: ESRI, 2012; FEMA, 2009; USFWS, 2004; NOAA 2014; MCBH Kaneohe Bay, 2007.

Figure 7-3
Surface Waters, Wetlands, and other Natural Resources
at MCB Hawaii Kaneohe Bay, Oahu, Hawaii

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No surface water features occur within or immediately adjacent to the proposed construction areas.

7.7.2 Water Quality

Surface waters surrounding MCB Hawaii Kaneohe Bay are classified and regulated by the state of Hawaii under *Title 11, Hawaii Administrative Rules, Department of Health, Chapter 54, Water Quality Standards*. The waters of Kaneohe and Kailua bays are protected by state and federal water quality standards. The inner portions of Kaneohe Bay are designated as Class AA waters, while the waters of Kailua Bay and outer portions of Kaneohe Bay are designated as Class A waters (Hawaii Department of Health 1987). The management objective for Class AA waters is to remain in their natural state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or action. Class A waters uses are for wildlife protection and recreational and aesthetic purposes (Hawaii Department of Health 2012).

The Nu‘upia Ponds complex is designated as Class 1 inland waters, while the Mokapu central drainage channel is designated as Class 2 inland waters (Hawaii Department of Health 1987). The management objective of Class 1 waters is to remain in a natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. The management objective of Class 2 inland waters is for recreational use, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation. Waters designated as Class 2 shall not act as receiving waters for any discharge that has not received the best degree of treatment or control (Hawaii Department of Health 2012).

The storm water collection system at MCB Hawaii Kaneohe Bay comprises artificial drainage ditches, sewer lines, and box culverts. Storm water from the base is discharged into Nu‘upia Ponds, Kaneohe Bay, and the Pacific Ocean via 25 storm drain outlets (Drigot et al. 2001; NAVFAC Hawaii 2006). Storm water from the airfield area is managed through a series of 4-foot box culverts and buried pipes.

All storm water outlets from the airfield drain to Kaneohe Bay (NAVFAC Hawaii 2006). Underground drainage pipes occur in the immediate vicinity of the taxiway; the closest box culvert in the proposed project area is approximately 350 feet west. No box culverts or pipes occur in the vicinity of the aircraft rinse facility.

MCB Hawaii Kaneohe Bay has a NPDES permit for the discharge of storm water into surrounding water bodies. As part of the permit program, MCB Hawaii Kaneohe Bay has prepared a SWMP and SWPPP to control storm water discharges from the base. The plans identify potential sources of storm water contamination and present BMPs that are used to prevent or minimize pollutants in storm water. Numerous structural BMPs are used on base at industrial and process areas, such as vehicle or aircraft maintenance, wash-down (e.g., aircraft rinse facility), and fueling areas; material storage, loading, and unloading areas; and waste disposal areas that are exposed to storm water. Structural BMPs include erosion and sediment controls and use of oil/water separators, containment/retention structures, grass-lined swales, and leak detection systems. Non-structural BMPs are also used and include preventive maintenance practices, regular inspections, spill prevention and response, procedures and practices for materials storage and handling, and regular pavement cleaning to remove oil and grease.

7.7.3 Floodplains

FEMA-mapped 100-year floodplains occur along portions of the Kaneohe Bay, Kailua Bay, and Pacific Ocean shorelines, extending inland on the base for up to approximately 1,500 feet (Figure 7-3). A 100-year floodplain associated with the Mokapu central drainage channel has also been mapped in the central portion of the base. No 100-year floodplains are mapped within or adjacent to the proposed project areas at MCB Hawaii Kaneohe Bay.

7.7.4 Groundwater

MCB Hawaii Kaneohe Bay lies within the Koolau rift zone, where groundwater is impounded in dike systems that are formed when highly impermeable formations of basalt restrict the flow of groundwater. The Koolau basalt is the principal aquifer on the windward side of Oahu. The exact thickness of groundwater in the Koolau rift zone is not currently known; however, impounded water is thought to extend far below the surface. Groundwater in this region occurs as much as 1,000 feet asl and generally flows from inland areas toward the ocean (Oki et al. 1999).

A relatively thin layer of surface soil exists at MCB Hawaii Kaneohe Bay, and an underlying layer of relatively impermeable rock and sediments provides little depth for groundwater drainage. In addition, the storm water conveyance system on the base restricts groundwater recharge. MCB Hawaii Kaneohe Bay purchases potable water from the City and County of Honolulu Board of Water Supply (Drigot et al. 2001). Groundwater is pumped to the base from multiple wells. The groundwater is chlorinated, fluoridated, and tested once it enters the base water system (Drigot et al. 2001).

7.7.5 Wetlands

EO 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative. Section 404 of the CWA requires that the USACE regulate the discharge of dredged or fill materials into waters of the U.S., including wetlands. Seven wetland complexes have been mapped on MCB Hawaii Kaneohe Bay, the largest of which is associated with the Nu‘upia Ponds complex (Figure 7-3) (Navy 2012). No wetlands occur within or adjacent to the proposed construction areas.

7.8 Biological Resources

MCB Hawaii Kaneohe Bay and the surrounding land and water area that provides habitat for wildlife comprises the study area for biological resources. The focus area for impact analysis for biological resources encompasses the area proposed for development and those areas where aviation activities could directly or indirectly impact protected species.

This chapter on the affected environment of biological resources presents vegetation in Chapter 7.8.1; wildlife in Chapter 7.8.2; migratory birds in Chapter 7.8.3; threatened and endangered species in Chapter 7.8.4; and marine mammals in Chapter 7.8.5.

7.8.1 Terrestrial and Marine Vegetation

Prior to its use as a military installation, much of MCB Hawaii Kaneohe Bay was used for cultivation. Therefore, vegetation communities on the base are primarily classified as secondary successional and are dominated by introduced species (Drigot et al. 2001). Vegetation in the Nu‘upia Ponds complex and other wetlands on the base is dominated by the invasive pickleweed (*Batis maritima*), while invasive grassland species are dominant in the Ulupa‘u Head WMA. Vegetation on the remainder of the base is dominated by non-native species, typically Bermuda grass and a variety of trees and shrubs (Drigot et al. 2001). Vegetation within the proposed construction areas consists of maintained Bermuda grass.

Native seagrass beds have been documented as occurring approximately 1,000 feet offshore of the western end of the base, northeast of Sag Harbor (Drigot et al. 2001). Dense patches of *Halophila Hawaiiana* and *Halophila decipiens* were found growing in soft sediments in an area highly modified by past dredging.

7.8.2 Wildlife

Wildlife at MCB Hawaii Kaneohe Bay is primarily concentrated along the base's 11 miles of shoreline, within the 500-yard seaward security buffer zone around Mokapu Peninsula, and within the two WMAs on the base (Drigot et al. 2001). More than 50 different species of waterbirds, migratory shorebirds, and seabirds have been recorded along the MCB Hawaii Kaneohe Bay shoreline and within the Nu'upia Ponds WMA. Sixteen native fish species inhabit the Nu'upia Ponds. A population of approximately 3,000 red-footed boobies (*Sula sula rubripes*) nest in a colony in the 25-acre Ulupa'u Head WMA; this colony is one of two red-footed booby colonies in the main Hawaiian Islands and has been active since the 1940s (Drigot et al. 2001).

The 500-yard seaward security buffer zone surrounding MCB Hawaii Kaneohe Bay supports diverse populations of native and transient aquatic wildlife species. Coral reef colonies occur throughout the zone, with coral species type and abundance varying based on wave conditions, freshwater input, and bathymetry. The highest coral coverage is believed to be offshore of the northwest end of Mokapu Peninsula and offshore of Ulupa'u Head. In addition, some portions of Kailua Bay have coral coverage of up to 50 percent (Shafer et al. 2002). Abundant populations of estuarine and marine fish, algae, sponges, and invertebrates also inhabit the marine waters surrounding MCB Hawaii Kaneohe Bay (Shafer et al. 2002). Numerous sensitive resources have been identified within the 500-yard seaward security buffer zone, including important bryozoan habitat; habitat for an endemic squid species; an area of finger coral; an area used by hammerhead sharks (*Sphyrna lewini*) for pupping and Hawaiian stingrays (*Dasyastis lata*) for foraging; coral colonies with high conservation value; an area dominated by finger coral that also supports a high diversity of other corals; soft coral rare to Hawaiian reefs; an area of elkhorn coral; an area used by turtles for grazing; culturally important seaweeds; and a native sea-grass meadow (Shafer et al. 2002; MCB Hawaii 2006).

7.8.3 Migratory Birds

The MBTA is the primary legislation in the U.S. established to protect migratory birds. The MBTA prohibits taking, killing, or possessing migratory birds unless permitted by regulation.

Migratory bird conservation in relation to the proposed action is addressed separately in a Memorandum of Understanding developed in accordance with EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, signed January 10, 2001. This memorandum between the DoD and the UUSFWS outlines the responsibility of federal agencies to protect migratory birds and how to incorporate conservation efforts into their routine operations and construction activities and was recently re-signed to cover DoD activities through 2013.

Over 50 species of birds protected under the MBTA, including waterbirds, migratory shorebirds, and seabirds, have been documented on MCB Hawaii Kaneohe Bay (Drigot et al. 2001). Documented bird species include several that are endemic to Hawaii (Navy 2012). Prominent migratory bird species include the great frigate bird (*Fregata minor palmerstoni*), the migratory Red-footed Booby (*Sula sula rubripes*), and Pacific golden plover (*Pluvialis fulva*). As described above for wildlife, birds are most likely to be concentrated in the less-developed areas of the base, including along the shoreline, within the 500-yard seaward security buffer zone, and within the two WMAs.

7.8.4 Threatened and Endangered Species

The ESA of 1973 and subsequent amendments provide for the conservation of threatened and endangered species of animals and plants and the habitats in which they are found. The Navy ensures that consultations are conducted as required under Section 7 of the ESA for any action that "may affect" a federally listed threatened or endangered species. Although protection of species listed at the state level as threatened or endangered is not legally mandated for federal agencies, the Navy encourages

cooperation with states to protect such species where such protection is consistent with an installation's mission.

The NMFS and the USFWS share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous[20] species.

Information on the potential occurrence of federally listed threatened and endangered species within the vicinity of MCB Hawaii Kaneohe Bay and adjacent waters was obtained through a review of the base's INRMP and correspondence used in the development of the 2008 FEIS (MCB Hawaii 2006; Walker 2008a, b; Robinson 2008).

A total of 16 ESA-listed species were identified as occurring within the vicinity of MCB Hawaii Kaneohe Bay and adjacent water, of which 11 are managed by the USFWS and five are managed by NMFS. ESA-listed species managed by the USFWS include the round-leaved chaff-flower (*Achyranthes splendens* var. *rotundata*), Pu'uka'a (*Cyperus trachysanthos*), white hibiscus (*Hibiscus arnottianus* ssp. *immaculatus*), yellow hibiscus (*Hibiscus brackenridgei*), Loulu palm (*Prichardia kaalae*), 'Ohai (*Sesbania tomentosa*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian gallinule (common moorhen, *Gallinula chloropus sandvicensis*), Hawaiian coot (*Fulica alai*), Hawaiian duck (*Anas wyvilliana*), and Townsend's (Newell's) shearwater (*Puffinus auricularis newelli*). Threatened and endangered species managed by NMFS within the vicinity of MCB Hawaii Kaneohe Bay include the Hawaiian monk seal (*Monachus schauinslandi*), humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), green sea turtle (*Chelonia mydas*), and hawksbill turtle (*Eretmochelys imbricata*). The current federal protection status and presence of each of these species within the vicinity of MCB Hawaii Kaneohe Bay is indicated in Table 7-11.

Table 7-11 Federally Threatened and Endangered Species that May Occur at or in the Vicinity of MCB Hawaii Kaneohe Bay

Common (Hawaiian) Name	Scientific Name	ESA Listing	Presence in the Study Area
Plants			
Round-leaved chaff-flower ('Ewa hinahina)	*Achyranthes splendens* var. *rotundata*	Endangered	Occurs in cultivated settings on the base. No suitable habitat to support the species occurs in the proposed construction areas.
Pu'uka'a	*Cyperus trachysanthos*	Endangered	Occurs in cultivated settings on the base. No suitable habitat to support the species occurs in the proposed construction areas.
White hibiscus (Koki'o ke'oke'o)	*Hibiscus arnottianus* ssp. *immaculatus*	Endangered	Occurs in cultivated settings on the base. No suitable habitat to support the species occurs in the proposed construction areas.
Yellow hibiscus (Ma'o hau hele)	*Hibiscus brackenridgei*	Endangered	Occurs in cultivated settings on the base. No suitable habitat to support the species occurs in the proposed construction areas.

[20] Migratory fishes that spend most of their lives in the sea and migrate to freshwater to breed.

Table 7-11 Federally Threatened and Endangered Species that May Occur at or in the Vicinity of MCB Hawaii Kaneohe Bay

Common (Hawaiian) Name	Scientific Name	ESA Listing	Presence in the Study Area
Loulu palm (Loulu)	*Pritchardia kaalae*	Endangered	Occurs in cultivated settings on the base. No suitable habitat to support the species occurs in the proposed construction areas.
‘Ohai (‘Ohai)	*Sesbania tomentosa*	Endangered	Naturally occurring on the base. No suitable habitat to support the species occurs in the proposed construction areas.
Birds			
Hawaiian stilt (Ae‘o)	*Himantopus mexicanus knudseni*	Endangered	Occurs in the Nu‘upia Ponds WMA. No suitable habitat to support the species occurs in the proposed construction areas.
Hawaiian moorhen (‘Alae ‘ula)	*Gallinula chloropus sandvicensis*	Endangered	Occurs in a variety of wetland habitats on base, primarily the Klipper Golf Course ponds and the Nu‘upia Ponds WMA. No suitable habitat to support the species occurs in the proposed construction areas.
Hawaiian coot (‘Alae ke‘oke‘o)	*Fulica alai*	Endangered	Occurs on base in the Percolation Ditch Wetland and the Nu‘upia Ponds WMA. No suitable habitat to support the species occurs in the proposed construction areas.
Hawaiian duck (Koloa moali)	*Anas wyvilliana*	Endangered	Occurs on base in the Nu‘upia Ponds WMA. No suitable habitat to support the species occurs in the proposed construction areas.
Newell’s shearwater (‘A‘o)	*Puffinus auricularis newelli*	Threatened	Likely forages in waters surrounding the base. No suitable habitat to support the species occurs in the proposed construction areas.
Mammals			
Hawaiian hoary bat (Ōpe‘ape‘a)	*Lasiurus cinereus semotus*	Endangered	There are no incidental records of the Hawaiian hoary bat on the Mokapu Peninsula, and it has not been documented on MCB Hawaii Kaneohe Bay during natural resources surveys.

Table 7-11 Federally Threatened and Endangered Species that May Occur at or in the Vicinity of MCB Hawaii Kaneohe Bay

Common (Hawaiian) Name	Scientific Name	ESA Listing	Presence in the Study Area
Hawaiian monk seal (‘Ilio-holo-i-ka-uaua)	*Monachus schauinslandi*	Endangered	Frequently hauls out on the beaches of MCB Hawaii Kaneohe Bay. An individual gave birth along the beach just northwest of Pyramid Rock in 1996. No suitable habitat to support the species occurs in the proposed construction areas.
Humpback whale (Kohola)	*Megaptera novaeangliae*	Endangered	Known to frequent the Pacific Ocean side of the Mokapu Peninsula and has been sighted within the 500-yard security buffer zone.
Sperm whale	*Physeter macrocephalus*	Endangered	Tend to inhabit areas with a water depth of 1,968 feet or more and are uncommon in waters less than 984 feet deep. Unlikely that they would occur in the vicinity of MCB Hawaii Kaneohe Bay
Reptiles			
Green sea turtle (Honu)	*Chelonia mydas*	Threatened	Significant numbers of green sea turtles are found throughout Kaneohe Bay. Recent surveys have identified significant strands of native sea grasses within the 500-yard security buffer zone, which could support green sea turtles.
Hawksbill turtle (‘Ea)	*Eretmochelys imbricate*	Endangered	Nesting has not been documented on the Mokapu Peninsula. Commonly seen swimming and feeding within the 500-yard security buffer zone of MCB Hawaii Kaneohe Bay.
Olive Ridley turtle	*Lepidochelys olivacea*	Threatened	An infrequent visitor to Hawaii, but successfully nested on Pyramid Rock beach in 2009.

7.8.4.1 USFWS-Managed Species

Round-leaved Chaff-flower

The round-leaved chaff-flower, a small flowering shrub that ranges in size from 1.5 to 6.5 feet tall, was listed as an endangered species on March 26, 1986 (Center for Plant Conservation 2010a; USFWS 2013a). It occurs at low elevation in open, dry forest remnants and open thickets, on talus or rocky slopes, and on coralline plains (Center for Plant Conservation 2010a). The round-leaved chaff-flower historically occurred on Oahu, Lanai, and Molokai. Currently, however, it is only known from eight natural occurrences on Oahu, totaling approximately 700 individual plants (USFWS 2012c). Critical habitat for the round-leaved chaff-flower has been designated on Oahu within 17 units; none of the units occur on the Mokapu peninsula (USFWS 2012c). Primary threats to the species include loss of habitat from urban development and agriculture, and predation by the parasitic vine *Cassytha filiformis* (Center for Plant Conservation 2010a; Bruegmann and Caraway 2003). Natural occurrences of the round-leaved chaff-flower have not been documented on MCB Hawaii Kaneohe Bay; however, the species has been planted in some cultivated settings at the base (Walker 2008a). The round-leaved chaff-flower does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass.

Puʻukaʻa

The Puʻukaʻa, a perennial grass-like plant, was listed as an endangered species on October 10, 1996 (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife n.d.[a]; USFWS 2013b). The species historically occurred on the islands of Niihau, Kauai, Oahu, Molokai, and Lanai (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife n.d.[a]). Currently, however, it is known to occur naturally only on Niihau, Kauai, and Oahu, with a total of approximately 400 plants (USFWS 2012c). Critical habitat for the Puʻukaʻa has been designated on Oahu within four units; none of the units occur on the Mokapu peninsula (USFWS 2012c). Puʻukaʻa typically occurs on wet sites, coastal cliffs, or talus slopes at elevations of 10 to 525 feet. Primary threats to the species include browsing by feral goats and competition from alien plant species (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife n.d.[a]). Natural occurrences of the Puʻukaʻa have not been documented on MCB Hawaii Kaneohe Bay; however, the species has been planted in some cultivated settings at the base (Walker 2008a). The Puʻukaʻa does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass.

White Hibiscus

The white hibiscus was listed as an endangered species on October 8, 1992 (USFWS 2013c). It is a long-lived perennial tree that grows up to 10 feet tall and produces white flowers, typically in July (Center for Plant Conservation 2010b; USFWS 2003). The white hibiscus is currently known to occur naturally in three locations on Molokai, totaling 20 to 30 plants. Critical habitat for the species has been designated on Molokai (USFWS 2003). Individual white hibiscus plants have been found scattered on steep sea cliffs in mesic forests from an elevation of 26 to 3,326 feet. Primary threats to the species include habitat destruction by feral goats and extinction from naturally occurring events due to the extremely small population size (USFWS 2003). Natural occurrences of the white hibiscus have not been documented on MCB Hawaii Kaneohe Bay; however, the species has been planted in some cultivated settings at the base (Walker 2008a). The white hibiscus does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass.

Yellow Hibiscus

The yellow hibiscus, a short-lived perennial shrub, was listed as an endangered species on November 10, 1994 (USFWS 2009a; 2013d). The species, which is comprised of three subspecies, *brackenridgei*, *mokuleianus*, and *molokaianus*, historically occurred on the islands of Kauai, Oahu, Molokai, Lanai,

Maui, and Hawaii. The yellow hibiscus is currently known to occur naturally on Oahu, Lanai, Maui, and Hawaii in 12 wild populations totaling approximately 245 plants (USFWS 2009a). Critical habitat for the species has been designated in nine units on Oahu, plus additional units on Hawaii, Molokai, and Maui (USFWS 2009a, 2012c). None of the critical habitat units on Oahu occurs on the Mokapu peninsula (USFWS 2012c). The yellow hibiscus occurs in lowland dry to mesic forest and shrubland from sea level to approximately 1,200 feet above msl (Center for Plant Conservation 2010c). Primary threats to the species include habitat degradation; predation by pigs, goats, cattle, and rats; competition from alien plant species; road construction; and fire (USFWS 2009a; Center for Plant Conservation 2010c). Natural occurrences of the yellow hibiscus have not been documented on MCB Hawaii Kaneohe Bay; however, the species has been planted in some cultivated settings at the base (Walker 2008a). The yellow hibiscus does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass.

Loulu Palm

The Loulu palm was listed as an endangered species on October 10, 1996 (USFWS 2013e). The Loulu palm is a tree that grows up to approximately 16 feet tall and has characteristic large fan-shaped leaves (National Tropical Botanical Garden 2013). The species is endemic to the northern Waianae Mountains in Oahu. In 2006, the population numbered 911 individual trees (USFWS 2008a). Critical habitat has not been designated for the Loulu palm because of concerns that such a designation would increase threats from vandalism or collection (USFWS 2002). The Loulu palm occurs in wet forests and is able to survive on both windswept ridges and sheltered valleys (National Tropical Botanical Garden 2013). It is generally found at elevations between approximately 1,475 and 3,200 feet. Threats to the Loulu palm include habitat degradation by feral goats and pigs, collection for horticulture purposes, seed predation by rats and goats, disease, habitat degradation, competition from alien plant species, and fire (USFWS 2008a). Natural occurrences of the Loulu palm have not been documented on MCB Hawaii Kaneohe Bay; however, the species has been planted in some cultivated settings at the base (Walker 2008a). The Loulu palm does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass.

‘Ohai

The ‘Ohai was listed as an endangered species on November 10, 1994 (USFWS 2013f). The species grows as a shrub or small tree, ranging in height from approximately 8 to 20 feet, and produces salmon-tinged flowers with yellow, orange-red, scarlet, or pure yellow (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife n.d.[b]). Historically, ‘Ohai occurred on all eight of the main Hawaiian Islands and the northwestern Hawaiian islands of Nihoa and Necker. Currently the species is known to occur on Kauai, Oahu, Molokai, Maui, Kahoolawe, Hawaii, Nihoa, and Necker. The total population size is estimated to number up to 7,500 plants across its known range. Critical habitat for ‘Ohai has been designated on the islands of Kauai, Oahu, Molokai, Maui, Hawaii, Nihoa, and Necker (USFWS 2010b). Currently, 15 units on Oahu are designated as critical habitat for ‘Ohai; none of the units occurs on the Mokapu peninsula (USFWS 2012c). ‘Ohai typically occurs in dry coastal shrublands and is found on calcareous beaches and sand dunes, rocky ridges and slopes, deep red soil, and soil pockets on lava. Threats to the species include trampling by off-road vehicles, development, and habitat degradation from cattle and goats (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife n.d.[b]). ‘Ohai was discovered in 2008 growing naturally in the sand dunes bordering the Nu‘upia Ponds Wildlife Management Area (MCB Hawaii 2006). The ‘Ohai does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass.

Hawaiian Stilt

The Hawaiian stilt was listed as an endangered species on October 13, 1970 (USFWS 2013g). It is a slender wading bird, colored black above and white below, with long pink legs (USFWS 2011a). The

Hawaiian stilt currently occurs on all of the main Hawaiian Islands except Kaho‘olawe. During recent counts, population estimates averaged approximately 1,500 birds but fluctuated between 1,100 and 2,100 birds. The Island of Oahu supports the largest number of Hawaiian stilts, with recent counts ranging from 450 to 700 birds. Large concentrations are known to occur at the James Campbell National Wildlife Refuge, the Kahuku aquaculture ponds, the Honouliuli and Waiawa units of the Pearl Harbor National Wildlife Refuge, and on Nu‘upia Ponds at MCB Hawaii Kaneohe Bay. No critical habitat has been designated for the species. Hawaiian stilts generally occur in early successional marshlands with water depths less than 9 inches. They feed in shallow flooded wetlands and nest on freshly exposed mudflats interspersed with low-growing vegetation. The nest itself consists of a simple scrape in the ground (USFWS 2011a). Currently, the primary threat to Hawaiian stilts is predation by introduced animals. Other threats include altered hydrology, alteration of habitat by invasive non-native plants, and disease (USFWS 2011a). The Nu‘upia Ponds WMA is an important breeding area for the Hawaiian stilt. The population of this species on MCB Hawaii Kaneohe Bay during counts conducted once per week in 2006 ranged from 67 to 159 birds (Walker 2008a). The Hawaiian stilt does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass and no wetland areas occur in the vicinity.

Hawaiian Moorhen

The Hawaiian moorhen was listed as an endangered species in 1967 (USFWS 2012d). It is a dark gray waterbird with a black head and neck, and white feathers on its flank and undertail coverts (USFWS 2011a, 2012d). It has a distinctive red shield over a red and yellow bill. The Hawaiian moorhen currently occurs only on Oahu and Kauai. Accurate population estimates of this species are not available due to its secretive behavior. Biannual waterbird surveys have produced stable but low numbers of Hawaiian moorhens, averaging 287 birds over a 10-year period (USFWS 2011a). Oahu holds approximately half of the state’s moorhen population. They are widely distributed across the island but are most common on the northern and eastern coasts between Haleiwa and Waimanalo. Winter waterbird surveys between 1999 and 2003 yielded estimates of one to three birds on the Klipper Golf Course ponds on MCB Hawaii Kaneohe Bay. No critical habitat has been designated for the Hawaiian moorhen. The species prefers dense, emergent vegetation near open fresh water with water depths less than one meter (USFWS 2011a; USFWS 2012d). Chicks are precocial and able to walk and swim shortly after hatching (USFWS 2011a). Primary threats to Hawaiian moorhens are predation by non-indigenous animals and degradation of wetland habitats. Other threats include disease, non-indigenous plants, and environmental contaminants (USFWS 2011a, 2012d). High numbers of nesting moorhens occur at the Ki`i Unit of James Campbell National Wildlife Refuge, Kahuku and `Uko`a wetlands, and Waialua lotus fields on Oahu (USFWS 2011a). The Hawaiian moorhen feeds in a variety of wetland habitats on MCB Hawaii Kaneohe Bay, primarily at the Klipper Golf Course ponds and within the Nu‘upia Ponds WMA (United States Marine Corps 2010; Walker 2008a). This species does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass and no wetland areas occur in the vicinity.

Hawaiian Coot

The Hawaiian coot was listed as an endangered species in 1970 (USFWS 2012e). It is a slate gray waterbird with a white bill and forehead patch (USFWS 2011a, 2012e). The forehead patch is typically white but can vary in color from blue to yellow to red. There is a total estimate of 1,500 to 2,800 Hawaiian coots across all the main islands of Hawaii, except Kahoolawe, where it is not known to occur. Oahu is believed to contain the largest population in the state, with between 500 and 1,000 coots, which largely inhabit the island’s coastal wetlands. Large concentrations of Hawaiian coots occur at the Ki`i Unit of James Campbell National Wildlife Refuge, the Kahuku aquaculture ponds, the Kuilima wastewater treatment plant, the Ka`elepulu Pond in Kailua, the Honouliuli Unit of Pearl Harbor National Wildlife Refuge, and the Hawaii Prince Golf Course. Within MCB Hawaii Kaneohe Bay, winter waterbird surveys between 1999 and 2003 yielded estimates of one to eight birds on the Klipper Golf

Course ponds and the water reclamation facility (USFWS 2011a). However, the 2013 bi-annual waterbird count yielded a total count of 28 coots at several sites on base, including the Nu‘upia Ponds; this is a 30 percent increase over the last 10 years. No critical habitat has been designated for the Hawaiian coot. Hawaiian coots occur in fresh and brackish water wetlands, and they build floating nests in aquatic vegetation (USFWS 2011a, 2012e). Chicks are precocial and able to walk and swim shortly after hatching. Primary threats to Hawaiian coots are predation by non-indigenous animals and degradation of wetland habitats. Other threats include disease, non-indigenous plants, and environmental contaminants (USFWS 2011a, 2012e). On MCB Hawaii Kaneohe Bay, the Hawaiian coot has become prevalent at the Percolation Ditch Wetland and utilizes the Nu‘upia Ponds WMA for foraging (USMC 2010; Walker 2008a). This species does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass and no wetland areas occur in the vicinity.

Hawaiian Duck

The Hawaiian duck was listed as endangered on March 11, 1967 (USFWS 2009b). It is a medium-sized duck from the *Anas* genus and is known to interbreed with the closely related mallard (Engilis et al. 2002). Hawaiian ducks are mottled brown overall in both sexes, although males have darker heads and necks with olive bills and females have more orange on their bills. They occur on all the major Hawaiian Islands except for Kaho’olawe in wetland habitats at elevations from sea level to approximately 9,800 feet above msl. Hawaiian ducks were re-established on Oahu and Maui through captive breeding programs, but those populations are now almost entirely Hawaiian duck/mallard hybrids (Engilis et al. 2002). The Hawaiian duck population is estimated at 2,500 ducks, with 80 percent of the population found on Kauai. No critical habitat has been designated for the species. Hawaiian ducks can be found in natural and artificial wetlands, freshwater marshes, flooded grasslands, coastal ponds, irrigation ditches, reservoirs, and other water bodies. They feed opportunistically on grass seeds, green algae, leaf parts of wetland plants, earthworms, snails, and dragonfly larvae. Currently, the greatest threat to this species is hybridization with introduced mallards, and this threat is especially problematic on Oahu, where most ducks are hybrids (USFWS 2009b). Additional threats include feral pigs and goats that reduce the suitability of nesting habitat for Hawaiian ducks; habitat loss and altered hydrology; invasive plant species; disease; and environmental contaminants such as fuel and oil spills (Engilis et al. 2002; USFWS 2009b). The Hawaiian duck is known to feed in the Nu‘upia Ponds WMA (Walker 2008a). This species does not occur within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass and no wetland areas occur in the vicinity.

Newell’s Shearwater

The Newell’s shearwater was listed as a threatened species on September 25, 1975 (USFWS 2011b). It is a medium-sized shearwater with black upper parts and white undersides; its toes are gray, but the webs of its feet are pink. The Newell’s shearwater only breeds within the major Hawaiian Islands (USFWS 1983). When not at breeding colonies, it is highly pelagic. Approximately 20 breeding colonies are known, with breeding confirmed on Molokai, Hawaii, and Kauai (Ainley et al. 1997). As of 2011, it is estimated that 75 to 90 percent of Newell’s shearwaters nested on Kauai (USFWS 2011b). At-sea population abundance estimates between 1984 and 1993 put their population at 83,739 (95-percent confidence interval, 57,360 to 115,093). However, population modeling studies that include anthropogenic-induced mortalities predict that the Newell’s shearwater population will decline approximately 60 percent every 10 years. No critical habitat has been designated for the species. The Newell’s shearwater nests in underground burrows and is nocturnally active in an attempt to avoid native predators. However, this has proved unsuccessful against introduced mammal predators. The Newell’s shearwater nests on steep slopes, most of which exceed 65 degrees, and this nesting habitat is believed to be a result of the presence of invasive predators such as pigs, mongooses, and cats (Ainley et al. 1997). Anthropogenic-caused mortalities include predation, light attraction, and power line collision. The Newell’s shearwater has not been documented as breeding on MCB Hawaii Kaneohe Bay; however, it has been documented at the base and likely forages in adjacent waters. This species is unlikely to occur

within the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass away from open water.

Hawaiian Hoary Bat

The Hawaiian hoary bat, Hawaii's only native terrestrial mammal, was listed as an endangered species on October 13, 1970 (USFWS 2013h). The species has a wingspan of approximately one foot and a coat of brown and gray fur with individual hairs tipped or frosted with white. The Hawaiian hoary bat has been reported from all of the main Hawaiian Islands but may currently be extirpated from Oahu and Molokai. Population estimates have ranged from hundreds to a few thousand but are considered unreliable as they were not based on systematic surveys (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife 2005). Critical habitat has not been designated for the Hawaiian hoary bat (USFWS 2013h). Little is known about the Hawaiian hoary bat's habitat requirements. Accounts of roosting bats indicate that they roost in native and non-native vegetation from approximately 3 to 29 feet above the ground. They rarely use lava tubes, cracks in rocks, or man-made structures for roosting. The Hawaiian hoary bat forages just before or after sunset, with water courses and edges appearing to be important foraging areas. They typically occur below an elevation of approximately 4,200 feet above msl. Threats to the Hawaiian hoary bat include habitat loss, pesticides, predation, and roost disturbance (Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife 2005). There are no incidental records of the Hawaiian hoary bat on the Mokapu Peninsula, and it has not been documented on MCB Hawaii Kaneohe Bay during natural resources surveys (Walker 2008a). Because of this, the species is not expected to occur in the vicinity of the proposed construction areas.

7.8.4.2 NMFS-Managed Species

Hawaiian Monk Seal

The Hawaiian monk seal was listed as an endangered species on November 23, 1976 (NMFS 2007). They are a member of the "true seal" family (*Phocidae*), with silvery-grey-colored backs and lighter creamy coloration on their underside; newborns are black (NMFS 2012a). The Hawaiian monk seal's entire range is within U.S. waters. They primarily occur around the northwestern Hawaiian Islands, with the population's six main reproductive sites occurring on Kure Atoll, Midway Islands, Pearl and Harmes Reef, Lisianski Island, Laysan Island, and French Frigate Shoals. Smaller breeding sub-populations occur on Necker Island and Nihoa Island. The Hawaiian monk seal has also been documented throughout the main Hawaiian Islands, with births documented on most (NMFS 2007, 2012a). Approximately 1,100 Hawaiian monk seals remain, with 90 percent of them occurring in the refuge and monument systems of the northwestern Hawaiian Islands (Schofield 2012).

Designated critical habitat for the Hawaiian monk seal includes all beach areas, lagoon waters, and ocean waters out to a depth of 20 fathoms around Kure Atoll, Midway Islands (except Sand Island), Pearl and Hermes Reef, Lisianski Island, Laysan Island, Gardner Pinnacles, French Frigate Shoals, Necker Island, Nihoa Island, and Maro Reef (NMFS 2007). A proposal is currently being considered to extend the critical habitat around the main Hawaiian Islands (NMFS 2012a). Monk seals live in warm subtropical waters and spend two-thirds of their time at sea. They use waters surrounding atolls, islands, and areas farther offshore on reefs and submerged banks. Monk seals are also found using deepwater coral beds as foraging habitat. When on land, monk seals breed and haul-out on sand, corals, and volcanic rock. Sandy, protected beaches surrounded by shallow waters are preferred when pupping. Monk seals are often seen resting on beaches during the day (NMFS 2012a).

Threats to the species include food limitations; by-catch in fishing gear; mother-pup disturbance at beaches; loss of haul-out and pupping beaches due to erosion; and disease (NMFS 2012a). Since 1987, a total of 34 Hawaiian monk seal sightings have been reported at MCB Hawaii Kaneohe Bay; however, since 2010, over 70 documented individual sightings have occurred on the shorelines around MCB Hawaii Kaneohe Bay. Specific locations of the sightings were not always reported; however, sightings

were reported for Pyramid Rock, North Beach, Fort Hase Beach, and Navy Operational Support Center boat ramp. Additional sightings have been reported on or near Mokumanu Island, located approximate 0.75 mile from MCB Hawaii Kaneohe Bay. A Hawaiian monk seal also gave birth along the beach just northwest of Pyramid Rock in 1996 (Bookless 1996). The Hawaiian monk seal does not occur within or in the vicinity of the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass away from open water and beaches.

Humpback Whale

The humpback whale was listed as an endangered species on June 2, 1970 (NMFS 2012b). They are baleen whales and consume large amounts of krill and small fish. Adult male and female humpback whales measure between 40 and 48 feet and 25 and 50 feet long, respectively, with both sexes weighing between 25 and 40 tons. The current population estimate for the North Pacific is approximately 20,000 (NMFS 2012b). No critical habitat has been designated for the humpback whale. Threats to the species include entanglement in fishing gear, ship strikes, whale watch harassment, and habitat impacts (NMFS 2012b). In Hawaiian waters, the majority of humpback whales occur east of MCB Hawaii Kaneohe Bay in the area between the islands of Maui Nui and on Penguin Banks off Molokai, including the 1,370-square-mile Hawaiian Islands Humpback Whale National Marine Sanctuary. No waters within 5 miles of MCB Hawaii Kaneohe Bay are designated as part of the sanctuary. The humpback whale is known to frequent the Pacific Ocean side of the Mokapu Peninsula and has been sighted within the 500-yard security buffer zone. Since 2006, NOAA and Hawaiian Islands Humpback Whale National Marine Sanctuary volunteers have conducted a shore-based survey from January to March of Humpback whales from 60 sites on the islands of O'ahu, Kaua'i, and the Big Island; the survey includes conducting counts from the shores of MCB Hawaii Kaneohe Bay (Bookless 2013). The humpback whale does not occur within or in the vicinity of the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass away from open water.

Sperm Whale

The sperm whale was listed as an endangered species on June 2, 1970 (NMFS 2012c). They are the largest of the toothed whales and feed mainly on large squid but will also feed on octopus, large demersal and mesopelagic sharks, skates, and deepwater fishes. Male sperm whales can have a body length up to 59 feet and weigh up to 57 tons. Females can reach up to 41 feet in length and weigh up to 24 tons. The estimated number of sperm whales occurring in U.S. waters of Hawaii is 66; however, this is considered an underestimate because the area around the northwest Hawaiian Islands and beyond 25 NM of the main islands was not surveyed (NMFS 2012c). No critical habitat has been designated for the sperm whale. Threats to the species include ship strikes, entanglement in fishing gear, disturbance by anthropogenic noise, and accumulation of stable pollutants (NMFS 2012c). Sperm whales tend to inhabit areas with a water depth of 1,968 feet or more and are uncommon in waters less than 984 feet deep. Therefore, it is unlikely that they would occur in the vicinity of MCB Hawaii Kaneohe Bay (Robinson 2008).

Green Sea Turtle

The green sea turtle was listed on July 28, 1978. Florida and Mexico's Pacific Coast breeding colonies are listed as endangered; it is listed as threatened elsewhere, including Hawaii (NMFS 2012d). The green sea turtle is the largest of the hard-shelled sea turtles, growing to a maximum length of approximately 4 feet and weighing up to 440 pounds. Adults are herbivorous, feeding on sea-grasses, sea lettuce, and algae. The Hawaiian green sea turtle is genetically distinct from other green sea turtle populations, nesting primarily in French Frigate Shoals of the northwestern Hawaiian Islands and feeding in the coastal areas of the main Hawaiian Islands. The Hawaiian green sea turtle population has increased by 53 percent over the past 25 years (NMFS 2013b). Critical habitat for the green sea turtle has been designated in coastal waters around Culebra Island, Puerto Rico; no critical habitat is designated around Hawaii. Significant numbers of green sea turtles are found throughout Kaneohe Bay. Recent surveys have identified significant strands of native sea grasses within the 500-yard security buffer zone, which could

support green sea turtles (Walker 2008b). The green sea turtle does not occur within or in the vicinity of the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass away from open water.

Hawksbill Sea Turtle

The hawksbill sea turtle was listed as an endangered species on June 2, 1970. The hawksbill sea turtle grows to a length of 25 to 35 inches, with a corresponding weight of 100 to 150 pounds. The carapace has "tortoiseshell" coloration, ranging from dark to golden brown, with streaks of orange, red, or black. The head of the hawksbill sea turtle is elongated and tapers to a beak-like mouth, from which the species gets its name. The shape of the mouth allows it to reach into holes and crevasses of coral reefs to find sponges, which are the primary food source for adults (NMFS 2013a). Hawksbill sea turtles are solitary nesters, making the development of a population estimate or trend from nesting beaches difficult. The largest populations are found in the Caribbean, the Republic of Seychelles, Indonesia, and Australia. Critical habitat for the hawksbill sea turtle has been designated in the coastal waters surrounding Mona and Monito Islands, Puerto Rico. Hawksbill sea turtles are most commonly associated with healthy coral reefs (NMFS 2013a). Although hawksbill sea turtles occur around all of the main Hawaiian Islands, they are uncommon and occur in much lower numbers than the green sea turtle. They are only known to nest on beaches of the main islands, primarily along the south coast of Hawaii and the east end of Molokai. Nesting has not been documented on the Mokapu Peninsula, but hawksbill sea turtles are commonly seen swimming and feeding within the 500-yard security buffer zone of MCB Hawaii Kaneohe Bay (Robinson 2008). The hawksbill sea turtle does not occur within or in the vicinity of the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass away from open water.

Olive Ridley Turtle

The olive ridley turtle was listed on July 28, 1978. Mexico's Pacific Coast breeding colonies are listed as endangered; it is listed as threatened elsewhere, including Hawaii (NMFS 2012d). The olive ridley turtle is a relatively small, hard-shelled sea turtle, growing to a maximum length of approximately 30 inches and weighing up to 100 pounds. Adults are omnivorous, feeding on algae, lobster, shrimp, crabs, jellyfish, and fish. No critical habitat for the olive ridley turtle has been designated. The olive ridley turtle is an infrequent visitor to Hawaii, but it successfully nested on Pyramid Rock beach in 2009, with over 50 percent of its eggs hatching. The olive ridley turtle does not occur within or in the vicinity of the proposed construction areas at MCB Hawaii Kaneohe Bay because the areas are maintained as mowed Bermuda grass, away from open water.

7.8.5 Marine Mammals

The MMPA is administered by the USFWS and NMFS to protect and manage marine mammals. Twenty non-endangered/non-threatened marine mammals have documented occurrences in the Hawaiian Islands (Navy 2005a). Of those 20 species, common marine mammal species known to occur in the nearshore marine waters adjacent to MCB Hawaii Kaneohe Bay include the Hawaiian spinner dolphin (*Stenella longirostris*), common bottlenose dolphin (*Tursiops truncatus*), and false killer whale (*Pseudorca crassidens*) (Navy 2005a).

Hawaiian spinner dolphins occur year round throughout the Hawaiian Islands, with primary occurrence from the shore to the 13,122-foot depth (Navy 2005a). The best available estimate for this species in Hawaii is 2,805 (Carretta et al 2005). Common bottlenose dolphins are common throughout the Hawaiian Islands, and they are typically observed throughout the main islands within 5 miles of the coast (Baird et al. 2009). The best available estimate for this species of the main Hawaiian Islands is 1,245 (Baird et al. 2009). Although false killer whales are found primarily in oceanic and offshore areas, they are commonly sighted in the nearshore waters of Hawaii by small boats and aircraft to water depths of

over 1,200 feet (Navy 2005a). The best available estimate for this species in Hawaii is 268 (Carretta et al 2005).

7.9 Cultural Resources

Under NEPA, cultural resources include archaeological resources, architectural or built resources, and Native American or Native Hawaiian resources. Under Section 106 of the NHPA, and its implementing regulations at 36 CFR Part 800, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking must identify historic properties within a proposed project's APE and consider the effects of the proposed undertaking on these properties.

Implementing regulations for Section 106 at 36 CFR Part 800 define historic properties as any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP, including the artifacts, records and remains that are related to and located within such properties and including properties of traditional religious and cultural importance to a federally recognized Indian tribe or Native Hawaiian organization (NHO). Such properties must meet the NRHP criteria for eligibility (36 CFR Part 60). Eligibility determinations are based on NRHP criteria (Table 7-12) and NPS criteria (Table 7-13) for architectural integrity.

Native American or Native Hawaiian resources are cultural resources of interest or importance to federally recognized Indian tribes or NHOs and may be archaeological, architectural, geographical, or biological. Such resources may also be considered historic properties, tangible or physical properties of traditional religious and cultural importance to an Indian tribe or NHO, and resources that meet the NRHP criteria (ACHP 2004; Parker and King 1990). Such resources may also include TCPs: properties that are eligible for inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continued cultural identity of the community (Parker and King 1990). Additionally, Native American or Native Hawaiian resources may include culturally sensitive locations, such as sacred sites, or cultural items that are offered protection under the AIRFA, EO 13007, the NAGPRA, and other federal legislation and regulations, as described in the ICRMP for MCB Hawaii Kaneohe Bay (Tomonari-Tuggle 2013).

Table 7-12 National Register of Historic Places Criteria for Historic Significance

36 CFR 60.4, Part I
The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and: A. That are associated with events that have made a significant contribution to the broad patterns of our history; or B. That are associated with the lives of persons significant in our past; or C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or D. That have yielded, or may be likely to yield, information important in prehistory or history.

Table 7-12 National Register of Historic Places Criteria for Historic Significance

36 CFR 60.4, Part II
Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories: A. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or B. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or C A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or D A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or F. A property primarily commemorative in intent if design, age, traditions, or symbolic value has invested it with its own exceptional significance; or G. A property achieving significance within the past 50 years if it is of exceptional importance.

Source: U.S. Department of the Interior, National Park Service 1995.

Table 7-13 National Park Service Criteria for Architectural Integrity

Criteria	Definition of Architectural Integrity
Location	Must not have been moved.
Design	Must retain historic elements that create the form, plan, space, structure, and style of the property.
Setting	Setting must retain its historic character.
Materials	Must retain the key exterior materials dating from the period of its historic significance.
Workmanship	Methods of construction from its time of significance must be evident.
Feeling	Physical features must convey its historic character.
Association	Must be the actual place where a historic event or activity occurred and must be sufficiently intact to convey that relationship to an observer.

Source: U.S. Department of the Interior, National Park Service 1995.

For the purposes of the identification and evaluation of cultural resources, the project area for the proposed action is considered the same as the APE. Implementing regulations for Section 106 define the APE for an undertaking as the geographical area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking, and it may be different for different kinds of effects caused by the undertaking. For the purposes of compliance with Section 106, the APE is the footprint within which existing or new facilities are or would be located at MCB Hawaii Kaneohe Bay (see Figure 7-4).

7.9.1 Architectural Resources

Four architectural or built resources would be associated with the APE at MCB Hawaii Kaneohe Bay: Hangar 104, Building 6470; the Aircraft Rinse Facility, and the Aircraft Parking Apron. The USMC has

conducted a number of building inventories at MCB Hawaii Kaneohe Bay, including inventories of World War II and Cold War properties, and determined that one of these architectural or built resources, Hangar 104, is a historic property (MCB Hawaii Kaneohe Bay, Environmental Compliance and Protection Department 2011; Tomonari-Tuggle 2013).

Hangar 104 (Maintenance Hangar/MNT HGR OH SPC VMFA235-232) was constructed in 1941 and is a contributing element to the NAS Kaneohe Bay Aviation District, which is eligible for inclusion in the NRHP under Criterion A (association with events) and C (represent the work of a master). Under Criterion A, the NAS Kaneohe Bay Aviation District has a direct association with the events of December 7, 1941; buildings within this district were extant at the time of the December 7, 1941 attack by the Japanese during World War II, although Hangar 104 was under construction and had not been completed at the time of the attack. Under Criterion C, the NAS Kaneohe Bay Aviation District, including Hangar 104, was designed by the architectural firm of American architect Albert Kahn. Kahn was best known for his work with industrial buildings and designed many standard plans for military use, particularly aircraft hangars (MCB Hawaii Kaneohe Bay, Environmental Compliance and Protection Department 2011).

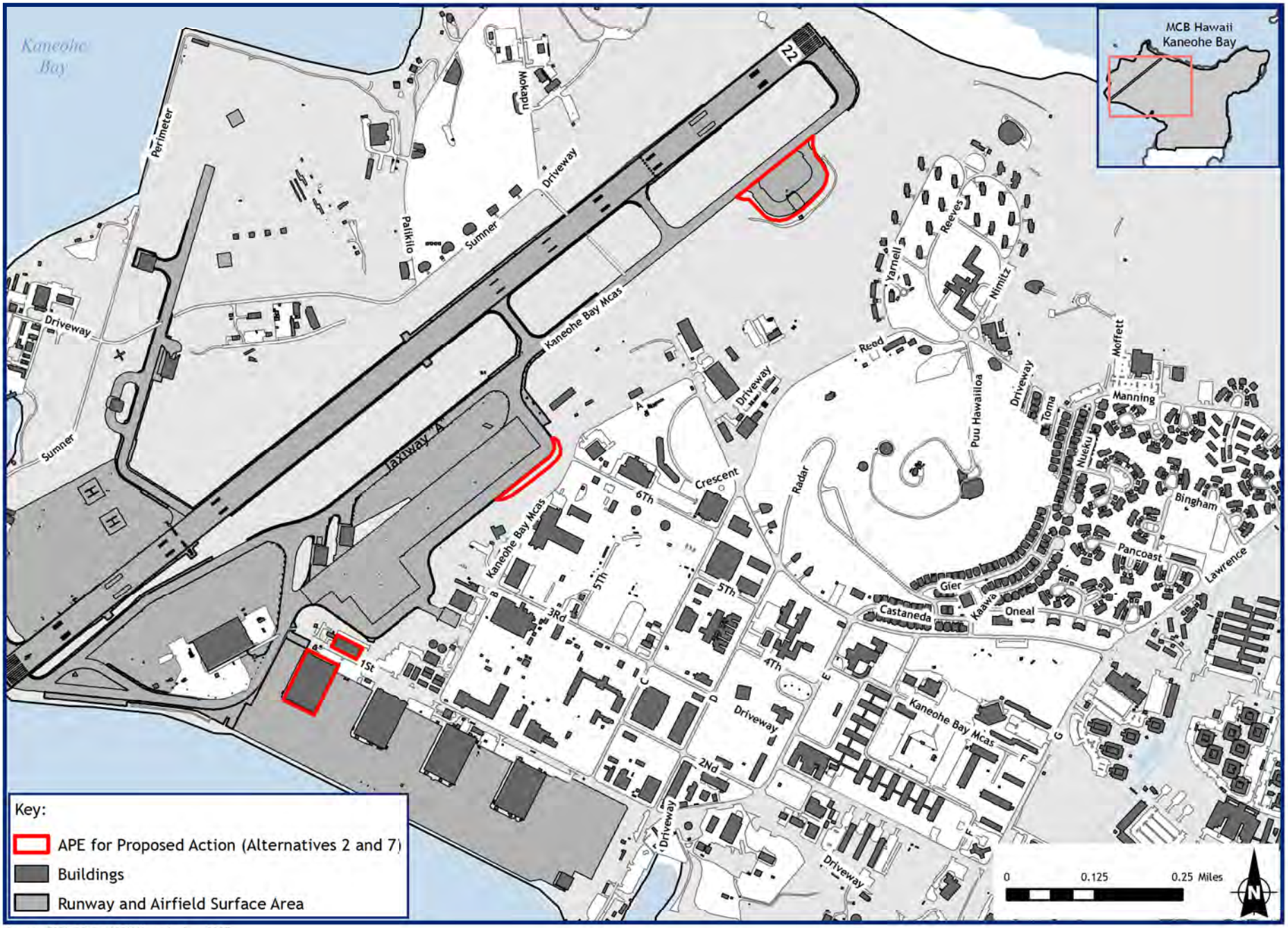
As part of previous Section 106 consultation for Alternative 5 in the 2008 FEIS, the Navy indicated that Building 6470, constructed in 1999, was not NRHP eligible because it does not meet any of the NRHP-eligibility criteria (Hudock 2008). The Aircraft Rinse Facility (Facility 6107) was constructed in 1994 and is not eligible for inclusion in the NRHP; the Aircraft Parking Apron near Hangar 5 is not identified as being eligible for inclusion in the NRHP (Rasmussen 2013).

7.9.2 Archaeological Resources

The APE at MCB Hawaii Kaneohe Bay is adjacent to, and may overlap, areas that are considered as having medium or low archaeological sensitivity (Tomonari-Tuggle 2013). A number of archaeological investigations were conducted within portions of the APE. At the proposed Rinse Facility location (see Figure 2-8), three archaeological investigations were conducted in the 1980s and 1990s: Barrera 1982, Anderson and Schilz 1993, and Anderson 1997, as cited in Tomonari-Tuggle 2013. These three archaeological investigations resulted in complete coverage of the proposed Aircraft Rinse Facility location, and no archaeological resources were identified at the location during these investigations (Tomonari-Tuggle 2013). In the 2000s, a fourth archaeological investigation was conducted in the vicinity of the proposed Rinse Facility location. This investigation identified one archaeological site, Site 7411, to the southeast and outside of the APE for the proposed Rinse Facility. Site 7411 is described as a traditional Native Hawaiian habitation and dryland agricultural complex dating with pre-contact and 19th century components (Filimoehala et al. 2012, Tomonari-Tuggle 2013).

At the proposed Taxiway Extension location (see Figure 2-8), one archaeological investigation was conducted in 2000: Prishmont and Anderson 2000 (Task 1), as cited in Tomonari-Tuggle 2013. This archaeological investigation included complete coverage of the proposed Taxiway Extension location, and no archaeological resources were identified at the location during this investigation (Tomonari-Tuggle 2013). No recommendations were made regarding the need for additional investigations or monitoring at this location (Tomonari-Tuggle 2013).

One archaeological site, Site 5829, is located between Hangar 104 and Building 6470. Site 5829 is described as a pre-contact site containing human burials and cultural deposits that dates to A.D. 1260-1670 (Prishmont and Anderson 2000; Roberts et al 2002). The proposed Hangar 104 and Building 6470 renovations would not require any ground disturbance, so archaeological resources at these locations would not be relevant for impact assessment purposes.



Source: ESRI, 2012; MCBH Kaneohe Bay, 2007.

Figure 7-4
Area of Potential Effect at
MCB Hawaii Kaneohe Bay, Oahu, Hawaii

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7.9.3 Native Hawaiian Resources

No Native Hawaiian resources have been identified within the APE. However, as noted below, one Native Hawaiian archaeological site is in the vicinity of, but outside, the APE. Site 7411 is located to the southeast and outside of the APE for the proposed Rinse Facility. Site 7411 is described as a traditional Native Hawaiian habitation and dryland agricultural complex, dating with pre-Contact and 19th century components (Filimoehala et al. 2012; Tomonari-Tuggle 2013). Site 5829 is located between Hangar 104 and Building 6470 but outside the APE for work that would be conducted at these buildings. Site 5829 is described as a pre-contact Native Hawaiian site containing human burials and cultural deposits that date to A.D. 1260-1670 (Prishmont and Anderson 2000; Roberts et al. 2002).

7.10 Hazardous Materials and Waste Management

Hazardous materials are used at MCB Hawaii Kaneohe Bay for airfield operations and industrial support activities, including petroleum, oils, and lubricants; solvents and thinners; caustic cleaning compounds and surfactants; cooling fluids (antifreeze); adhesives; acids and corrosives; paints; and herbicides, pesticides, and fungicides. Hazardous materials are used for aircraft and vehicle repair and maintenance at MCB Hawaii Kaneohe Bay. Activities at MCB Hawaii Kaneohe Bay that generate hazardous wastes include painting, using solvents for cleaning and degreasing, mechanical and chemical paint and corrosion removal, fluids change-out, electroplating, metal casting, machining, and welding or soldering. The Navy and USMC monitor their operations to minimize the use of hazardous materials and reduce the generation of hazardous wastes. If not consumed during use, these materials and possibly their containers eventually may be disposed of as a solid or hazardous waste.

MCB Hawaii Kaneohe Bay is classified as a large-quantity hazardous waste generator, as defined by the RCRA, because it has the potential to generate more than 2,200 pounds of hazardous waste every month. Hazardous wastes are accumulated at less-than-90-day accumulation points throughout the base before being transferred to permitted storage facilities and then collected and stored on site in accordance with MCB Hawaii Kaneohe Bay's RCRA Part B operating permit. Collection, transportation, and disposal of wastes at MCB Hawaii Kaneohe Bay are conducted by the DRMO (Navy 2012). MCB Hawaii Kaneohe Bay maintains a hazardous waste management plan that establishes procedures and provides guidance regarding hazardous waste generation, accumulation, and disposal at the installation (Navy 2012).

Environmental Restoration Program Sites

Hazardous waste disposal sites at MCB Hawaii Kaneohe Bay have been investigated under the DoD's ERP, comprised of both the Installation Restoration Program and Munitions Response Program, in compliance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act for former waste sites and with RCRA for sites associated with continuing operations. Restoration processes have been in place at MCB Hawaii Kaneohe Bay since 1983, when site assessments were initiated. The purpose of the ERP is to identify, assess, characterize, and clean up or control contamination caused by past hazardous waste disposal practices and hazardous material spills at Navy and USMC facilities. Past hazardous material use and methods of disposal, although acceptable at the time, resulted in pollutants being released into soil and groundwater. The Navy and USMC have taken an aggressive and proactive approach to cleaning up their hazardous waste sites through the ERP.

MCB Hawaii Kaneohe Bay has 22 sites in various stages of investigation and remediation under the ERP. No ERP sites are within or in the immediate vicinity of the proposed construction areas.

7.11 Safety

Safety is a priority for the Navy. The Navy practices operational risk management as outlined in the Office of the Chief of Naval Operations Instruction 3500.9 A. Requirements outlined in this document

provide a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. This chapter includes flight safety (Chapter 7.11.1) and BASH (Chapter 7.11.2).

7.11.1 Flight Safety

The FAA is responsible for ensuring the safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. In addition, the Navy and USMC have developed guidance on airfield safety zones, flight rules, ATC procedures, and safety procedures.

To complement flight training, all Navy pilots use state-of-the-art simulators. Simulator training includes flight operations and comprehensive emergency procedures, which minimizes risks associated with mishaps due to pilot error. Additionally, highly trained maintenance crews routinely inspect each aircraft in accordance with Navy regulations, and maintenance activities are monitored by senior technicians to ensure aircraft are equipped to withstand the rigors of operational and training events safely.

The primary safety concern with regard to military aircraft training operations is the potential for aircraft mishaps to occur. Aircraft mishaps could be caused by mid-air collisions with other aircraft or objects, weather, mechanical failures, pilot error, or BASH (See Chapter 7.11.2). Mishaps are classified as Class A, B, or C according to the severity of injury to individuals and total property damage, with the most severe being a Class A Mishap ($2 million or more in property damage, aircraft destroyed, or fatality or permanent total disability) and the least severe a Class C Mishap ($50,000 to $500,000 in property damage and/or nonfatal injury) (Naval Safety Center 2012).

MCB Hawaii Kaneohe Bay maintains emergency and mishap response plans to guide responses to aircraft accidents. These plans assign responsibilities and prescribe functional activities necessary to react to major mishaps, whether on- or off-base. Response would normally occur in two phases. The initial response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. The second phase is the mishap investigation.

7.11.2 Bird/Wildlife Aircraft Strike Hazards

The presence of resident and migratory birds creates a BASH risk at MCB Hawaii Kaneohe Bay. The airfield's proximity to marine waters combined with the presence of several large hangars and expanses of grass adjacent to the airfield increase the potential BASH risk. To reduce the potential for collisions between aircraft and birds or other animals, MCB Hawaii Kaneohe Bay has prepared and currently implements a BASH plan (USMC 2006). The BASH plan provides guidance to minimize bird/ wildlife strike hazards to military aircraft operating at MCB Hawaii Kaneohe Bay. The plan includes procedures to decrease the attractiveness of the airfield to birds as well as operational procedures to avoid high-hazard situations. To reduce the attractiveness of the runway area to birds, the area is kept clear of most vegetation, except grasses. In addition, the grass is mowed periodically. Birds occurring in the runway area are dispersed from the flight line area by USDA Wildlife Services staff, under permits from the USFWS. The MCB Hawaii Kaneohe Bay Environmental Compliance and Protection Department, Natural Resources Section, secures the appropriate permits from USFWS and ensures compliance by USDA Wildlife Services staff (USMC 2006).

8 MCB Hawaii Kaneohe Bay Environmental Consequences

Chapter 8 presents an analysis of the potential direct and indirect effects of each alternative on each of the resource areas described in Chapter 7. The potential cumulative effects of each alternative are described in Chapter 9. The level of significance is assessed according to NEPA implementing regulations in 40 CFR 1508.27, which requires consideration of both context (e.g., society as a whole [human, national], the affected region, the affected interests, and the locality) and intensity (i.e., the severity of an impact).

As defined in Chapter 1.5, the baseline for SEIS analysis is the existing conditions present at the time a new home basing decision is made, which is expected to be April 2014. The year 2020 is the end-state year used in this analysis, which represents a reasonable timeframe for the full complement of training crews to be in place and achieving a steady state of training events.

Tables 8-1, 8-2, and 8-3 are provided to guide the evaluation of proposed environmental impacts.

Table 8-1 2014 Baseline (No Action Alternative) and Projected (2020 End-State) P-3C and P-8A Personnel Loading at MCB Hawaii Kaneohe Bay

Activity	2014 Baseline (No Action Alternative) P-3C Personnel	2020 End-State (P-8A Personnel) ALTs 1 and 2
P-3C/P-8A Personnel	1,443	102[1, 2]
Net Change	**0**	**- 1,341**

Notes:

[1] The 102 personnel are transient and therefore not permanently assigned to MCB Hawaii Kaneohe Bay.

[2] There would be a loss of approximately 75 civilian/contract personnel at MCB Hawaii Kaneohe Bay. Approximately 85 civilians are currently employed in the maintenance of P-3C aircraft. The P-8A detachment under Alternatives 1 and 2 would only require 10 civilian/contract personnel.

Table 8-2 2014 Baseline (No Action Alternative) and Projected (2020 End-State) P-3C and P-8A Aircraft at MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative) P-3C	2020 End-State (P-8A) ALTs 1 and 2
Fleet Squadrons	3	0
Authorized Aircraft per Squadron	8	0
Total Fleet Authorized Aircraft	24	0
Detachment Aircraft	0	2
Total	**24**	**2 (-22)**

Table 8-3 Areas of Impact from New Construction at MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative)	ALTs 1 and 2
Facility Renovation (square feet)	NA	26,490
New Construction (acres)	NA	1.62
New Impervious Surface	NA	1.1

8.1 Airfield Operations

This assessment examines how the proposed action would affect airspace (Chapter 8.1.1) and airfield operations (8.1.2). Airspace within the vicinity of MCB Hawaii Kaneohe Bay is assessed for changes in management or structure. Airspace is also assessed for impacts from changes to the number of annual operations that would result from the transition of P-3C to P-8A aircraft, as well as the potential effects on civil aviation.

The airfield at MCB Hawaii Kaneohe Bay is assessed for impacts from changes to the number of annual operations that would result from the transition of P-3C to P-8A aircraft.

8.1.1 Airspace

Neither of the action alternatives would require any modification to the current airspace or operational procedures, or any changes to the departure and arrival route structures. The proposed action would have no adverse impact on Hawaiian area civil and commercial aviation airspace use because the P-8A would be operating within the same flight parameters currently used for MCB Hawaii Kaneohe Bay airspace. Neither of the action alternatives would have an adverse impact to civil aviation transiting airspace under MCB Hawaii Kaneohe Bay ATC control. As described in Chapter 8.1.2, Navy aircraft operations would decrease under Alternatives 1 and 2 compared to baseline operations. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced.

The No Action Alternative would not impact airspace because no changes would occur to current airspace or operational procedures, and overall aircraft operations would not change.

8.1.2 Airfield Operations

The projected number of annual P-8A aircraft operations for Alternatives 1 and 2 was calculated using the Patrol Reconnaissance Group Projected P-8A Syllabus Flight Operations**.** Based on this analysis, the number of annual Navy P-8A operations at MCB Hawaii Kaneohe Bay under both action alternatives is projected to be less than the P-3C operations under the 2014 baseline (see Table 8-4). The reduction in Navy aircraft operations under Alternatives 1 and 2 would result because no P-8A squadrons would be home based at MCB Hawaii Kaneohe Bay and the existing P-3C squadrons would leave MCB Hawaii Kaneohe Bay and transition to the P-8A aircraft at other locations. Under Alternatives 1 and 2, two P-8A aircraft would rotate on a permanent basis to MCB Hawaii Kaneohe Bay; however, no fleet squadrons would be home based at MCB Hawaii Kaneohe Bay. As a result, the total number of Navy aircraft operations at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would decrease by 99 percent compared with the 2014 baseline operations. Table 8-4 provides a comparison of baseline and end-state Navy aircraft operations by alternative.

Table 8-4 Comparison of 2014 Baseline (No Action Alternative) and 2020 End-State Navy Aircraft Operations at MCB Hawaii Kaneohe Bay

	2014 Baseline (No Action Alternative)[1]	2020 End-State[2]	
		ALT 1	ALT 2
P-3C	20,189	0	0
P-8A	0	208	208
Total Navy Aircraft Operations	**20,189**	**208**	**208**

Notes:

1 2009 baseline operations from the *Final EIS for Basing MV22 and H1 Aircraft in Support of III MEF Elements in Hawaii*, Baseline Annual Flight Operations, as reported in Appendix D (Noise Analysis Report).

2 Projected operations are based on established training requirements, which may vary in response to future training needs. Therefore, actual numbers of operations projected to be flown in future years may fluctuate.

MCB Hawaii Kaneohe Bay meets all the operational requirements under routine operating conditions to support the airfield operations of the P-8A squadrons. Flight operations under Alternatives 1 and 2 would include twice weekly departures and arrivals with no proposed T&G operations. Based on the decrease in P-8A operations when compared to baseline P-3C operations, airfield operations at MCB Hawaii Kaneohe Bay would not be adversely impacted under any of the proposed action alternatives.

The No Action Alternative would not impact airfield operations because the 2014 baseline Navy aircraft operations would not change.

Conclusion

Overall, the action alternatives would not result in adverse impacts to airspace and airfield operations at MCB Hawaii Kaneohe Bay from the transition of P-3C to P-8A aircraft. The same training regime as currently used by P-3C aircraft would continue. Navy aircraft operations would decrease under both action alternatives when compared to baseline P-3C operations. The opportunity for civil aviation to transit existing airspace would not be reduced.

8.2 Noise

The noise analysis in this chapter is presented in three parts. Chapter 8.2.1 provides a discussion of the relationship between DNL noise zones and contributing aircraft operations for MCB Hawaii Kaneohe Bay. Chapter 8.2.2 presents an analysis of the SEL for single-event aircraft overflights. The SEL represents the sound energy exposure at a specific location resulting from a specific aircraft operation. It is provided here to allow the reader to compare the relative difference in sound emitted by two different aircraft. Chapter 8.2.3 includes a discussion of potential impacts related to construction noise. A full discussion on noise modeling is included in Appendix D, Background Noise Information and Wyle Laboratories, Inc., Noise Report WR13-02.

The No Action Alternative would not impact the noise environment at MCB Hawaii Kaneohe Bay because the 2014 baseline aircraft operations would not change.

8.2.1 DNL Noise Zones

Although DNL is the standard metric for assessing aircraft noise, it would not be useful in assessing the impact of home basing of P-8A aircraft at MCB Hawaii Kaneohe Bay due to the large reduction in the number of projected Navy aircraft operations under Alternatives 1 and 2 in conjunction with the large increase in USMC helicopter operations.

The DNL noise metric is a composite metric accounting for the maximum noise levels, the duration of each air operation, and the number of air operations that occur over an average annual day. As discussed in Chapter 8.1, the number of annual P-8A operations at MCB Hawaii Kaneohe Bay under both action alternatives would be less than the number of P-3C operations under the 2014 baseline (see Table 8-4). The projected reduction in Navy aircraft operations is 20,086 (a 99-percent reduction).

Considering that over 20,000 P-3C baseline operations contributed less than 10 percent to the overall noise environment at MCB Hawaii Kaneohe Bay, the significantly fewer proposed P-8A operations for both action alternatives would negate that aircraft's contribution to the overall noise environment of the base, and its contribution would be negligible. Currently, the noise environment is dominated by the operations of the transient, large and heavy jet aircraft (e.g., C-5, C-17) and transient FA-18C/D aircraft, which contribute 57 percent of the overall noise environment. Furthermore, by 2018, the USMC is projecting to increase helicopter operations at MCB Hawaii Kaneohe Bay up to 49 percent compared with the baseline operations (Navy 2012). This increase in USMC aircraft operations would further lessen the

acoustic contribution of the P-8A operations to the DNL noise zones such that the P-8A would no longer rank among the top five noise-contributing aircraft at MCB Hawaii Kaneohe Bay (Wyle 2013).

8.2.2 SEL Analysis

Table 8-5 shows the comparative difference in SEL noise values for the P-3C and the P-8A. Noise values for the C-17 and C-5 are also shown in the table because of their respective influence in the noise environment at MCB Hawaii Kaneohe Bay.

Table 8-5 Comparative Single-Event Noise Levels for the P-3C, P-8A, C-5, and C-17

Event	SEL (dB) for Flyover at 1,000 feet AGL			
	P-3C	P-8A	C-17	C-5
Departure	94	95	99	113
Arrival	85	87	93	107
Touch and Go – Downwind	86	94	94	110

Source: Wyle 2008.

Key:
AGL = above ground level.

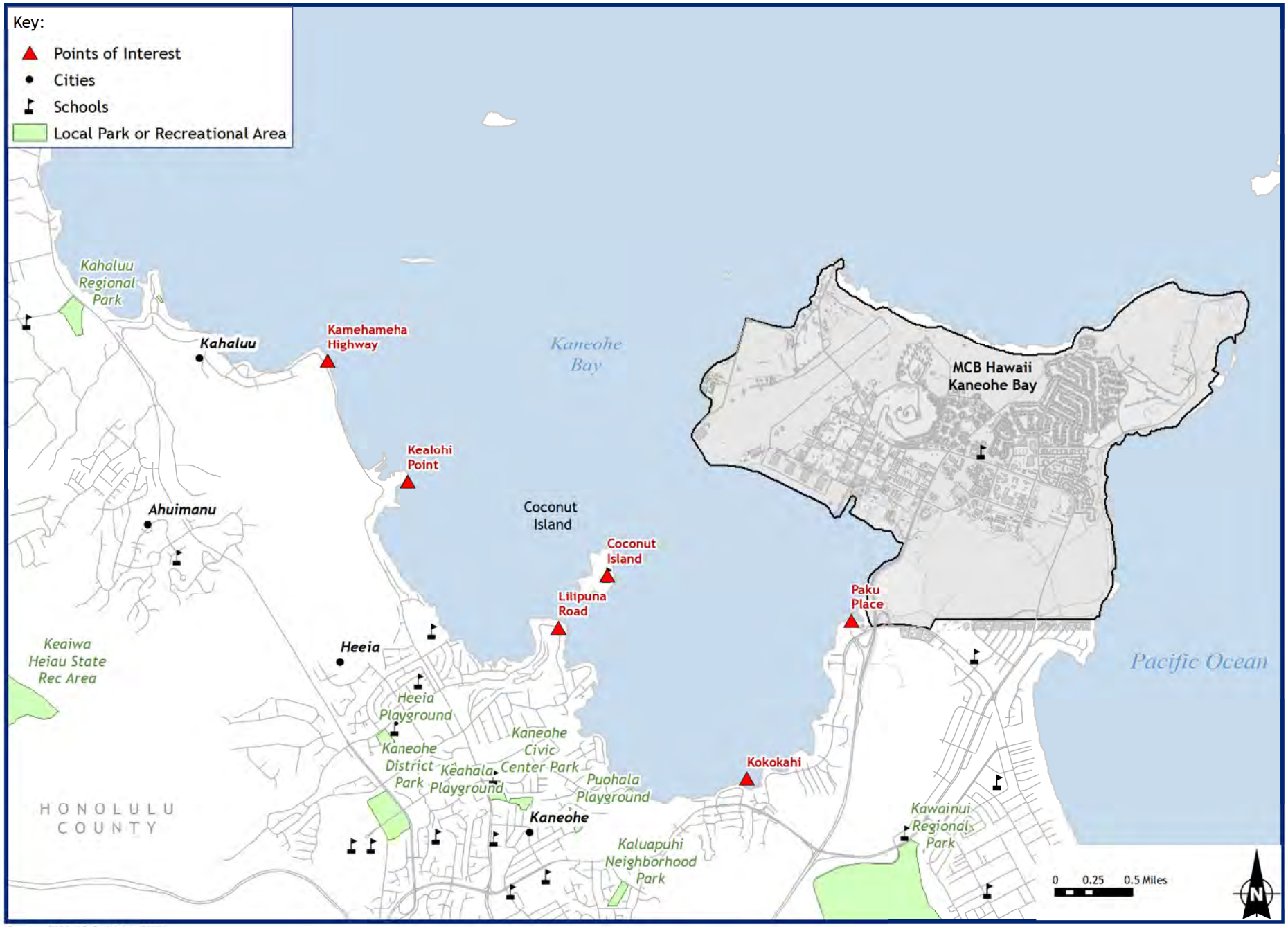
The P-3C, as a turboprop, and the P-8A, as a jet aircraft, generally have different noise characteristics. For example, the P-8A exhibits more noise in some higher frequency bands during approach (2,500 Hz to 5,000 Hz) than the P-3C, and, as a result, while the overall sound energy of the two aircraft is similar, people on the ground will likely detect the "whine" from the P-8A turbofan engines during arrivals. However, the actual increase in total sound energy at a distance of 1,000 feet during arrivals for a P-8A would range only from 1 dB to 2 dB. A larger difference in SEL noise values can be found when comparing T&G operations. In this case, the P-8A is on average about 8 dB louder than the P-3C. The C-17, when compared with the P-8A for arrival, departure, and T&G operations, is approximately 4, 6, and 10 dB louder, respectively. The C-5, when compared with the P-8A for approach, departure, and T&G operations, is approximately 18, 20, and 16 dB louder, respectively, and therefore dominates the single-event noise environment at MCB Hawaii Kaneohe Bay.

Noise exposures at six selected locations in the vicinity of MCB Hawaii Kaneohe Bay were analyzed for single-event noise levels. The USMC identified these locations as points of interest to the community. These locations are listed in Table 8-6 and are shown on Figure 8-1.

Table 8-6 Highest SEL (dB) for Modeled Aircraft Operations at Points of Interest for All Alternatives[1]

Point of Interest	P-3C	P-8A	C-17	C-5
Coconut Island	83	91	99	102
Kamehameha Highway	80	85	85	99
Kokokahi	75	83	84	79
Kealohi Point	86	90	97	109
Lilipuna Road	79	87	93	96
Paku Place	80	85	85	85

Note:
[1] The modeled sound is representative only for each individual location and does not provide a representative measure of the sound heard during aircraft overflights in other areas.



Source: ESRI, 2012; Wyle, 2007.

Figure 8-1
Points of Interest in the Vicinity of
MCB Hawaii Kaneohe Bay, Oahu, Hawaii

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The SEL provided at each location represents the loudest event (i.e., arrival, departure, T&G) for the P-3C, P-8A, C-5, and C-17. The difference in SEL between the P-3C and the P-8A ranges between 5 dB and 8 dB. For most operations, the difference in the single-event sound level of the P-8A can be described as noticeably louder than the P-3C.

8.2.3 Construction Noise

Construction under Alternatives 1 and 2 would result in short-term noise impacts at MCB Hawaii Kaneohe Bay. Typical noise emission levels for construction equipment that may be used as part of the proposed action are listed in Table 8-7. Noise impacts related to construction would be intermittent and temporary (over an approximately 12-month construction period). Furthermore, since the proposed construction is located at the MCB Hawaii Kaneohe Bay airfield, approximately 4,500 feet from the nearest residences and other sensitive noise receptors, neither action alternative would result in significant construction-noise-related impact on the existing environment.

Table 8-7 Typical Noise Emission Levels for Construction Equipment

Type of Equipment	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (derrick)	88
Delivery Truck	88
Diamond Saw	90
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-Driven Vibro-compactor	76
Hoist	76
Jackhammer (paving breaker)	88
Line Drill	98
Motor Crane	83
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Tug	85
Vibratory Pile Driver/Extractor	89

Source: Barnes et al. 1977.

Key:
dBA = A-weighted decibels.

Conclusion

Overall, the proposed action alternatives would not result in significant noise impacts from aircraft operations or construction at MCB Hawaii Kaneohe Bay. Fewer proposed P-8A operations for both action alternatives compared with 2014 baseline P-3C operations would result in negligible noise impacts. All proposed construction-related noise would be located at the airfield, approximately 4,500 feet from the nearest residences and other sensitive noise receptors.

8.3 Air Quality

The air quality analysis considers criteria pollutant and GHG emissions. Air quality emissions associated with the proposed action at MCB Hawaii Kaneohe Bay include those from construction, flight operations from the P-8A, and POV commuting from base personnel. Other site emissions, such as those from stationary sources, other aircraft, GSE, and other sources, are assumed to remain constant under this action. The Conformity Rule does not apply to the implementation of this action because MCB Hawaii Kaneohe Bay is located in a region that is in attainment for all NAAQS. GHG emissions have been considered, and cumulative impacts are discussed in Chapter 9.

8.3.1 Construction Emissions

Construction may affect air quality primarily as a result of construction equipment emissions, paving and painting emissions, and fugitive dust from grading and earthmoving. These emissions are calculated separately from operational emissions because they are temporary and would occur before full implementation of the selected alternative.

Construction emissions under Alternatives 1 and 2 were estimated using emission factors from multiple guidelines and references including EPA's NONROAD emission modeling program (EPA 2008b); EPA420-F-08-024 (EPA 2008a); and the USEPA AP-42 (1995). Emissions were based on estimates of equipment to be used 8 hours per day on average and assuming 250 workdays per year. It is assumed that all construction required to support Alternatives 1 and 2 would occur within one year. Particulate emissions from site preparation and demolition activities were also considered. Total projected annual construction emissions in tpy at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 are listed in Table 8-8. Construction equipment, activities, emission factors, and calculations are detailed in Appendix E.

Table 8-8 Construction Emissions at MCB Hawaii Kaneohe Bay, Alternatives 1 and 2

Activity	Emissions (tpy)				
	NO_x	VOCs	CO	SO_2	PM_{10}
ALTs 1 and 2					
Construction equipment use	2.44	0.22	1.06	0.01	0.20
VOCs emitted during paving and painting	0	0.15	0	0	0
PM_{10} generated during site preparation	0	0	0	0	0.75
Worker and delivery traffic	0.06	0.040	0.37	0.001	0.12
Total	**2.50**	**0.41**	**1.42**	**0.01**	**1.07**

Key:
CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter less than 10 microns in diameter.
SO_2 = Sulfur dioxide.
TPY = Tons per year.
VOCs = Volatile organic compounds.

No construction emissions would occur under the No Action Alternative because no new construction would be planned under these alternatives.

8.3.2 Operational Emissions

Operational emissions considered in this analysis include those generated from P-3C and P-8A flight and maintenance operations and POVs operated by the squadron personnel. Assumptions and emission factors from the baseline analysis were used in the analysis (see Chapter 7.3). Existing emissions are discussed in Chapter 7.3.2 and summarized in Table 8-9. These emissions are the baseline for comparison of impacts with the proposed action alternatives. Annual aircraft operational emissions, changes to POV emission totals for each alternative, and the change in emission totals compared to baseline emissions are also listed in Table 8-9.

The Conformity Rule does not apply to the implementation of this action because MCB Hawaii Kaneohe Bay is located in a region that is in attainment for all NAAQS. Estimates of projected operational emissions show a decrease in annual emissions for all criteria pollutants under both alternatives. GHG emissions would also decrease. Consequently, there would be no adverse impacts on air quality from operational emissions or changes in GHG emissions.

Table 8-9 Projected Operational Emissions at MCB Hawaii Kaneohe Bay, Alternatives 1 and 2

Flight Operation	No. of Operations[1]	Emissions (tpy)				
		CO	NO_x	VOC	SO_2	PM_{10}
ALTs 1 and 2 (2 P-8A Aircraft)						
Straight-In Arrival LTOs	208	0.9	1.4	0.12	0.1	0.05
T&G	0	0.0	0.0	0.0	0.0	0.0
GCA Pattern	0	0.0	0.0	0.0	0.0	0.0
Maintenance Run Ups		0.000	0.003	0.000	0.001	0.000
Total P-8A Emissions		**0.9**	**1.4**	**0.1**	**0.1**	**0.05**
Baseline P-3C Emissions		78.4	60.0	50.6	17.3	29.2
Change in Aircraft Emissions		-77.5	-58.6	-50.5	-17.2	-29.2
Change in POV Emissions[2]		-97.9	-7.6	-10.4	0.00	-28.9
Total Change in Operational Emissions		**-175.5**	**-66.2**	**-60.9**	**-17.2**	**-58.0**

Notes:

1 Operational information from Wyle 2013. An LTO includes a departure and an arrival, and T&G and GCA patterns also include two operations; therefore, total operations listed in Chapter 2.4.2.3 and in noise analysis will be double these air quality operations totals.

2 POV emissions decrease under both action alternatives compared to baseline conditions by the amount indicated in the table.

Key:

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter less than 10 microns in diameter.
POV = Privately owned vehicle.
SO_2 = Sulfur dioxide.
TPY = Tons per year.
VOC = Volatile Organic Compounds.

Conclusion

In summary, the transition of P-3C to P-8A aircraft under the action alternatives would not result in adverse impacts on air quality at MCB Hawaii Kaneohe Bay. Construction emissions would be temporary, and projected operating air emissions show a large decrease in annual totals for all criteria pollutants and GHGs under both alternatives. The No Action Alternative would have no impact on air quality because there would be no new construction and no change in baseline aircraft operations.

8.4 Land Use

The impact analysis for land use in this SEIS focuses on those areas affected by proposed construction and aircraft noise. Land uses are frequently regulated by management plans, land use plans, comprehensive plans, and local zoning and ordinances. These plans and regulations assist in identifying where future development can occur so that it is compatible with surrounding land uses and protective of specially designated or environmentally sensitive uses. This analysis relies on zoning designations as well as APZs and noise zones as defined by the Navy's AICUZ Program. As stated in Chapter 1.3.5, AICUZ studies provide recommendations to promote community development that is compatible with operations at an air station.

8.4.1 MCB Hawaii Kaneohe Bay Land Use

The area of new construction required to support a permanent, rotating squadron P-8A detachment under Alternatives 1 and 2 is provided in Table 8-3. The locations of the proposed construction projects are shown on Figure 2-8 in Chapter 2, Alternatives.

Construction activities under Alternatives 1 and 2 would include expansion of an existing taxiway and rinse facility to accommodate the P-8A aircraft. All construction under Alternatives 1 and 2 would be located on the south side of the airfield, either on or adjacent to areas currently developed to support airfield operations. Land use in this portion of the base has been designated as an "Air and Ground Operations Training Area." Expansion of existing facilities in this area would be consistent with current land use designations and would maximize use of existing facilities in an area with little developable land remaining.

8.4.2 Regional Land Use

The expansion of facilities proposed under Alternatives 1 and 2 would not be expected to cause direct or indirect impacts on regional land use because the facilities would be located entirely within MCB Hawaii Kaneohe Bay.

The proposed action would not result in any indirect growth-induced development under either of the home basing alternatives. The number of personnel at MCB Hawaii Kaneohe Bay would decrease by 1,341 individuals under Alternatives 1 and 2. Considering the projected 5.4-percent growth rate of Honolulu County, the overall reduction in personnel would not be anticipated to result in changes to existing land use patterns. The number of personnel at MCB Hawaii Kaneohe Bay would not change under the No Action Alternative, and thus no impacts would occur related to growth-induced development or changes to existing land use patterns.

As discussed in Chapter 8.2, the proposed action alternatives would not result in significant noise impacts at MCB Hawaii Kaneohe Bay. Fewer proposed P-8A operations for both action alternatives compared with 2014 baseline P-3C operations would result in negligible noise impacts. Consequently, off-station land use would not be adversely affected by aircraft operations associated with the proposed action.

8.4.3 Land Use Consistency with Local Plans, Programs, and Policies

Implementation of the proposed action under both alternatives and the No Action Alternative would not affect the baseline APZs at MCB Hawaii Kaneohe Bay; would be consistent with the MCB Hawaii Plus Up Development Plan; would have no effect on management practices currently implemented under the INRMP or ICRMP; and is consistent with the objectives of the Koolaupoko Sustainable Communities Plan and Land Use Ordinance.

Conclusion

Overall, as discussed above, implementation of the action alternatives at MCB Hawaii Kaneohe Bay would not result in significant impacts on local and regional land use. Off-station land use would not be adversely affected by aircraft operations associated with the proposed action. Both of the action alternatives would be consistent with management plans, land use plans, comprehensive plans, and local zoning and ordinances designed to control growth and new development in the vicinity of MCB Hawaii.

8.5 Socioeconomics

This assessment examines how the proposed action would affect population and housing (Chapter 8.5.1), the economy (Chapter 8.5.2), taxes and revenue (Chapter 8.5.3), education (Chapter 8.5.4), and environmental justice (Chapter 8.5.5).

This socioeconomic analysis focuses on impacts resulting from changes in military and civilian personnel and construction expenditures. Economic impacts are defined to include direct effects, such as changes to employment, payrolls, and expenditures that affect the flow of dollars into the local economy, and secondary effects, which result from the "ripple effect" of spending and re-spending in response to the direct effects.

Socioeconomic impacts, particularly impacts such as those being evaluated in this SEIS, may be mixed, i.e., beneficial in terms of gains in jobs, expenditures, and tax revenues but adverse in terms of reduction in base personnel and growth management issues such as demands for housing and community services. The analysis in this EIS identifies potential environmental justice issues. Impacts on environmental justice populations are identified where high and adverse human health or environmental effects may disproportionately affect minority or low-income populations. Impacts on children would occur if there were an increased disproportionate environmental, health, or safety risk to children.

8.5.1 Population and Housing

8.5.1.1 Population

The proposed alternatives would result in moderate impacts to the personnel loading at MCB Hawaii Kaneohe Bay and minor impacts to total population in the region. Total P-8A personnel loading at MCB Hawaii Kaneohe Bay under both alternatives would be less than the baseline P-3C personnel loading. As shown on Table 8-10, 1,443 P-3C personnel (358 officers and 1,085 enlisted personnel) are assigned at MCB Hawaii Kaneohe Bay under baseline conditions. Following implementation of Alternatives 1 and 2, 102 transient P-8A personnel would operate P-8A aircraft at the base. These personnel loading levels represent a decrease of 1,341 personnel (a 99-percent decrease). In addition, it should be noted that the 102 transient P-8A personnel would not be permanently assigned to MCB Hawaii Kaneohe Bay; they would be permanently assigned to other installations and would rotate in on a short-term basis.

The baseline P-3C loading at MCB Hawaii Kaneohe Bay would not change under the No Action Alternative.

The population and demographic characteristics of Honolulu County and Honolulu (City) would also be impacted. As military personnel are relocated from MCB Hawaii Kaneohe Bay, their dependents (e.g., spouses and children) would accompany them and also move out of the region. The number of military dependents affected by the proposed alternatives was calculated using a national Navy/USMC percentage of married enlisted personnel and officers, by rank, and the average number of dependents by parents' rank (see *Unified Facilities Criteria: Facility Planning for Navy and Marine Corps Shore Installations, Series 700 Housing and Community Facilities UFC-2-000-05N*). Personnel who were not married were assumed to have no dependents. These average percentages were applied to the number of enlisted

personnel and officers who would be relocating under each of the proposed alternatives to determine the corresponding number of dependents who would be affected (see Table 8-11).

Table 8-10 P-8A Personnel at MCB Hawaii Kaneohe Bay under Each Alternative at 2020 End-State[1]

Type of Personnel	2014 Baseline P-3C Personnel (No Action Alternative)[2]	ALTs 1 and 2 (Permanent squadron detachment)	
		P-8A Personnel[3, 4]	Change (+/-)
Officers	358	15	-343
Enlisted	1,085	87	-998
Total	**1,443**	**102**	**-1,341**

Notes:
1 The end-state for Alternatives 1 and 2 occurs in 2020.
2 The 2014 baseline assumes three P-3C squadrons and no P-8A squadrons.
3 P-8A personnel under Alternatives 1 and 2 would be considered transient and would not be permanently assigned to MCB Hawaii Kaneohe Bay.
4 There would be a loss of approximately 75 civilian/contract personnel at MCB Hawaii Kaneohe Bay. Approximately 85 civilians are currently employed in the maintenance of P-3C aircraft. The P-8A detachment under Alternatives 1 and 2 would only require 10 civilian/contract personnel.

Table 8-11 Regional Population Impacts[1] Resulting from the Changes in P-3C and P-8A Personnel Loading at MCB Hawaii Kaneohe Bay Compared to the 2014 Baseline (No Action Alternative) Levels

Personnel	Change from 2014 Baseline (No Action Alternative)
	ALTs 1 and 2
Military Personnel[1]	-1,443
Military Dependents	-1,820
Total Population/Total Population Change (+/-)	**-3,263**
Honolulu County's 2020 Projected Population	1,003,700
Total Population/Total Population Change as a Percentage of Honolulu County's 2020 Projected Population	**-0.3%**

Source: State of Hawaii 2012a

Note:
1 Demographic modeling for Alternatives 1 and 2 assumes that all of the P-8A personnel and their dependents would relocate to their permanent home base and leave MCB Hawaii Kaneohe Bay.

Under Alternatives 1 and 2, in which no permanently assigned P-8A personnel would be based at MCB Hawaii Kaneohe Bay, total population impacts were calculated assuming that all military personnel and dependents would relocate from Hawaii to their permanent home base. The transient 102 personnel would rotate in on a short-term basis and would therefore not impact permanent population levels. There would also be a loss of approximately 75 civilian/contract personnel at MCB Hawaii Kaneohe Bay. Approximately 85 civilians are currently employed in the maintenance of P-3C aircraft. The P-8A detachment under Alternatives 1 and 2 would only require 10 civilian/contract personnel.

As shown on Table 8-11, the resulting changes in population would be expected to be minor relative to the size of the regional population. Alternatives 1 and 2 would be expected to result in a net reduction of up to 3,263 personnel and dependents in the Honolulu area compared to 2014 levels. This decrease in population represents a reduction of approximately 0.3 percent of the projected population of Honolulu County in 2020.

Regional population would not be impacted by the No Action Alternative because baseline P-3C personnel loading at MCB Hawaii Kaneohe Bay would not change.

8.5.1.2 Housing

The change in personnel loading at MCB Hawaii Kaneohe Bay that would occur under both of the action alternatives would have only a minor impact to the overall housing market in the Honolulu area. Implementation of Alternatives 1 and 2 would result in up to 1,443 households leaving the region. The impact analysis for Alternatives 1 and 2 assumes that due to the transient nature of the P-8A assignments, no permanent military households associated with the P-8A aircraft would remain in the area.

Assuming each household occupies a housing unit, 1,443 fewer housing units under Alternatives 1 and 2 would be required. This change in the demand for housing units would account for 0.4 percent or less of the total number of housing units in Honolulu County in 2010. Given the vacancy rate of 7.7 percent in the county as a whole and the low vacancy rates of 3.6 percent and 5.3 percent in the communities of Kaneohe and Kailua, respectively, the reduction in the number of military personnel stationed at MCB Hawaii Kaneohe Bay that would occur under both of the action alternatives would not have a significant impact on the availability or price of housing in the regional market.

The housing market in Honolulu County would not be impacted by the No Action Alternative because baseline P-3C personnel loading at MCB Hawaii Kaneohe Bay would not change.

8.5.2 Economy, Employment, and Income

Implementation of the action alternatives would have the potential to impact the regional economy in two ways. First, any additional construction that is required to support the mission would have a short-term positive economic effect as these funds would be injected into the regional economy. Second, there would be a long-term economic impact on the Honolulu County regional economy as a result of changes in employment and payroll at MCB Hawaii Kaneohe Bay that would be associated with each alternative. The impacts from construction would be one-time in nature, whereas the impacts from the decreased employment and employee earnings would be annual and long term.

In order to quantify the total economic impacts the proposed alternatives would have on the regional economy, the Navy used the RIMS II, designed by the U.S. Bureau of Economic Analysis. The multipliers utilized in this input-output model are based on regional information derived from databases analyzing commercial, industrial, and household spending patterns and relationships. These multipliers also estimate the potential number of jobs created or lost as a result of changes in earning and spending patterns. Both one-time, short-term construction-related economic impacts and annual, long-term operational spending impacts are discussed below.

Short-Term Construction-Related Impacts

Implementation of Alternatives 1 and 2 would require modification of facilities or expansion of existing infrastructure at MCB Hawaii Kaneohe Bay to accommodate the P-8A permanent detachment. Both alternatives would require $11.2 million in construction expenditures.

A number of jobs would be generated during the construction period and contribute to local income and indirect spending, as well as direct spending. The proposed construction projects under Alternatives 1 and 2 would generate an estimated 172 jobs and $8.0 million in employee earnings. Table 8-12 presents the total (e.g. direct, indirect, and induced) economic impacts associated with Alternatives 1 and 2.

Because these construction dollars represent a one-time expenditure, the resulting positive economic impacts would last only a short time. Once these funds leave the regional economy through savings, taxes, or purchases of goods and services outside the region, the positive effects would no longer be multiplied.

Table 8-12 Total Direct, Indirect, and Induced Impacts Resulting from Construction Expenditures in Honolulu under Alternatives 1 and 2

Construction Expenditures	ALTs 1 and 2
Total Construction Expenditures	$11.3M
Total Direct, Indirect, and Induced Impacts	
Change in Regional Output[1]	$22.3M
Change in Value Added[1]	$12.4M
Change in Employee Earnings	$8.0M
Change in Employment (jobs)	172

Note:
[1] The Terms "Regional Output" and "Value Added" are measurements of economic activity.

Long-Term Employee Earnings and Spending Impacts

As described above in Chapter 8.5.1, direct Navy employment at MCB Hawaii Kaneohe Bay attributable to the proposed action would decrease by 1,341 personnel under Alternatives 1 and 2 by 2020 compared to 2014 employment levels.

Changes in the amount of income that would be injected into the regional economy through MCB Hawaii Kaneohe Bay's payroll expenditures would directly and indirectly affect employment and earnings in the regional economy. As income would be removed from the regional economy through changes in MCB Hawaii Kaneohe Bay payroll, employment and earnings in the regional economy would likewise contract.

Personnel assigned to MCB Hawaii Kaneohe Bay spend a portion of their disposable income in the regional economy. As this amount of income contracts, the profits and sales of local merchants and suppliers would decrease. These local merchants and suppliers may, in turn, decrease their employment or decrease their output as a direct result of the change in demand for their goods and services. Thus, the economic impacts of the original change of funds would be cycled back into the economy, repeating or multiplying the effect.

Table 8-13 summarizes projected changes in employment and payroll at MCB Hawaii Kaneohe Bay under each of the alternatives and includes the estimated regional economic impact that would result from these annual changes. Payroll expenditures were calculated for all personnel transitioning from the area under each of the alternatives. The change in direct payroll for personnel stationed at MCB Hawaii Kaneohe Bay is also shown in Table 8-13. Alternatives 1 and 2 would result in a decrease of $114.0 million in Navy payroll in the region.

The indirect and induced impacts, as well as the total impacts of the decrease in regional employment and employee earnings income, are also presented in Table 8-13. These indirect, induced, and total effects were calculated using RIMS II Type II direct effect multipliers.

The reduction in personnel and payroll expenditures at MCB Hawaii Kaneohe Bay would have a significant negative regional economic impact, with a combined decrease of 2,787 direct, indirect, and induced jobs and a total decrease of employee earnings of approximately $211.8 million under Alternatives 1 and 2 (see Table 8-13). Total employment in 2012 for the Honolulu MSA was 429,726 persons (U.S. Department Labor 2013f; 2013g). Therefore, the relocation of 2,787 personnel resulting

from implementation of Alternatives 1 and 2 would represent a decrease of 0.6 percent in the total number of people employed in the MSA.

Long-term employee earnings and spending would not be impacted under the No Action Alternative because baseline P-3C personnel loading at MCB Hawaii Kaneohe Bay would not change.

Table 8-13 Annual Direct, Indirect, and Induced Impacts on Employment and Employee Earnings in the Honolulu MSA under Each Alternative

	ALTs 1 and 2
Annual Employment Impacts (in jobs)	
Direct Employment Changes[1]	-1,443
Indirect and Induced Employment Impacts	-1,344
Total Annual Employment Impacts[2]	-2,787
Annual Employee Earnings Impacts ($Millions)	
Direct Changes in Military Payroll	-$114.0
Indirect and Induced Impacts	-$97.8
Total Annual Employee Earnings Impacts[2]	-$211.8

Notes:

1 Due to the transient nature of the P-8A personnel positions under Alternatives 1 and 2, they have not been included in the regional economic analysis. In addition, the economic analysis is based on military personnel numbers and does not include civilian contractors.

2 Data may not sum to total due to rounding.

8.5.3 Taxes and Revenues

The reduction in personnel at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would have a negative impact on the generation of state and local tax revenue. Property tax and sales tax receipts would all decrease as a direct result of the contracted regional economy attributable to the relocation of personnel. However, this reduction in population would also reduce the amount of government services and facilities that would be required, thereby reducing total government expenditures such that the reduction of property and sales tax revenue would not be significant.

Taxes and revenues would not be impacted under the No Action Alternative because baseline P-3C personnel loading at MCB Hawaii Kaneohe Bay would not change.

8.5.4 Education

The reduction in personnel at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would be expected to decrease the number of school-aged military dependents living in the area and attending local public schools. Assuming that all impacted military personnel and their families stationed at MCB Hawaii Kaneohe Bay relocate outside the area, a net decrease in the population of school-aged children would occur under Alternatives 1 and 2. Under both alternatives, an estimated 813 fewer school-aged dependents would attend local schools.

During the 2012-2013 school year, an estimated 4,663 students were enrolled in the seven local public schools typically used by school-aged military dependents. If all of the projected decrease in number of school-aged children was experienced within these seven schools, the impact on total enrollment would be a decrease of 17.4 percent under Alternatives 1 and 2.

The enrollment declines of school-aged military dependents would be expected to be concentrated in schools with a history of high enrollment from MCB Hawaii Kaneohe Bay and would likely be concentrated at the seven local public schools. While the impacts at specific schools cannot be quantified

with precision, the enrollment decreases under Alternatives 1 and 2 could potentially have a significant impact on the seven local public schools, and adjustments at the impacted schools may be required to address the decline in school population.

The change in "federally connected students" attending local district schools would result in a corresponding change in federal impact aid received by the district. However, federal impact aid typically does not cover the full per-pupil costs experienced by the district.

The number of school-aged children would not change as a result of the No Action Alternative because baseline P-3C personnel loading at MCB Hawaii Kaneohe Bay would remain the same.

8.5.5 Impacts on Minority and Low-Income Populations and Environmental Health and Safety Risks to Children

Consistent with Executive Orders 12898 and 13045, and as discussed in Chapter 7.5.5, the Navy's policy is to identify any disproportionately high and adverse human health or environmental effects of its actions on minority and low-income populations or that pose environmental health and safety risks to children. The potential for minority and low-income populations and children to be exposed to additional aircraft noise was identified as the most likely negative environmental and human health impact that could potentially result from the proposed action.

Navy aircraft noise would not increase at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 compared to 2014 baseline conditions. Consequently, there would be no disproportionately high and adverse environmental and human health impacts to minority and low-income populations, and the proposed action would not result in environmental health risks and safety risks that may disproportionately affect children.

Conclusion

Overall, implementation of the action alternatives would not result in significant impacts on population and housing from the decrease in personnel levels at MCB Hawaii Kaneohe Bay. The changes in personnel loading represent a decrease of 0.3 percent in the projected population of Honolulu County in 2020 under Alternatives 1 and 2. The local housing market would be expected to recover from short-term impacts. Construction would have a short-term positive economic effect. The decrease in personnel levels would result in significant long-term reductions in employee earnings and spending in the region. Local schools could potentially be significantly impacted by enrollment decreases. There would be no disproportionate high or adverse human health or environmental effect on minority or low-income populations or on children in the MCB Hawaii Kaneohe Bay area.

8.6 Topography and Soils

The analysis of topography and soils focuses on the area of proposed construction where soils would be disturbed and where there would be potential for soil erosion. BMPs are identified to minimize soil impacts and prevent or control pollutant discharge into storm water.

The two soil types occurring at the proposed construction areas (fill land, mix; and Molokai silty clay loam, 7 to 15 percent slopes) under Alternatives 1 and 2 are both characterized as well drained and suitable for construction. Under both alternatives, topography at MCB Hawaii Kaneohe Bay would not be affected because the proposed construction areas are generally level and only limited grading and filling would be required.

Soils at the proposed construction sites would be temporarily affected under Alternatives 1 and 2. Impacts would include a potential for soil erosion, compaction, and rutting from vehicle traffic during

construction. A projected increase in impervious surfaces of approximately 1.1 acres would occur under Alternatives 1 and 2 to expand the taxiway and shoulder at the aircraft parking apron, as well as to expand the aircraft rinse facility. An increase in impervious surfaces would also increase the quantity and velocity of storm water runoff, which would increase the susceptibility of surrounding soils to erosion. These impacts would be minimized or avoided by using standard soil erosion- and sedimentation-control techniques at the construction sites, such as silt barriers (filter fabric), and by appropriate revegetation techniques upon construction completion. Revegetation techniques would include replanting disturbed areas with native plants that meet the base's landscape management goals and objectives (Marine Corp Base Hawaii 2011). Consequently, potential impacts on soils at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would not be significant.

Topography and soils would not be impacted under the No Action Alternative because no construction would occur under this alternative.

Conclusion

Overall, implementation of the proposed action at MCB Hawaii Kaneohe Bay would not result in significant impacts on topography and soils from construction activities. The projected increase in impervious surface of approximately 1.1 acres under Alternatives 1 and 2 would represent a long-term loss of useable soils. Standard soil erosion- and sedimentation-control techniques would be implemented to avoid and minimize erosion and sedimentation.

8.7 Water Resources and Wetlands

This assessment examines how the proposed action and alternatives at MCB Hawaii Kaneohe Bay would affect surface water (8.7.1), water quality (8.7.2), floodplains (8.7.3), groundwater (8.7.4), and wetlands (8.7.5).

For the purposes of this EIS, water quality is considered in light of the statutory requirements that regulate water quality conditions and considers the potential for impacts that may change the water quality, including both improvements and degradation of current water quality. The analysis of floodplains considers whether any new construction is proposed within a floodplain or may impede the functions of floodplains in conveying floodwaters. The analysis of groundwater focuses on the potential for impacts on the quality, quantity, and accessibility of the water. The analysis of wetlands considers the potential for impacts that may change the local hydrology, soils, or vegetation that support a wetland.

8.7.1 Surface Water

No in-water construction would be required to complete the proposed action. In addition, no water bodies are present within or adjacent to the proposed construction areas under Alternatives 1 and 2; therefore, the proposed action would have no direct effects on surface waters.

8.7.2 Water Quality

Construction of facilities to support a permanent P-8A squadron detachment at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would require a construction footprint of approximately 1.62 acres. With proper controls, storm water runoff from the construction sites would not impact water quality in Kaneohe Bay. Because more than 1 acre would be disturbed during construction under Alternatives 1 and 2 and because Kaneohe Bay waters are classified as Class AA waters, an individual NPDES permit for the discharge of storm water from construction activities will be required from the State of Hawaii, Department of Health. Under the permit, the Navy will submit a site-specific SWPPP that will include a site plan for managing storm water runoff. The plan will also describe the BMPs to be implemented to eliminate or reduce erosion, sedimentation, and storm water pollutants. Examples of storm water BMPs that may be used include:

- **Grass swales**. Temporary or permanent features designed to filter and reduce storm water runoff from construction areas;
- **Silt fencing**. A temporary erosion and sediment control used to prevent soil from entering waterways before bare soil is stabilized with vegetation; and
- **Berms**. A temporary erosion and sediment control that physically prevents polluted runoff from entering nearby storm drain inlets and waters.

New construction under Alternatives 1 and 2 would create a total of approximately 1.1 acres of new impervious surfaces. These surfaces would, on the average, generate additional runoff of approximately 1.2 million gallons per year. No new storm water outfalls would be expected to be required to support the new construction. Once the facilities would be constructed, storm water from the new impervious surfaces would be directed to the existing storm water conveyance system for final discharge into Kaneohe Bay. Because Kaneohe Bay is classified as Class AA waters, the Navy will implement site-specific BMPs to control the volume and quality of storm water that would be transported from the new construction areas. In addition, the base's current NPDES permit (Permit No. HI 0110078) includes restrictions on the amount of storm water that may be discharged to the bay. Notwithstanding the small amount of new impervious surface that would be added to the base under Alternatives 1 and 2 and the ability to minimize storm water transport through the implementation of certain BMPs (e.g., grass-lined swales), any additional storm water runoff would require a revision of the base's current NPDES permit. Adverse impacts on Kaneohe Bay and other surface waters surrounding the base would be avoided to the greatest extent possible by implementing site-specific BMPs and other storm water management practices as specified in the base's existing SWMP. As part of the SWMP, sampling is regularly conducted to ensure that storm water discharges meet state water quality standards.

MCB Hawaii Kaneohe Bay would continue to comply with established BMPs and programs for the management of hazardous substances and spill response at the installation. Possible oil or other material spills from the aircraft would be minimized by appropriate management techniques such as requiring all equipment to be in good condition and to be properly maintained to avoid the potential for spills and other leaks.

No adverse impacts on water quality related to storm water runoff would occur under the No Action Alternative because no new construction would occur under this alternative.

8.7.3 Floodplains

The proposed action would have no effect on any mapped 100-year floodplain because no 100-year floodplains are present within or adjacent to the proposed construction areas at MCB Hawaii Kaneohe Bay.

8.7.4 Groundwater

The proposed action would not impact groundwater resources in the vicinity of MCB Hawaii Kaneohe Bay. None of the proposed construction projects under Alternatives 1 and 2 would extend below the surface at a depth that would impact the underlying water table. The potential exists for spills of fuel or other chemicals during construction; however, immediate cleanup of these spills would prevent any infiltration into the underlying groundwater.

The number of Navy personnel at MCB Hawaii Kaneohe Bay would decrease under both of the proposed action alternatives compared with the 2014 baseline personnel levels. Therefore, it would be expected that a corresponding decrease would occur in demand for groundwater from the regional aquifer system.

8.7.5 Wetlands

The proposed action would have no effect on wetlands because no wetlands occur within or adjacent to the proposed construction areas at MCB Hawaii Kaneohe Bay.

Conclusion

Overall, implementation of the proposed action at MCB Hawaii Kaneohe Bay would not result in significant impacts on water resources from proposed facility development. Groundwater, water quality, floodplains, and wetlands would not be impacted. Construction activities would be performed in compliance with state general construction storm water permit requirements. An SWMP and BMPs would be implemented to limit erosion and runoff into surface waters.

8.8 Biological Resources

This assessment examines how the proposed action would affect vegetation (Chapter 8.8.1), wildlife (Chapter 8.8.2), migratory birds (Chapter 8.8.3), threatened and endangered species (Chapter 8.8.4), and marine mammals (Chapter 8.8.5).

This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or protected under federal or state law or statute. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

8.8.1 Vegetation

Approximately 1.1 acres of maintained Bermuda grass would be removed to expand existing facilities. The vegetation permanently removed under these alternatives would total less than 1 percent of the currently vegetated area at the base. Furthermore, no unique or natural vegetation communities would be affected by the proposed action at MCB Hawaii Kaneohe Bay. Consequently, impacts on vegetation under Alternatives 1 and 2 would not be significant.

Vegetation would not be impacted under the No Action Alternative because no construction would occur under this alternative.

8.8.2 Wildlife

The proposed construction areas under Alternatives 1 and 2 do not provide suitable habitat to support a diverse or abundant terrestrial wildlife population because there is little vegetation cover or habitat diversity; both areas contain maintained Bermuda grass. The maintained grasslands that would be affected by the proposed construction support a variety of wildlife species, such as migratory birds, songbirds, and small mammals. These species commonly use these habitats for foraging and occasional nesting. Construction in these areas would result in both direct and indirect impacts on resident wildlife. Direct effects could include mortality of less-mobile species, such as small mammals. The loss of approximately 1.1 acres (Alternatives 1 and 2) of herbaceous vegetation at MCB Hawaii Kaneohe Bay would cause the migration of species to other areas with suitable habitat, indirectly resulting in a decrease in the number of wildlife species in the area. However, the overall loss of wildlife species would be undetectable at a population level, given the relatively large amount of suitable habitat that would remain near the proposed facilities.

Since the proposed facilities are located either on existing developed areas or directly adjacent to them, limited impacts on wildlife as a result of habitat fragmentation would occur. Temporary displacement of wildlife may occur in peripheral areas during construction, when localized human activity levels increase. However, once construction has been completed, wildlife should return to these areas. Some wildlife

species such as songbirds and small mammals that are able to adapt to the landscaped conditions of urban environments can be expected to inhabit the developed areas.

As discussed in Chapter 8.7, storm water created as a result of the new impervious surfaces would be controlled through the implementation of BMPs to prevent the degradation of water quality in the marine waters surrounding the base to the greatest extent possible. Furthermore, these BMPs employed during construction would prevent silt from entering the storm water system and subsequent silting in sensitive coral reef habitats. Also, no additional outfalls would be expected to be installed to accommodate storm water discharge. Consequently, any impacts on coral reef colonies or other aquatic species from additional storm water discharge during construction would be expected to be highly localized with implementation of on-site BMPs to reduce storm water run-off. Impacts during operation would be minor due to the small area of new impervious surface that would be added at the base.

As discussed in Chapters 8.1 and 8.2, annual Navy aircraft operations would decrease, and no increase would occur in noise levels compared to baseline conditions as a result of P-8A operations under any of the alternatives. Given the nature of the current MCB Hawaii Kaneohe Bay operations, locally occurring wildlife species have likely become habituated to aircraft noise at the base. Studies that focus on investigating the impacts of aircraft noise on wildlife and domestic animal species have observed a variety of species, including waterfowl, shore birds, songbirds, terrestrial mammals, and domestic animals (cows, chickens, sheep, and horses). Overall, the studies suggest that species differ in their response to aircraft noise (Manci et al. 1988). All species not exposed to aircraft noise, however, seem to initially respond with some form of a startle response, the intensity and duration of which diminishes or disappears with subsequent exposures. Other general responses include running, stampeding, flying, circling, or becoming motionless. Several studies indicate that there is a strong tendency for species to acclimate or habituate to noise disturbances (Grubb and King 1991; Ellis et al. 1991; Manci et al. 1988; Fraser et al. 1985; Black et al. 1984). Consequently, the proposed action would have no adverse impacts on wildlife at or in the vicinity of MCB Hawaii Kaneohe Bay from aircraft noise.

Based on the above analysis, proposed construction and aircraft operations at MCB Hawaii under the proposed action alternatives would not have a significant impact on terrestrial or aquatic wildlife.

Wildlife would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

8.8.3 Migratory Birds

As noted above, wildlife at and in the vicinity of MCB Hawaii Kaneohe Bay, including migratory birds, would not be impacted by aircraft noise under any of the action alternatives because overall noise levels at MCB Hawaii Kaneohe Bay are not expected to increase compared to current baseline conditions. The maintained grassland that would be impacted by the proposed construction under all action alternatives does not support a high diversity or abundance of birds or suitable habitat to support large populations of nesting birds. While the proposed new construction would disturb approximately 1.1 acres (Alternatives 1 and 2) of habitat potentially used by various species of neotropical migratory songbirds, removal of this habitat would have a negligible impact on migratory bird species populations at the base, based on the availability of remaining suitable habitat. In addition, management activities outlined in the station's INRMP to benefit migratory birds would continue to be implemented, offsetting any adverse impact associated with the proposed action. Such ongoing management activities may include conducting surveys to determine migratory bird and habitat use on the installation, providing nest boxes and platforms for birds, and leaving snags and downed logs for nesting, roosting, foraging, cover, and/or perching.

Direct mortality of migratory birds is unlikely to occur during construction because birds would be expected to relocate to other areas; however, some limited mortality could occur to nesting individuals depending on the timing of construction activities. As stated above, the impacted areas do not contain habitat that would attract large numbers of nesting birds, further reducing the potential for direct mortality of individual birds.

The P-8A aircraft would continue to operate in the same airfield environment and would continue to fly the same flight routes as the P-3 aircraft; therefore, the potential strike risk along these routes would remain the same. However, compared to the 2014 baseline conditions, annual Navy aircraft operations at MCB Hawaii Kaneohe Bay would be reduced by 99 percent under Alternatives 1 and 2; therefore, there would be an expected reduction in the overall potential for bird-aircraft strikes.

Based on the above analysis, the proposed action alternatives would have no significant adverse or disruptive impacts to migratory birds.

Migratory birds would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

8.8.4 Threatened and Endangered Species

8.8.4.1 USFWS-Managed Species

Round-leaved Chaff-Flower, Puukaa, White Hibiscus, Yellow Hibiscus, Loulu Palm, and Ohai

None of the proposed construction projects at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would disturb habitats that are known to, or could potentially, support any of these endangered plant species: the round-leaved chaff-flower (*Ewa hinahina*), Puukaa, white hibiscus (*Kokio keokeo*), yellow hibiscus (*Mao hau hele*), Loulu palm, and Ohai. Furthermore, these species would not be indirectly impacted by dust or other construction-related stressors, as they are at least 1,340 feet from the construction zone and would be buffered by the existing buildings on the installation. Consequently, the Navy has determined that the proposed action would have no effect on these endangered plant species. In addition, under NEPA, no significant impacts would occur on these endangered plant species at MCB Hawaii Kaneohe Bay.

The endangered plant species would not be impacted under the No Action Alternative because no additional facilities would be constructed.

Hawaiian Stilt, Hawaiian Common Moorhen, Hawaiian Coot, and Hawaiian Duck

The Nu‘upia Ponds WMA on MCB Hawaii Kaneohe Bay provides important nesting and/or foraging habitat for each of these endangered waterbirds: the Hawaiian stilt, Hawaiian common moorhen, Hawaiian coot, and Hawaiian duck (see Chapter 7.8.4.1). Proposed construction under Alternatives 1 and 2 would be located more than 0.5 mile northwest of the Nu‘upia Ponds WMA boundary. Consequently, no habitat used by the endangered waterbirds would be directly impacted by construction disturbance. Because of the noise of ongoing activities at the installation, including air operations and ground vehicle traffic, these species are not expected to be indirectly affected by construction noise. In addition, no indirect impacts on aquatic habitats would occur because storm water runoff would not be directed to any surface waters within the WMA. As discussed in Chapters 8.1 and 8.2, annual Navy aircraft operations would decrease, and no increase would occur in noise levels compared to baseline conditions as a result of P-8A operations under any of the alternatives.

Based on the above analysis, the Navy has determined that the proposed action would have no effect on the Hawaiian stilt, Hawaiian common moorhen, Hawaiian coot, and Hawaiian duck. In addition, under NEPA, no significant impacts would occur to these endangered waterbirds at MCB Hawaii Kaneohe Bay.

The endangered waterbirds would not be impacted under the No Action Alternative because no additional facilities would be constructed and noise levels attributed to Navy aircraft operations would not increase.

Newell's Shearwater

Proposed construction at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would not affect any habitat used by this species for breeding. The Newell's shearwater could potentially forage near the shoreline and therefore be affected by artificial light or by permanent changes in water quality related to storm water discharge. As construction would occur during daylight hours and no new light-emitting structures would be constructed, no impacts related to artificial light would occur. Any water quality impacts would be expected to be minor and highly localized given implementation of on-site BMPs to reduce storm water runoff. Impacts during operation would be minor given the small area of new impervious surface added at the base and compliance with NPDES permitting requirements for storm water quality. Consequently, the Navy has determined that the proposed action would have no effect on the Newell's shearwater. In addition, under NEPA, no significant impacts would occur to the Newell's shearwater at MCB Hawaii Kaneohe Bay.

The Newell's shearwater would not be impacted under the No Action Alternative because no additional facilities would be constructed and noise levels attributed to Navy aircraft operations would not increase.

Hawaiian Hoary Bat

As noted in Chapter 7.8.4.1, there are no incidental records of hoary bats on the Mokapu Peninsula, and this species has not been documented at MCB Hawaii Kaneohe Bay. Moreover, no habitats on the base that could potentially support the occurrence of this species would be affected by construction activities under Alternatives 1 and 2. Therefore, the Navy has determined that the proposed action under any of the alternatives would have no effect on the Hawaiian hoary bat.

8.8.4.2 NMFS-Managed Species

Five of the 16 federally listed threatened and endangered species identified as potentially occurring on or in the immediate vicinity of MCB Hawaii Kaneohe Bay are aquatic species managed by NMFS, including the Hawaiian monk seal, humpback whale, sperm whale, green sea turtle, and hawksbill sea turtle. Proposed construction at MCB Hawaii Kaneohe Bay under Alternatives 1 and 2 would not directly affect any of the aquatic habitats that could be inhabited by these species. Furthermore, the proper implementation of measures outlined in Chapter 8.7 to control storm water runoff from construction sites would prevent the degradation of water quality in the marine waters surrounding the base. Any increase in storm water discharge from the addition of up to 1.1 acres of new impervious surface at MCB Hawaii Kaneohe Bay may affect but is not likely to adversely affect the humpback whale, sperm whale, Hawaiian monk seal, green sea turtle, and hawksbill sea turtle as these species could potentially forage near the shoreline and therefore be affected by changes in water quality related to storm water discharge. However, any impacts during construction would be expected to be highly localized based on implementation of on-site BMPs to reduce storm water runoff. Impacts during operation, given the small area of new impervious surface added at the base and compliance with NPDES permitting requirements for storm water quality, would be minor.

As discussed in Chapters 8.1 and 8.2, annual Navy aircraft operations would decrease, and no increase would be expected to occur in noise levels as a result of P-8A operations under any of the alternatives. As such, marine species in the vicinity of MCB Hawaii Kaneohe Bay would not be exposed to any additional or louder single-event noise levels during P-8A operations associated with the proposed action.

The Navy previously determined in the 2008 FEIS that construction and operations of the P-8A at MCB Hawaii Kaneohe Bay may affect but is not likely to adversely affect the Hawaiian monk seal, humpback whale, sperm whale, green sea turtle, and hawksbill sea turtle. NMFS, in a letter dated July 25, 2008, concurred with the Navy's findings (NMFS 2008).

It was concluded by NMFS that the effects to the identified federally listed species would be insignificant or discountable. Changes in construction and air operations planned under the proposed action alternatives do not represent a significant project change sufficient to cause new or additional impacts to any of the above NMFS-managed species. Specifically, the construction footprint is approximately 4.5 acres smaller than what was considered and consulted on in 2008. Consequently, there would be no increase in storm water quantity and/or decrease in water quality being discharged into Kaneohe Bay over what was previously evaluated. The number of P-8A aircraft operations is also less than what was considered in the 2008 consultation. Therefore, the Navy considers the 2008 NMFS concurrence to be valid for the proposed action alternatives.

NMFS-managed species would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

8.8.5 Marine Mammals

Non-ESA listed species protected under the MMPA known to commonly occur in the nearshore marine waters adjacent to MCB Hawaii Kaneohe Bay include the Hawaiian spinner dolphin, common bottlenose dolphin, and false killer whale. As discussed above, the Hawaiian monk seal, humpback whale, and sperm whale would not be affected by construction activities or aircraft operations at MCB Hawaii Kaneohe Bay under any of the proposed alternatives. Based on the analysis presented above, the same impact assessment applies to the Hawaiian spinner dolphin, common bottlenose dolphin, and false killer whale. Increased storm water discharges into Kaneohe Bay could have a negligible and highly localized impact on dolphin species foraging along the western shoreline of MCB Hawaii Kaneohe Bay. However, these discharges are discountable, given the small area of new impervious surface added at the base, implementation of on-site BMPs to reduce storm water runoff, and compliance with NPDES permitting requirements for storm water quality. Consequently, the Navy has determined that the proposed action would not result in reasonably foreseeable "takes" of a marine mammal species by harassment, injury, or mortality as defined under the MMPA. In addition, under NEPA, there would be no significant impact on marine mammals in the vicinity of MCB Hawaii Kaneohe Bay under the proposed action alternatives.

Marine mammals would not be impacted under the No Action Alternative because no additional facilities would be constructed and baseline aircraft operations would not change.

Conclusion

Overall, implementation of the proposed action at MCB Hawaii Kaneohe Bay would not result in significant impacts to biological resources. Proposed construction activities would primarily impact previously disturbed or actively managed areas; no unique or critical vegetation habitats would be impacted. Short-term noise increases from construction could temporarily displace wildlife and migratory birds; however, noise from ongoing operations at the base would likely be greater than construction noise. Noise levels associated with aircraft operations under both of the action alternatives would not result in significant impacts to wildlife and migratory birds because overall noise levels at MCB Hawaii Kaneohe Bay are not expected to increase compared to baseline conditions. There would be no significant impacts to ESA-listed species or marine mammals under any of the action alternatives.

8.9 Cultural Resources

The potential effects of the proposed action are being assessed by considering any changes to historic structures (Chapter 8.9.1), archaeological resources (Chapter 8.9.2), and Native Hawaiian resources (Chapter 8.9.3).

Under NEPA, cultural resources within a project area are identified, including archaeological resources, architectural or built resources, and Native Hawaiian resources. Under Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800, the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking must identify historic properties within a proposed project's APE and consider the effects of the proposed undertaking on these properties.

Under NEPA, the evaluation of impacts of a proposed action on cultural resources, including archaeological resources, architectural or built resources, and Native Hawaiian resources are considered in terms of direct or indirect impacts that are permanent or temporary (long-term or short-term). Where appropriate, impacts on cultural resources were also considered in terms of beneficial or negative impacts.

Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800 require the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally financed undertaking to consider the effects of the proposed undertaking on historic properties. The effects of the impacts of the proposed action on historic properties are being evaluated in accordance with 36 CFR 800.4(d) and 800.5(d), including the ACHP's *Criteria of Adverse Effect* in 36 CFR 800.5(a)(1). The criteria of adverse effect are listed in Table 8-14.

Table 8-14 Criteria of Adverse Effects on Historic Properties

Criteria of Adverse Effect
"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or cumulative" (36 CFR 800.5[a][1]).
Examples of Adverse Effect
"Adverse effects on historic properties include but are not limited to: ■ Physical destruction of or damage to all or part of the property ■ Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines ■ Removal of the property from its historic location ■ Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance ■ Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features ■ Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization ■ Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance" (36 CFR 800.5[a][2]).

Source: ACHP 2004.

8.9.1 Architectural Resources

As discussed in Chapter 7.9.1, Hangar 104 is a contributing element of the NRHP-eligible NAS Kaneohe Bay Aviation District. None of the other architectural or built resources within the APE that would be impacted by the proposed action are considered historic properties.

The high bay area of Hangar 104 would be renovated to support equipment storage and provide space for maintenance. The total area of the high bay renovation would include 10,301 square feet. The USMC has determined that the proposed construction activities will have no adverse effects on historic properties that are architectural resources because the proposed interior renovation of Hangar 104 will not be visible from the exterior of the building and will not alter the integrity of the hangar. As part of the effects determination pursuant to Section 106 of the NHPA and implementing regulations for Section 106 at 36 CFR Part 800, the USMC consulted with the Hawaii SHPO regarding potential direct and indirect effects of proposed construction activities on Hangar 104 and the NAS Kaneohe Bay Aviation District (George 2013). The Hawaii SHPO concurred with the USMC's determination of no adverse effect to historic properties (Westfall 2013).

Architectural resources would not be impacted or affected under the No Action Alternative because no construction would occur under this alternative.

8.9.2 Archaeological Resources

No direct impacts on archaeological resources would be expected as a result of proposed construction under Alternatives 1 and 2 because no archaeological resources have been identified within the APE. In keeping with previous recommendations for the proposed Aircraft Rinse Facility location (Anderson and Schilz 1993:25-26, Anderson 1997:23, as cited in Tomonari-Tuggle 2013), the Navy will implement archaeological monitoring during construction involving excavation in this area, particularly due to the identification of a traditional Native Hawaiian archaeological site located southeast and outside the APE for the proposed Aircraft Rinse Facility location (Filimoehala et al. 2012, as cited in Tomonari-Tuggle 2013).

The USMC has determined that the proposed construction activities will have no adverse effects on historic properties that are archaeological resources because the area for the proposed taxiway extension and rinse facility expansion was previously disturbed, and no archaeological sites or deposits are located within the proposed construction areas. Additionally, an archaeologist will monitor excavations because sand fill is located in the proposed construction areas and has the potential to contain cultural items (including human skeletal materials) as defined in the NAGPRA. In the event that NAGPRA cultural items (including human skeletal materials) are discovered, all work in the vicinity will stop, the remains will be stabilized and protected, and treatment will proceed under the authority of NAGPRA. As part of the effects determination pursuant to Section 106 of the NHPA and implementing regulations for Section 106 at 36 CFR Part 800, the USMC consulted with the Hawaii SHPO regarding the effects of proposed construction activities on archaeological resources (George 2013). The Hawaii SHPO concurred with the USMC's determination of no adverse effect to historic properties (Westfall 2013).

Archaeological resources would not be impacted or affected under the No Action Alternative because no construction would occur under this alternative.

8.9.3 Native Hawaiian Resources

As noted in Chapter 7.9.3, one Native Hawaiian archaeological site, Site 7411, is present to the southeast and outside of the APE for the proposed Rinse Facility. The Navy will implement archaeological monitoring during construction involving excavation of the proposed Rinse Facility to ensure the Native Hawaiian archaeological site is not adversely impacted. Additionally, archaeological monitoring will be

implemented because sand fill is located in the proposed construction areas and has the potential to contain NAGPRA cultural items (including human skeletal materials). In the event that NAGPRA cultural items (including human skeletal materials) are discovered, all work in the vicinity will stop, the remains will be stabilized and protected, and treatment will proceed under the authority of NAGPRA.

Native Hawaiian resources would not be impacted or affected under the No Action Alternative because no construction would occur under this alternative.

Conclusion

Implementation of the action alternatives at MCB Hawaii Kaneohe Bay would have no adverse effect on architectural, archaeological, or Native Hawaiian resources. Archaeological monitoring will be conducted during construction of the Aircraft Rinse Facility due to a documented archaeological site nearby. The Hawaii SHPO has concurred with the USMC's determination of no adverse effect to historic properties at MCB Hawaii Kaneohe Bay.

8.10 Hazardous Materials and Waste Management

The analysis of hazardous materials, hazardous waste, and contaminated sites focuses on the potential for these substances to be introduced into the environment from aircraft operations and maintenance, or during construction/demolition activities. Potentially affected areas include the airfields and aircraft support and maintenance facilities. Factors considered in the analysis include the potential for increased human health risk or environmental exposure, as well as changes in the quantity and types of hazardous substances transported, stored, used, and disposed. The methodology for contaminated sites compares the proximity of proposed facility development to contaminated sites and considers the operational uses of the facilities to determine potential impacts on or from the sites.

Operation and maintenance of the P-8A aircraft under both alternatives would not introduce any new hazardous materials and/or waste streams that cannot be managed by existing hazardous material and waste management functions and facilities at MCB Hawaii Kaneohe Bay. The addition of P-8A aircraft would not result in significant impacts with regard to the handling, use, storage, or disposal of fuel, oils, and lubricants at MCB Hawaii Kaneohe Bay. All wastes would continue to be collected, managed, and stored on site in accordance with MCB Hawaii Kaneohe Bay's RCRA Part B operating permit. With new aircraft requiring less maintenance, incorporation of the appropriate procedures for handling of hazardous materials, and the application of BMPs for the management of hazardous substances and spill response at MCB Hawaii Kaneohe Bay, the proposed action would have no adverse impacts related to hazardous materials and the waste management program.

Environmental Restoration Program Sites

The proposed action would not interfere with any ongoing remedial programs at MCB Hawaii Kaneohe Bay, and none of the proposed construction projects under both of the alternatives would result in potentially hazardous exposure of on-site personnel. None of the construction projects under Alternatives 1 and 2 would require large-scale removal or disturbance of surface soil, subsurface soil, groundwater, or existing groundcover near or within any ERP site. Therefore, contaminated media would not likely be encountered near ERP site locations.

Conclusion

Overall, implementation of the action alternatives at MCB Hawaii Kaneohe Bay would not result in significant impacts on public health and safety from hazardous materials and waste related to the proposed P-8A operations. Hazardous waste management activities would follow existing procedures for the safe handling, use, and disposal of hazardous substances and waste.

8.11 Safety

This assessment examines how the proposed action would affect flight safety (Chapter 8.11.1) and BASH (Chapter 8.11.2). Environmental health and safety risks to children are analyzed in Chapter 8.5.5.

8.11.1 Flight Safety

There is no generally recognized threshold of air safety that defines acceptable or unacceptable conditions. Instead, the focus of airspace managers is to reduce risks through a number of measures. These include, but are not limited to, providing and disseminating information to airspace users, requiring appropriate levels of training for those using the airspace, setting appropriate standards for equipment performance and maintenance, defining rules governing the use of airspace, and assigning appropriate and well-defined responsibilities to the users and managers of the airspace. When these measures are implemented, risks are minimized, even though they can never be eliminated. Analysis of flight risks correlates Class A mishap rates and BASH with projected airfield utilization.

Implementation of Alternatives 1 and 2 at MCB Hawaii Kaneohe Bay would reduce the annual Navy aircraft air operations. The 99-percent decrease in Navy aircraft operations under Alternatives 1 and 2 would reduce the potential for aircraft incidents at MCB Hawaii Kaneohe Bay and in the community. In addition, current airspace safety procedures, maintenance, training, and inspections discussed previously would continue to be implemented, and additional airfield flight operations would adhere to established safety procedures. Modeling, simulation, and ground tests of new aircraft reduce the uncertainties of flight testing, and the subsequent flight-test program includes efforts to ensure flight safety and to reduce risks associated with the operation of new aircraft. In all cases, each new aircraft type has met all required standards prior to certification. While it is generally difficult to project future safety/mishap rates for any new aircraft, the P-8A is a military variant of the commercial Boeing 737 aircraft, which has a well-documented and established safety record as one of the most reliable aircraft currently in operation.

No changes to established clear zones, APZs, or other established airfield safety features would be required. Therefore, with more simulator training and new aircraft, the potential for aircraft mishaps would be similar if not improved compared to existing conditions.

Because the P-8A would be a new airframe at the base, it would require an update to response plans specific to the P-8A and associated equipment, including the emergency and mishap response plans. With development and implementation of these plans, no increase in the potential safety risk from the P-8A operational training actions would be expected for MCB Hawaii Kaneohe Bay airfield airspace.

8.11.2 Bird/Wildlife Aircraft Strike Hazards

No aspect of the action alternatives or the No Action Alternative would create attractants with the potential to increase the concentration of birds in the vicinity of the airfield. Therefore, considering the decrease in annual air operations for both of the action alternatives and the use of existing flight tracks, the BASH risk would remain the same, if not decrease, at MCB Hawaii Kaneohe Bay.

Conclusion

Overall, implementation of the action alternatives at MCB Hawaii Kaneohe Bay would not result in adverse impacts on safety from the transition of P-3C to P-8A aircraft. P-8A operations would decrease under each action alternative when compared with baseline P-3C operations, and extensive use of flight simulators would minimize the risk associated with aircraft mishaps due to pilot error.

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9 Cumulative Impacts

The CEQ regulations stipulate the cumulative effects analysis within an EIS should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). CEQ guidance regarding cumulative effects involves defining the scope of other actions and their interrelationship with the proposed action. The scope must consider geographical and temporal overlaps among the proposed action and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative impacts can result from individually minor but collectively significant actions that are expected to occur in a similar location or during a similar time period. Accordingly, a cumulative impacts analysis must identify and define the scope of other actions and their relationship with the proposed action or its alternatives if there is an overlap in space and time. Actions overlapping with or in proximity to the proposed action would be expected to have a greater potential for a relationship than those more geographically separated.

The following questions were considered in identifying the potential for cumulative effects:

- Does a relationship exist such that affected resource areas of the proposed action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

The scope of the cumulative effects analysis involves the geographic extent of the potential effects and the timeframe in which the effects could be expected to occur. It is possible that analysis of cumulative impacts may go beyond the scope of the project-specific direct and indirect impacts to include expanded geographic and time boundaries and a focus on broad resource sustainability. This "big picture" approach is becoming increasingly important as growing evidence suggests the most significant impacts result not from the direct impact of a particular action but from the combination of individual, often minor, impacts of multiple actions over time. The underlying issue is whether or not a resource can adequately recover from the impact of an action before the environment is exposed to a subsequent action or actions.

Various types of past, present, and reasonably foreseeable actions not related to the proposed action have the potential to affect the resources identified in the existing environment chapters of this SEIS. The overview of these actions in this chapter emphasizes components of the activities relevant to the impact analysis in environmental consequences chapters. Geographic distribution, intensity, duration, and historical effects of similar activities are considered when determining whether a particular activity may contribute cumulatively and significantly to the impacts of the proposed action on the resource areas identified in the existing environment.

For the purposes of this analysis, public documents prepared by federal, state, and local agencies were the primary sources of information for identifying reasonably foreseeable actions. Government agencies were also contacted to determine proposed development and transportation projects that could pose cumulative impacts when considered with the proposed action. The focus of this cumulative impact analysis was on:

- Actions occurring within the alternative home basing installations, including NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay, and
- Actions occurring within the local communities surrounding the alternative home basing installations.

Cumulative impacts are identified by home base location in the following subchapters. If the proposed action does not result in a direct or indirect impact to a resource area, then no further analysis of potential cumulative effects is necessary.

9.1 NAS Jacksonville

As discussed in Chapter 4, environmental impacts resulting from implementation of the proposed action at NAS Jacksonville are related to airspace and aircraft operations, noise, air quality, socioeconomics, and water resources. Potential cumulative impacts related to each of these resources are evaluated below.

9.1.1 Federal Actions

Table 9-1 describes actions at NAS Jacksonville that have been determined to be relevant to the analysis of cumulative impacts associated with the proposed action. In addition to the listed actions, other fixed-wing and helicopter aircraft would continue to operate at NAS Jacksonville for the foreseeable future.

Projects are proposed at NAS Jacksonville that could interact directly or indirectly with the proposed action because of geographic proximity. These consist of military construction projects or other ongoing projects and include the following:

- Alterations to VP 30 Hangar. This project would entail extending the hangar doors on the VP 30 Hangar to accommodate aircraft with a wider wingspan.
- Broad Area Maritime Surveillance (BAMS) Mission Control Complex. This project would demolish an existing building and surface parking area to construct in its place a BAMS Mission Control Complex, a two-story, approximately 34, 000- square-foot building. The new building is approximately half the size of the building it is replacing, representing a reduction in impervious surface. It is reasonable to expect this action could result in additional personnel being based at NAS Jacksonville; however, this potential action is in the early stages of development and is too speculative for detailed analysis in this SEIS. Separate NEPA documentation will be prepared to identify and evaluate the potential environmental impacts associated with additional personnel.
- Repairs to Bachelor Quarters. This project would consist of repairs to Building 846, bachelor quarters, and entail a new heating, ventilation, and air conditioning system and improvements to the exterior façade of the building.
- Repair Airfield Pavements. This project would resurface and remark existing airfield pavement.
- Replace Airfield Lighting. This is an energy project to replace and bring into compliance all airfield lighting and signage.
- Construct New Commissary. This project would demolish the existing commissary and construct a new commissary at the same location. This project would include low-impact design features.
- BAMS Mission Control Systems Facility Expansion. This project would construct an approximately 12,000-square foot addition to the BAMS Mission Control Complex. This

project, a planned expansion of the previously mentioned BAMS Mission Control Complex, would commence at some time period (several years, yet to be determined based on funding opportunities) after completion of the original project.

Table 9-1 Federal Actions Considered in the Cumulative Impacts Analysis for NAS Jacksonville

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/To Occur
Navy	Disestablish Special Projects Patrol Squadrons	The Navy has made the decision to disestablish two VPU squadrons operating P-3C aircraft. VPU-1, based at NAS Jacksonville, disestablished in April 2012. A portion of the squadron's aircraft and personnel were absorbed by VPU-2 at MCB Hawaii Kaneohe Bay. VPU-2 will disestablish at MCB Hawaii Kaneohe Bay before 2020.	2012 - 2020
Navy	MH-60R Apron and Repairs	Repair existing MH-60R parking apron and provide approximately 325,000 square feet of additional MH-60R helicopter parking apron.	2014 - 2015
Navy	Atlantic Fleet Training and Testing EIS/OEIS	An EIS/OEIS has been prepared to identify and evaluate the potential environmental impacts associated with training and testing in the AFTT Study Area. The Navy released the Draft EIS/OEIS in May and June 2012; the Final EIS/OEIS was released for public review in August 2013. The ROD was signed on November 25, 2013, and a notice of this signing was published in the *Federal Register* on December 2, 2013. The AFTT Study Area includes the western Atlantic Ocean, Gulf of Mexico, and parts of the Caribbean Sea. Within this area, training is conducted within the seaspace and airspace within at-sea portions of the range complexes and testing and training ranges, including at-sea areas where P-3C and P-8A aircraft train. As part of the EIS/OEIS, the Navy expanded the Study Area and made adjustments to types and levels of activities to support current and planned Navy training and testing requirements.	2014 – 2019

All of these proposed military construction projects have limited potential to interact with impacts from the proposed action because the impacts of the proposed action result primarily from noise and air emission changes associated with newer aircraft or with changes in population at NAS Jacksonville. None of these construction projects would have such impacts. Several of these construction projects have the potential to interact with impacts of the proposed action in a positive manner by providing additional base support infrastructure; by implementing sustainable design features, such as low impact design; and by reducing the amount of impervious surface at NAS Jacksonville.

9.1.2 Non-Federal Actions

To identify non-federal projects that should be included in the cumulative impacts analysis, the Navy reviewed community planning documents including comprehensive plans, master plans, regional transportation plans, and other local planning board initiatives. The Navy has not identified any proposed, new, non-federal actions in the vicinity of NAS Jacksonville that would interact with the proposed action and contribute to cumulative impacts on airspace and airfield operations, noise, air quality, socioeconomics, or water resources. Ongoing non-federal activities in the vicinity of NAS Jacksonville related to the analysis of cumulative impacts include vehicle traffic on the regional roadway network and aircraft operating from the Jacksonville International Airport, Cecil Commerce Center, and other airports in the region.

9.1.3 Cumulative Impact Analysis

9.1.3.1 Airspace and Airfield Operations

The past, present, or reasonably foreseeable actions that have a potential to interact with the proposed action and cumulatively impact airspace and airfield operations are the disestablishment of VPU Squadrons operating P-3C aircraft at NAS Jacksonville and the AFTT EIS/OEIS training activities.

Disestablish Special Projects Patrol Squadrons

The 2014 baseline and action alternatives for this SEIS considered the elimination of annual VPU-1 air operations.

Atlantic Fleet Training and Testing EIS

The airspace-related activities associated with the AFTT EIS/OEIS project include additional operations in airspace offshore of NAS Jacksonville. Aircraft were already operating in this airspace, and no significant changes in the types of airspace classifications and uses will occur.

Proposed Action

The proposed action would not affect local Jacksonville area civil and commercial aviation airspace use because the P-8A operates within the same flight parameters currently used for NAS Jacksonville airspace. Additionally, none of the action alternatives would have an adverse impact to civil aviation transiting airspace under NAS Jacksonville ATC control. While the number of aircraft home based at NAS Jacksonville would increase, overall aircraft operations would decrease under Alternatives 1 and 2 compared to baseline operations. Consequently, the opportunity for civil aviation to transit existing airspace would not be reduced.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The proposed action's decrease of up to 11 percent in aircraft operating in the NAS Jacksonville controlled airspace, combined with the disestablishment of VPU capabilities at NAS Jacksonville and additional training in the AFTT Study Area, would not require changes in the types of classification or civilian and commercial use of the airspace.

9.1.3.2 Noise

The only past, present, or reasonably foreseeable action that has a potential to interact with the proposed action and cumulatively impact airspace and airfield operations is the disestablishment of VPU squadrons operating P-3C aircraft at NAS Jacksonville.

Disestablish Special Projects Patrol Squadrons

The disestablishment of the VPU mission, completed in April 2012, resulted in fewer air operations and a corresponding elimination of aircraft-related noise from this mission. The modeled 2014 baseline and

2020 proposed action alternative noise contours for this SEIS incorporated the elimination of VPU-1 annual air operations.

Proposed Action

Implementation of the proposed action alternatives would not result in significant operational noise impacts at NAS Jacksonville because the change in acreage and population exposed to aircraft noise levels would not be significant. Supplemental noise analyses for aircraft operations indicate minor fluctuations for speech interference, classroom noise, and sleep disturbance. Construction-related noise impacts associated with the proposed action would be limited to the airfield, would be intermittent and temporary, and would be expected to occur only during an approximately 14-month construction period. Thus, no significant impacts on the existing noise environment would be anticipated.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

As previously stated, the modeled 2014 baseline and 2020 proposed action alternative noise contours incorporated the elimination of VPU-1 annual air operations. It has been determined that the proposed action, combined with the VPU-1 disestablishment, would have no significant impacts on the existing noise environment.

Other current aircraft operations at NAS Jacksonville and ongoing non-federal activities in the vicinity of the installation (i.e., vehicle and air traffic) would be expected to continue in the future at current levels. These activities, when combined with the proposed action, would not have significant cumulative impacts on noise.

9.1.3.3 Air Quality

Under all alternatives, the proposed action would result in a decrease in total emissions, or, in the case of construction emissions, that any increase in emissions would be temporary. As discussed above in 9.1.3.1, Airspace and Airfield Operations, overall operations will be reduced as a result of cumulative actions, resulting in a decrease in associated overall emissions. Therefore, the proposed action would not contribute to a cumulative impact on air quality in the region.

Other current aircraft operations at NAS Jacksonville and ongoing non-federal actions in the vicinity of the installation (i.e., vehicle and air traffic) would be expected to continue in the future at current levels. Consequently, these actions, when combined with the proposed action, would not have a significant cumulative impact on air quality.

Greenhouse Gases

As discussed in Chapter 3.3.1, scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere, and world-wide use of fossil fuel is the primary cause of that increase. On a national scale, federal agencies are addressing emissions of GHGs through reductions mandated by federal laws and EOs. Most recently, EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, were enacted to address GHGs, including GHG emissions inventory, reduction, and reporting. GHG emissions occur locally, but GHG impacts are global in both impacts and scale, and cumulative over time.

The draft CEQ NEPA GHG guidance, "Draft Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions," dated February 18, 2010, recommends that projects with an increase in GHGs over 25,000 metric tons (MT) be evaluated with a quantitative assessment. Since all emissions from the proposed action decrease, GHGs would decrease. Therefore, the proposed action would not contribute to an increase in GHG emissions in the region.

9.1.3.4 Socioeconomics

The only identified past, present, or reasonably foreseeable action that has a potential to interact with the proposed action and cumulatively impact socioeconomics is the disestablishment of the VPU squadron operating P-3C aircraft at NAS Jacksonville.

Disestablish Special Projects Patrol Squadrons

The disestablishment of the VPU mission, completed in April 2012, resulted in a slight reduction in personnel at NAS Jacksonville.

Proposed Action

Implementation of Alternative 1 or 2 would result in minor impacts on the personnel loading at NAS Jacksonville and on total population in the region. Total P-8A personnel loading at NAS Jacksonville would decrease under Alternatives 1 and 2 compared to baseline P-3C and P-8A personnel loading. These personnel loading levels represent a decrease of 422 P-3C/P-8A personnel under Alternative 1 (a 16-percent decrease) and a decrease of 687 P-3C/P-8A personnel under Alternative 2 (a 26-percent decrease).

Implementation of Alternative 1 would be expected to reduce the number of military personnel and dependents in the Jacksonville area by 919 persons compared to 2014 levels. This decrease in population would represent a decrease of approximately 0.1 percent to the projected population of Duval County in 2020. Likewise, implementation of Alternative 2 would be expected to decrease the total population in Duval County by 1,520 personnel and dependents, which equates to approximately 0.2 percent of the county's projected 2020 population. This change in population would be minor relative to the size of the regional population.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The reduction in personnel loading at NAS Jacksonville under either alternative, combined with the slight reduction in personnel that already occurred from the disestablishment of the VPU mission, would cumulatively impact regional population. However, the cumulative impact would not be significant because the combined decrease would total less than 1 percent of the regional population.

9.1.3.5 Water Resources

The only identified past, present, or reasonably foreseeable action that has a potential to interact with the proposed action and cumulatively impact water resources is the MH-60R apron and repairs at NAS Jacksonville.

MH-60R Apron and Repairs

The repair and extension of the existing MH-60R parking apron would require ground-disturbing activities as part of this project. Construction would occur on existing paved surfaces and maintained lawn and landscaped areas. Water quality would not be significantly impacted by construction. Runoff from the addition of 7.4 acres of impervious surface resulting from the construction of the new apron extension is anticipated to be retained on-site. Discharge of this surface water would meet the conditions of NAS Jacksonville's NPDES permit. No wetlands or waters of the U.S. would be impacted. Thus, no significant impacts to water resources would be expected.

Proposed Action

The proposed infrastructure development would increase storm water runoff from NAS Jacksonville. The new construction to support the continued transition of P-3C aircraft to P-8A aircraft would create approximately 12.89 acres of new impervious surface under either action alternative. To maintain water quality during construction, the action alternatives would incorporate storm water mitigation measures

including sediment basins, silt fencing, and berms, or a combination of these measures. During operation, storm water would be discharged into the installation's existing storm water conveyance system via sheet flow or grass-lined swales. Based on discussion with NAS Jacksonville natural resources personnel, additional storm water runoff would be directed to an existing storm water detention pond located approximately 2,000 feet from the end of the proposed overrun. Storm water discharge would comply with the conditions of NAS Jacksonville's current NPDES permit; therefore, the construction at the station under the proposed action alternatives would not have a significant impact on water quality.

Combined Impacts of Past, Present, and Reasonably Foreseeable Actions

When all past, present, and reasonably foreseeable future actions are examined together, there would be a net increase in storm water discharge at NAS Jacksonville. Storm water discharge generated from the repair and expansion of the MH-60R parking apron along with the new impervious surface to support the P-8A operations would discharge into the existing storm water conveyance system via sheet flow or grass-lined swales. This discharge would continue to comply with the conditions of NAS Jacksonville's NPDES permit. Consequently, the proposed action when considered with other past, present, and future actions could cumulatively impact water resources but would not be anticipated to have a significant cumulative impact.

9.2 NAS Whidbey Island

As discussed in Chapter 6, environmental impacts resulting from implementation of the proposed action at NAS Whidbey Island are related to airspace and airfield operations, noise, air quality, land use, socioeconomics, water resources and wetlands, and biological resources. Potential cumulative impacts related to each of these resources are evaluated below.

Based on a review of past, present, and reasonably foreseeable actions at NAS Whidbey Island and in the local community, it was determined that several actions have the potential to result in a cumulative impact with the proposed action. The projects listed in this subchapter are those that have the greatest potential to cumulatively impact the resources assessed in this SEIS. These projects are described below and the impacts of these projects, in combination with the impacts of the proposed action, are described in Chapter 9.2.3.

9.2.1 Federal Actions

Table 9-2 describes actions at NAS Whidbey Island that have been determined to be relevant to the analysis of cumulative impacts associated with the proposed action. In addition to the listed actions, other fixed-wing and helicopter aircraft would continue to operate at NAS Whidbey Island for the foreseeable future.

Table 9-2 Federal Actions Considered in the Cumulative Impacts Analysis for NAS Whidbey Island

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
Navy	Northwest Training Range Complex EIS/OEIS	A Record of Decision for the EIS/OEIS was signed in October of 2010. The EIS/OEIS identifies and evaluated the potential environmental consequences associated with training and testing activities, primarily within existing range complexes, OPAREAs, and testing ranges in the Pacific Northwest. The range consists of ocean OPAREAs, special use airspace, and land-based training areas from 250 nautical miles west of the coasts of Northern California, Oregon, and Washington inland to the Washington/Idaho border, including Military Operating Areas and training areas in the vicinity of NAS Whidbey Island. The Navy evaluated the impacts of increases in training activities, including those that would be needed as a result of changes in basing locations for ships, aircraft, and personnel (force structure changes) and impacts of providing for range enhancements in the Northwest Training Range Complex. Baseline training activities will increase, and training activities associated with force structure changes will be implemented for the EA-18G Growler, Guided Missile Submarine, P-8A, unmanned aerial systems, air-to-air missiles, and sonobuoys. Most training activities in the inshore area will increase, but mine countermeasure activities will decrease. Underwater detonations will decrease from 60 detonations per year to two detonations per year at Crescent Harbor, and no more than two underwater detonations per year will take place at Floral Point (Naval Base Kitsap Bangor), for a maximum of four detonations per year (Navy 2010).	Ongoing

Table 9-2 Federal Actions Considered in the Cumulative Impacts Analysis for NAS Whidbey Island

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
Navy	Transition of Expeditionary EA-6B Prowler Aircraft with EA-18G Growler Aircraft	A FONSI for the EA was signed on October 30, 2012. This EA analyzed the potential environmental effects of transitioning the Expeditionary VAQ squadrons at NAS Whidbey Island from the retiring EA-6B Prowler to the EA-18G Growler in the 2012-2014 timeframe. The action includes retaining the Expeditionary VAQ mission capabilities at NAS Whidbey Island; performing the in-place transition of three existing Expeditionary VAQ squadrons home based at NAS Whidbey Island from the EA-6B aircraft to the EA-18G aircraft; potentially relocating one Reserve Expeditionary VAQ EA-6B squadron from Joint Base Andrews to NAS Whidbey Island and transitioning from the EA-6B aircraft to the EA-18G aircraft; adding up to 11 EA-18G aircraft to the FRS at NAS Whidbey Island to support the Expeditionary VAQ community; modifying certain facilities at Ault Field to provide infrastructure and functions to support the new aircraft; and a modest increase in personnel to support the Expeditionary VAQ community. The purpose of the transition is to provide deployable, land-based Expeditionary VAQ community assets that meet DoD requirements. It is assumed that the in-place transitions and relocation of the reserve squadron, if directed, will be completed prior to the arrival of P-8A aircraft at NAS Whidbey Island.	2012-2014

Table 9-2 Federal Actions Considered in the Cumulative Impacts Analysis for NAS Whidbey Island

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
Navy	Northwest Training and Testing EIS/OEIS	An EIS/OEIS is being prepared to identify and evaluate the potential environmental consequences associated with training and testing activities, primarily within existing range complexes, OPAREAs, and testing ranges in the Pacific Northwest. An NOI was published on February 27, 2012. The DEIS was released to the public in January 2014. This EIS/OEIS is to reassess and consolidate environmental analyses of Navy at-sea training and testing activities contained in previous NEPA and environmental planning documents, including the NWTRC EIS/OEIS. The study area for this EIS/OEIS includes training within the following existing range complexes and facilities: (1) the Northwest Training Range Complex, (2) the Naval Undersea Warfare Center Keyport Range Complex, and (3) the Southeast Alaska Acoustic Measurement Facility. Additionally, the proposed action includes the resumption of testing activities in Carr Inlet Operations Area, and the proposed action includes pier-side sonar testing at Naval Base Kitsap Bremerton, Naval Base Kitsap Bangor, and Naval Station Everett. The Navy is proposing to conduct training and testing primarily within existing range complexes, OPAREAs, testing ranges, and selected Navy pier-side locations in the Pacific Northwest. The purpose of the proposed action is to conduct training and testing to ensure the Navy accomplishes its mission to maintain, train, and equip combat-ready military forces. This analysis will reassess the environmental analyses of Navy at-sea training and testing activities contained in two previous EISs/OEISs and various environmental planning documents, and consolidate these analyses into a single environmental planning document. This reassessment will support reauthorization of permits under the Marine Mammal Protection Act and the Endangered Species Act for activities to be carried out from 2015 to 2020.	2015-2020

Table 9-2 Federal Actions Considered in the Cumulative Impacts Analysis for NAS Whidbey Island

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
Navy	NAS Whidbey Island Petroleum, Oil, and Lubricants Pipeline	The Navy would construct 4.4 miles of 12-inch underground petroleum, oil, and lubricants pipeline from storage tanks located on Seaplane Base to storage tanks located on NAS Whidbey Island and decommission two existing 55-year-old pipelines. The existing pipelines would be used as conduits for communication systems or decommissioned by draining, plugging, and abandoning them in compliance with environmental requirements.	FY 2012
Navy	Fuel Pier Breakwater Construction and Finger Pier Demolition	Demolition of a 536-foot-long finger pier and construction of a 320-foot-long partial depth sheet-pile breakwater at NAS Whidbey Island Seaplane Base.	FY 2014
Navy	Replacement of the C-9 Aircraft with the C-40 Aircraft	The four C-9 Skytrain II aircraft stationed at NAS Whidbey Island would be replaced by three C-40 Clipper aircraft. This action is not anticipated to impact the number of personnel assigned to the Fleet Logistics Support Squadron.	FY 2015
Navy	Pacific Northwest Electronic Warfare Range EA	This EA analyzes the potential impacts of actions associated with the installation and operation of an electronic warfare (EW) range in Washington. The scope of this EA is three previously unanalyzed components of operating the proposed Pacific Northwest EW range: (1) the fixed emitter at NAS Everett Annex Pacific Beach, (2) the movement of the mobile emitters (in both the Olympic Peninsula and Okanogan), and (3) the operation of the EW emitters.	Ongoing
Navy	EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island	An EIS is being prepared to identify and evaluate the potential environmental consequences associated with ongoing and future EA-18G operations at NAS Whidbey Island's Ault Field and OLF Coupeville. The EIS is also evaluating the introduction of two additional expeditionary VAQ squadrons (a total of 10 additional EA-18G aircraft) and the addition of three EA-18G aircraft to the training squadron. Additionally, the EIS is addressing the construction and renovation of facilities at Ault Field over a three-year period to accommodate additional aircraft and the addition of 860 personnel and approximately 2,150 family members to NAS Whidbey Island and the surrounding community. An NOI was published on September 5, 2013. In December 2013, the Navy conducted a series of public scoping meetings. The Draft EIS is anticipated to be released to the public in spring 2015.	2015 - 2017

Table 9-2 Federal Actions Considered in the Cumulative Impacts Analysis for NAS Whidbey Island

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
Navy	Fleet Air Reconnaissance (VQ) Disestablishment	The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2019. VQ Squadron Two (VQ-2) was disestablished in FY 2012, and personnel were consolidated with VQ Squadron One (VQ-1). Personnel loading for VQ-1 following consolidation will be approximately 640.	2019

The following proposed military construction project at NAS Whidbey Island could interact directly or indirectly with the proposed action because of geographic proximity:

- Broad Area Maritime Surveillance Facility. This project would construct an approximately 30,000-square-foot BAMS facility to provide space and communications for two mission control stations that would control BAMS aircraft that fly from a remote location. The facility would be constructed on previously disturbed and impervious surface within the existing flight line.

This proposed military construction project has limited potential to interact with impacts from the proposed action because the impacts of the proposed action result primarily from noise and air emission changes associated with newer aircraft or with changes in population at NAS Whidbey Island. The proposed construction project would not have any such impacts. This construction project has the potential to interact with impacts of the proposed action in a positive manner by implementing sustainable design features, such as low-impact design.

9.2.2 Non-Federal Actions

To identify non-federal projects that should be included in the cumulative impacts analysis, the Navy reviewed community planning documents including comprehensive plans, master plans, regional transportation plans, and other local planning board initiatives. Table 9-3 describes actions surrounding NAS Whidbey Island that have been determined to be relevant to the analysis of cumulative impacts associated with the proposed action. In addition to the actions listed in Table 9-3, ongoing non-federal activities in the vicinity of NAS Whidbey Island related to the analysis of cumulative impacts include vehicle traffic on the regional roadway network and aircraft operating from numerous regional airports in Island and surrounding counties.

Table 9-3 Non-Federal Actions Considered in the Cumulative Impacts Analysis for NAS Whidbey Island

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
City of Oak Harbor	City of Oak Harbor Water System Improvements	The city is planning to construct improvements to its water system in order to replace aging infrastructure and meet minimum storage requirements over the next 20-year planning horizon. Improvements will include construction of a new water reservoir tank, which will be 150 feet in diameter and 39 feet tall, with a capacity of 4.0 million gallons, and a new booster station. The reservoir tank and booster station will be located off of Gun Club Road, south of Ault Field. Additionally, 5,700 feet of 18-inch and 24-inch water transmission mains will be installed along Gun Club Road from Oak Harbor Road to the reservoir site. Other, follow-on improvement projects may include extension of large-diameter mains and construction of pressure-regulating valve stations in the city's distribution system. The project will allow the city to supply water to Seaplane Base through its distribution system (City of Oak Harbor 2012).	2012 – 2019
City of Oak Harbor	Clean Water Facilities Planning	The City of Oak Harbor is planning to replace its two existing wastewater treatment facilities (WWTFs) with a new wastewater treatment system. The current facilities have neither the technology to meet modern water quality standards nor the capacity for the city's projected population growth. The new WWTF would use a membrane bioreactor wastewater treatment process and would discharge treated effluent to Oak Harbor (Matson 2011). The city is completing the facilities plan for the 50-acre Windjammer site.	2010 – 2017 Construction expected to begin in 2015

9.2.3 Cumulative Impact Analysis

9.2.3.1 Airspace and Airfield Operations

The past, present, or reasonably foreseeable actions that have a potential to interact with the proposed action and cumulatively impact airspace and airfield operations include the NWTRC EIS/OEIS, the transition of Expeditionary EA-6B Prowler squadrons to EA-18G Growler aircraft, the NWTT EIS/OEIS, the disestablishment of the VQ mission capabilities at NAS Whidbey Island by 2019, the EIS for EA-18G Growler operations at NAS Whidbey Island, and the replacement of the C-9 aircraft with the C-40 aircraft. A summary of relevant impacts of each action is provided below.

Northwest Training Range Complex EIS/OEIS

The airspace-related activities associated with the NWTRC EIS/OEIS project included additional operations in the inshore area around NAS Whidbey Island. Aircraft were already operating in this airspace, and no significant changes in the types of airspace classification and uses would occur.

Transition of the Expeditionary EA-6B Prowler Aircraft to the EA-18G Growler Aircraft

The transition of Expeditionary EA-6B Prowler squadrons to EA-18G Growler aircraft is increasing annual air operations by 3.1 percent (2,178 operations). The increase in operations would remain below the historical average for annual air operations at NAS Whidbey Island. Therefore, it was determined that no significant impacts would occur on airspace and airfield operations at Ault Field.

Northwest Training and Testing EIS/OEIS

The airspace-related activities associated with the NWTT EIS/OEIS include additional operations offshore of NAS Whidbey Island. Aircraft were already operating in this airspace, and no significant change in the types of aircraft classifications would occur. The NWTT EIS/OEIS will contain further discussion of cumulative impacts.

Replacement of Four C-9 Skytrain II Aircraft by Three C-40 Aircraft

Replacement of the C-9 Skytrain II aircraft has not been fully developed, so potential changes to airfield operations associated with this action cannot be assessed at this time. However, it would not be expected that the percentage of total aircraft operations conducted by the C-9 Skytrain II replacement aircraft, the C-40 Clipper, or the overall flight patterns of the aircraft, would change significantly as a result of the replacement actions. Consequently, it would be expected that impacts on airspace and airfield operations would not be significant.

EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island

This EIS for ongoing and future EA-18G operations at NAS Whidbey Island's Ault Field and OLF Coupeville, as well as the addition of two expeditionary VAQ squadrons (a total of 10 additional EA-18G aircraft) and the addition of three EA-18G aircraft to the training squadron at NAS Whidbey Island, is in the early stages of development; therefore, potential changes to airfield operations associated with this action cannot be assessed at this time. However, overall flight patterns of expeditionary VAQ aircraft would not be expected to change significantly as a result of adding the new squadrons. The EIS will identify and evaluate the potential environmental impacts associated with the additional expeditionary EA-18G aircraft, and this documentation will contain further discussion of cumulative impacts.

Disestablishment of the Fleet Air Reconnaissance VQ

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2019. The 2008 FEIS accounted for the VQ mission to be at NAS Whidbey Island beyond 2019. While the full scope of this action has not been fully developed, the potential changes to airfield operations associated with this action would be an anticipated decrease of approximately 4,700 EP-3 operations annually. Consequently, it would be expected that impacts on airspace and airfield operations would be positive.

Proposed Action

Under the proposed action, most pattern operations originating at Ault Field would be conducted within the Class C airspace over the airfield or within an up to 10-nm radius of the airfield (depending on altitude). The proposed annual air operations for P-8A aircraft, as well as the total annual operations for the airfield as a whole, would be projected to decrease under each of the action alternatives (see Tables 6-4 and 6-5) as compared with the 2014 baseline. Total annual airfield operations would be reduced by 8 to 10 percent, depending on the action alternative, while P-8A operations would be 17 percent (Alternative 1) to 20 percent (Alternative 2) less than baseline P-3C operations. The P-8A squadrons would not change the existing types of flight operations or flight tracks that are currently under use by the P-3C squadrons.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Each of the proposed projects would result in changes to the number of flight operations; some of these changes cannot be quantified at this time until NEPA documentation is completed (the EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island, and Replacement of the C-9 Skytrain II Aircraft), while some would decrease operations (the proposed action and disestablishment of Fleet Air Reconnaissance VQ). The proposed action's decrease of up to 15 percent in aircraft operations would partially offset any anticipated increases in operations from other proposed actions. Under either alternative, the six or seven proposed P-8A squadrons would fly fewer operations annually at Ault Field than current annual P-3C operations. Therefore, it is assumed that the reduced number of P-8A operations would offset any potential increase in future Expeditionary VAQ squadron operations at Ault Field without displacing Fleet EA-18G operations to OLF Coupeville. It would not be anticipated that the combination of ongoing projects and expected foreseeable projects would significantly change or increase the number of operations above baseline levels. No changes in the types of classification or civilian and commercial use of the airspace would be anticipated. Therefore, when considered in combination, cumulative impacts on airspace and airfield operations could occur but would not be expected to be significant.

9.2.3.2 Noise

The past, present, or reasonably foreseeable actions that have a potential to interact with the proposed action and cumulatively impact noise include the NWTRC EIS/OEIS training activities, the transition of Expeditionary EA-6B Prowler squadrons to EA-18G Growler aircraft EA, the NWTT EIS/OEIS, the disestablishment of the VQ mission capabilities at NAS Whidbey Island by 2019, the EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island**,** and the replacement of the C-9 aircraft with the C-40 aircraft. A summary of relevant impacts of each action is described below.

Northwest Training Range Complex EIS

The training activities associated with the NWTRC EIS/OEIS include additional aircraft training, including P-8A training activities, and underwater detonations in the inshore area around NAS Whidbey Island but not a large increase in aircraft overflights over terrestrial areas. Underwater detonations have been proposed to decrease from 58 per year to two per year at Crescent Harbor, resulting in a decrease in noise impacts from detonations. It was determined that no significant impact on noise receptors would occur from noise associated with surface ships, aircraft, weapons and target use, and explosive ordnance training.

Transition of the Expeditionary EA-6B Prowler Aircraft to the EA-18G Growler Aircraft

Aircraft operations associated with the transition of Expeditionary EA-6B Prowler squadrons to EA-18G Growler aircraft under both action alternatives would result in minor positive impacts due to the reduced size of the DNL[21] noise zones, which would result in at least 9 percent fewer people exposed to the greater than 65 dB DNL zone for Alternative 2.

Northwest Training and Testing EIS/OEIS

Underwater detonations at Crescent Harbor Explosive Ordnance Disposal Training Range, located approximately 2 miles southeast of NAS Whidbey Island, would increase from two, 2.5-lb. net explosive weight charges (E3 source class) per year to three, 2.5-lb. net explosive weight charges per year under both action alternatives. The total number of explosive training events in Crescent Harbor would also increase from the additional use of 18 shock wave action generators (SWAGs). The SWAG is composed of a cylindrical steel tube, 3 inches long by 1 inch wide, containing approximately 0.033 lb. of explosives.

[21] The DNL is a noise metric based on the number of air operations that occur on an average annual day at an installation over a 24-hour period.

The single explosive is highly focused. Divers place a single SWAG on the mine that is located mid-water column, within water depths of 10 to 12 feet. No increase in aircraft operations in airspace near NAS Whidbey Island is proposed.

Replacement of Four C-9 Skytrain II Aircraft by Three C-40 Aircraft

The replacement of four C-9 Skytrain II aircraft by three C-40 Clipper aircraft at NAS Whidbey Island has not been fully developed, so potential changes to the noise environment associated with this action cannot be assessed at this time. However, it would not be expected that the percentage of total aircraft operations conducted by the C-9 Skytrain II replacement aircraft, the C-40 Clipper, or the overall flight patterns of aircraft would change significantly as a result of the replacement action. Therefore, it would be expected that impacts to noise would be minor.

EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island

This EIS for ongoing and future EA-18G operations at NAS Whidbey Island's Ault Field and OLF Coupeville, as well as the addition of two expeditionary VAQ squadrons (a total of 10 additional EA-18G aircraft) and the addition of three EA-18G aircraft to the training squadron at NAS Whidbey Island, is in the early stages of development; therefore, potential changes to the noise environment associated with this action cannot be assessed at this time. The EIS will identify and evaluate the potential environmental impacts associated with the additional expeditionary EA-18G aircraft, and this documentation will contain further discussion of cumulative impacts.

VQ Squadron Disestablishment

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2019. The 2008 FEIS accounted for the VQ mission to be at NAS Whidbey Island beyond 2019. The full scope of this action has not been fully developed, so potential changes to the noise environment associated with this action cannot be assessed at this time. However, potential changes to airfield operations associated with this action would likely decrease by approximately 4,700 EP-3 operations annually. Therefore, noise impacts would likely be minor.

Proposed Action

Implementation of the proposed action would result in a less than 1-percent increase in off-station area within the 65 dB DNL or greater noise zone. Likewise, there would be a less than 1-percent change in the number of residents exposed to the 65 dB DNL or greater noise zone under each of the alternatives. Construction-related noise impacts associated with the proposed action would be limited to the airfield, would be intermittent and temporary, and would be expected to occur only during an approximately 24-month construction period. Thus, no significant impacts on the existing noise environment would be anticipated.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The proposed action would result in a less than 1-percent increase in the amount of land area within the greater than 65 dB noise zone in the vicinity of Whidbey Island. The C-40 is anticipated to be quieter than the C-9, and fewer of them would be home based at NAS Whidbey Island. The transition of the expeditionary EA-6B to the EA-18G has resulted in a reduction of DNL noise contours at Ault Field. Training activities associated with the NWTRC and NWTT EIS/OEIS would not cause significant impacts on noise receptors from noise associated with surface ships, aircraft, and underwater explosive ordnance training. Finally, the disestablishment of the VQ mission at NAS Whidbey Island is anticipated to result in fewer air operations and a correlating reduction in aircraft-related noise. As a result and when considered cumulatively, the noise environment would not be anticipated to be significantly different from baseline conditions because the increases in noise would likely be partially offset by decreases in projected annual air operations. Therefore, cumulative impacts on noise could occur but would not be expected to be significant.

Other current aircraft operations at NAS Whidbey Island and ongoing non-federal activities in the vicinity of the installation (i.e., vehicle and air traffic) would continue in the future at reasonably foreseeable current levels. These activities, when combined with the proposed action, would not have significant cumulative impacts on noise.

9.2.3.3 Air Quality

Air quality in the State of Washington is managed under the Department of Ecology as described in the SIP. Washington's SIP contains air quality rules adopted into the SIP, plans for implementing new or revised NAAQS, plans for attaining and maintaining NAAQS, and state air quality programs (Washington Department of Ecology 2013). The NWCAA is the regional agency responsible for overseeing the state's operating permit program for Island, Skagit, and Whatcom counties. Island County is in attainment of the NAAQS for all criteria pollutants.

Under all alternatives, the proposed action would result in a decrease in total emissions, or, in the case of construction emissions, any increase in emissions would be temporary. As discussed above in 9.2.3.1, Airspace and Airfield Operations, overall operations will drop as a result of cumulative actions, resulting in a decrease in associated overall emissions. Therefore, the proposed action would not contribute to a cumulative impact on air quality in the region.

Other current aircraft operations at NAS Whidbey Island and ongoing non-federal activities in the vicinity of the installation (i.e., vehicle and air traffic) would continue in the future at reasonably foreseeable current levels. These activities, when combined with the proposed action, would not have significant cumulative impacts on air quality.

Greenhouse Gases

As discussed in Chapter 5.3.1, scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere, and world-wide use of fossil fuel is the primary cause of that increase. On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and EOs. Most recently, EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, were enacted to address GHGs, including GHG emissions inventory, reduction, and reporting. GHG emissions occur locally, but GHG impacts are global in both impacts and scale and cumulative over time.

WAC, Chapter 173-441, establishes a mandatory GHG reporting requirement for facilities (i.e. stationary sources, not mobile sources) that emit 10,000 metric tons of CO_2 equivalents or more in a calendar year. A CO_2 equivalent is a metric used to compare emissions from various GHGs based upon their global-warming potential.

The draft CEQ NEPA GHG guidance, "Draft Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions," dated February 18, 2010, recommends that projects with an increase in GHGs over 25,000 MT be evaluated with a quantitative assessment. Since all emissions (except a very small increase of VOCs under Alternative 2) from the proposed action decrease, GHGs would decrease. Therefore, the proposed action would not contribute to an increase in GHG emissions in the region.

Any changes to the energy usage in stationary sources at NAS Whidbey Island would be incorporated into annual GHG Emission Inventory Reports to the NWCAA.

9.2.3.4 Land Use

The past, present, or reasonably foreseeable actions that have a potential to interact with the proposed action and cumulatively impact land use compatibility in the area surrounding NAS Whidbey Island include the development of the NWTRC; replacement of the EA-6B Prowler aircraft with the EA-18G Growler aircraft; the replacement of the C-9 Aircraft with the C-40 Aircraft; the EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island; and the VQ squadron disestablishment. A summary of relevant impacts of each action is described below.

Northwest Training Range Complex EIS

The training and testing activities associated with the NWTRC EIS/OEIS project could increase the amount of land within the greater than 65 dB DNL noise zone due to the increase in aircraft training operations as well as the potential development, testing, and introduction of new aircraft. As described in the NWTRC EIS/OEIS, the potential exists for increased aircraft operations in the inshore area but not a large increase in aircraft overflights over terrestrial areas. Therefore, the EIS concluded that no significant impacts to land use compatibility in the vicinity of NAS Whidbey Island would occur.

Replacement of the Expeditionary EA-6B Prowler Aircraft with the EA-18G Growler Aircraft

The replacement of expeditionary EA-6B Prowler aircraft with EA-18G Growler Aircraft would reduce the acreage of land and water within the projected greater than 65 dB DNL noise zone by up to approximately 14 percent. No additional residential areas within Oak Harbor would be in the projected greater than 65 dB DNL noise zone. This action would result in a positive impact on land use compatibility in the vicinity of NAS Whidbey Island.

Replacement of Four C-9 Skytrain II Aircraft by Three C-40 Aircraft

The replacement of four C-9 Skytrain II aircraft by three C-40 Clipper aircraft has not been fully developed, so potential changes to the noise environment associated with this action cannot be assessed at this time. However, it would not be expected that the percentage of total aircraft operations conducted by the C-9 Skytrain II replacement aircraft, the C-40 Clipper, or the overall flight patterns of the aircraft would change significantly as a result of the replacement actions. It would be expected that there would not be significant impacts on land use surrounding NAS Whidbey Island.

VQ Squadron Disestablishment

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2019. The 2008 FEIS accounted for the VQ mission to be at NAS Whidbey Island beyond 2019. The full scope of this action has not been fully developed, so potential changes to the noise environment associated with this action cannot be assessed at this time. However, potential changes to airfield operations associated with this action would likely decrease by approximately 4,700 EP-3 operations annually. Therefore, it would be expected that there would not be significant impacts to land use compatibility.

EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island

This EIS for ongoing and future EA-18G operations at NAS Whidbey Island's Ault Field and OLF Coupeville, as well as the addition of two expeditionary VAQ squadrons (a total of 10 additional EA-18G aircraft) and the addition of three EA-18G aircraft to the training squadron at NAS Whidbey Island, is in the early stages of development; therefore, potential changes to the noise environment associated with this action cannot be assessed at this time. However, it would not be expected that overall flight patterns of EA-18G aircraft would change significantly. The EIS will identify and evaluate the potential environmental impacts associated with the additional expeditionary EA-18G aircraft, and this documentation will contain further discussion of cumulative impacts.

Proposed Action

The proposed action would not result in significant impacts on land use surrounding NAS Whidbey Island as a result of changes in noise contours. Aircraft operations associated with home basing six or seven P-8A fleet squadrons at NAS Whidbey Island would result in a slight increase in the land area within the greater than 65 dB DNL noise zone when compared to 2014 baseline conditions. When compared with baseline conditions, each alternative would result in a less than 1-percent increase in the acreage of land and water within the projected greater than 65 dB DNL noise zone. Most of the additional area within the projected noise zones under each alternative is over water.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The majority of actions described that could affect land use over population areas would likely decrease air operations and noise contours, or have only a minor change (i.e., the EA-6B transition to EA-18G; replacement of four C-9 with three C-40 aircraft; VQ squadron disestablishment; proposed action, NWTRC EIS/OEIS). While there is no information yet available for the expeditionary VAQ squadron standup action, it would be expected that the expeditionary VAQ aircraft associated would operate similarly to the existing Growler aircraft; therefore, significant impacts on land use compatibility would not be expected. As such, cumulative impacts to land use could occur, but no significant cumulative impacts on land use would be expected.

9.2.3.5 Socioeconomics and Environmental Justice

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the proposed action and cumulatively impact socioeconomics and environmental justice include the replacement of the expeditionary EA-6B Prowler aircraft with EA-18G Growler aircraft; the expeditionary VAQ squadron standup; and the disestablishment of the fleet air reconnaissance VQ. A summary of relevant impacts of each action is described below.

The other six federal and five non-federal project actions described in Tables 9-2 and 9-3 would all have a minor cumulative impact on the socioeconomic environment of Island County, primarily as a result of the injection of construction funds into the regional economy. However, these projects represent the types of typical construction projects that occur each year at a military installation or in a well-developed economy. This level of construction activity is not atypical for the region and could in fact be considered part of the baseline or existing level. Therefore, from an economic standpoint, these projects do not represent a cumulative change in economic activity over existing conditions.

Transition of Expeditionary EA-6B Prowler Aircraft to EA-18G Growler Aircraft

The transition of expeditionary EA-6B Prowler Aircraft stationed at NAS Whidbey Island to EA-18G Growler Aircraft is expected to result in an increase of aircraft and personnel assigned to the station. Implementation of this project would result in 91 or 311 additional personnel based to NAS Whidbey Island, depending upon which alternative is implemented.

EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island

This EIS for ongoing and future EA-18G operations at NAS Whidbey Island's Ault Field and OLF Coupeville, as well as the addition of two expeditionary VAQ squadrons (a total of 10 additional EA-18G aircraft) and the addition of three EA-18G aircraft to the training squadron at NAS Whidbey Island, is in the early stages of development. At this time, the Navy estimates the additional VAQ squadrons will add 860 personnel and approximately 2,150 family members to NAS Whidbey Island and the surrounding community.

Disestablishment of the Fleet Air Reconnaissance VQ

The DoD has directed the Navy to disestablish the VQ mission capabilities at NAS Whidbey Island by 2019. The 2008 FEIS accounted for the VQ mission to be at NAS Whidbey Island beyond 2019. The full scope of this action has not been fully developed; however, VQ Squadron Two (VQ-2) was disestablished in FY 2012, and personnel were consolidated with VQ Squadron One (VQ-1). Personnel loading for VQ-1 following consolidation is approximately 640. Therefore, it would be expected that impacts to socioeconomics would result in a reduction of approximately 640 personnel.

Proposed Action

Implementation of Alternatives 1 and 2 under the proposed action would result in minor impacts on the personnel loading at NAS Whidbey Island and on total population in the region. Total P-8A personnel loading at NAS Whidbey Island would decrease under Alternative 1 and increase under Alternative 2 compared to baseline P-3C personnel loading. These personnel loading levels represent a decrease of 90 personnel under Alternative 1 (a 5-percent decrease) and an increase of 175 personnel under Alternative 2 (a 9-percent increase).

The resulting changes in population would be expected to be minor relative to the size of the regional population. Implementation of Alternative 1 would result in a loss of 191 personnel and dependents from the local area compared to 2014 levels. This decrease in population would represent a decrease of 0.2 percent of the projected population of Island County in 2020. Alternative 2 would increase the regional population by a projected 410 persons, an increase of 0.5 percent.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

Personnel loading at NAS Whidbey Island would increase under Alternative 1 of the proposed action, under the transition of the EA-18G Growler, and under the EIS for EA-18G Growler Airfield Operations at NAS Whidbey Island. However, personnel loading under Alternative 2 of the proposed action, and the VQ squadron disestablishment, would be expected to decrease. When these projects are analyzed in combination and are examined for their context and intensity, no significant change in personnel loading at NAS Whidbey Island from baseline conditions would occur. Each of the actions would partially offset each other with some increases and some decreases in personnel.

9.2.3.6 Water Resources and Wetlands

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the proposed action and cumulatively impact water resources and wetlands include the replacement of the expeditionary EA-6B Prowler aircraft with the EA-18G Growler aircraft at NAS Whidbey Island; construction of the NAS Whidbey Island oil, petroleum, and lubricants pipeline; construction of a fuel pier breakwater and demolition of a finger pier; and improvements to the City of Oak Harbor's clean water facilities and water system. A summary of relevant impacts of each action is described below.

Replacement of the Expeditionary EA-6B Prowler Aircraft with the EA-18G Growler Aircraft

The replacement of the expeditionary EA-6B Prowler aircraft with the EA-18G Growler aircraft would include ground-disturbing activities for new facilities that are required as part of this project. Construction would occur on existing paved surfaces and maintained lawn and landscaped areas. Water quality would not be impacted by construction. Runoff from the addition of 0.2 acre of impervious surface resulting from the construction of new buildings is anticipated to be retained on-site. Discharge of this surface water would meet the conditions of NAS Whidbey Island's NPDES permit. Wetlands would not be impacted. Thus, no significant impacts to water resources are anticipated.

Construction of an Oil, Petroleum, and Lubricants Pipeline at NAS Whidbey Island

Construction-related impacts from the installation of NAS Whidbey Island's 4.4-mile long petroleum, oil and lubricants pipeline could impact wetlands along the pipeline right-of-way. However, this potential disruption would be expected to be short term, with wetlands likely to return upon the completion of construction and with mitigation implemented. Impervious surface area would not increase as a result of this construction. Potential water quality impacts during initial runoff events following construction could occur due to the potential for accidental releases during construction, exposure of contaminated soil, or erosion associated with construction. These potential impacts would be short term and offset by the implementation of mitigation measures. Thus, no significant impacts to water resources are anticipated.

Construction of a Fuel Pier Breakwater and Demolition of a Finger Pier

The proposed demolition of the 536-foot finger pier and construction of the 320-foot partial depth sheet-pile breakwater at NAS Whidbey Island Seaplane Base could result in temporary water quality impacts from accidental spills of hazardous material, removal of potentially creosote-treated pilings, and exposure of potentially contaminated sediments during construction. Removal of the finger pier would suspend sediment and temporarily increase localized turbidity in the surrounding area. Impacts to water quality would be temporary and return to pre-construction conditions once construction is completed. Wetland areas would be impacted but would require mitigation to reduce impacts. Overall, no significant impacts to water resources are anticipated.

Improvements to the City of Oak Harbor's Water System

Construction-related water resource impacts could result from the replacement of the City of Oak Harbor's aging water system. This project would increase impervious surfaces due to the installation of a new storage tank and new road; however, this impact would be partially mitigated by the removal of an old storage tank (the Eastside tank). Water quality of nearby water bodies could potentially be impacted during initial runoff events following construction due to erosion associated with grading and clearing activities. This runoff would be temporary until cleared areas have been re-vegetated. It is unknown at this time whether wetlands would be impacted.

Replacement of the City of Oak Harbor's Clean Water Facilities

Construction-related impacts to water resources could result from the replacement of the City of Oak Harbor's two existing water treatment facilities under the City of Oak Harbor Water Systems Improvement project. The improvement of the City of Oak Harbor's water supply infrastructure and the replacement of the City of Oak Harbor's two existing water treatment facilities are expected to improve water quality of the discharge of effluent into Oak Harbor, although the new impervious surface will increase storm water runoff in the area. The new treatment facilities are planned to be built within a 100-year flood plain; as such, these facilities may be elevated to avoid flooding during a 100-year flood event. Wetlands would likely be filled in the 100-year floodplain as a result of this project but to what extent is unknown at this time.

Proposed Action

The proposed infrastructure development would increase storm water runoff from Ault Field. The Navy proposes to remove 2.67 acres of existing impervious surfaces on the station to offset the increase in storm water. In addition, the Navy will install underground storm water retention infrastructure; infrastructure for infiltrating storm water via wet ponds, ditches, and swales; or a combination of these measures to meet the standards established by the Washington State Department of Ecology in its Western Washington Stormwater Manual (2012). With implementation of these measures and to the extent technologically feasible, the quality and quantity of storm water discharged to Dugualla Lagoon would be maintained at current levels.

Wetland loss at NAS Whidbey Island as a result of the construction projects under the proposed action would only occur under Alternative 2 (1.64 acres). Because complete wetland avoidance would not be feasible under Alternatives 2, a CWA Section 404 permit would be obtained from the USACE and a Section 401 permit from the Washington Department of Ecology if this alternative is selected. These permits regulate the discharge of dredged and fill materials into waters of the United States, including wetlands. Compensation would be required for long-term impacts resulting from lost wetland acreage that cannot be avoided or minimized. The Washington Department of Ecology, USACE, and the EPA have developed guidelines and acre-for-acre replacement mitigation ratios.

Combined Impacts of Past, Present, and Reasonably Foreseeable Actions

While projects impacting water resources or wetlands would implement regulatory- required mitigation, any anticipated impacts from the above-listed projects would not be considered significant because of geographic separation of wetlands, the types of waters impacted (freshwater or marine), and temporal displacement and replacement of the resource function. Any wetland impacts as a result of the proposed actions would require mitigation to replace lost wetland functions or values, resulting in no net loss of the resource at Whidbey Island. Consequently, the proposed action when considered with other past, present, and future actions could cumulatively impact water resources and wetlands but would not be anticipated to have a significant cumulative impact.

9.2.3.7 Biological Resources

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the proposed action and cumulatively impact biological resources include the NWTRC EIS/OEIS; the NWTT EIS/OEIS; replacement of the expeditionary EA-6B Prowler aircraft with the EA-18G Growler aircraft and the C-9 Aircraft with the C-40 Aircraft at NAS Whidbey Island; construction of the NAS Whidbey Island oil, petroleum, and lubricants pipeline; construction of a fuel pier breakwater and demolition of a finger pier; and improvements to the City of Oak Harbor's clean water facilities and water system. A summary of relevant impacts of each action is described below.

Northwest Training Range Complex EIS/OEIS

The USFWS biological opinion and incidental take statement (August 12, 2010) concluded that implementation of the NWTRC will have adverse effects but is not likely to jeopardize the continued existence of the bull trout. Impacts to this salmonid would result from the use of explosive ordnance, not from changes in water quality. No significant impacts would occur on the marbled murrelet from aircraft noise and aerial and underwater sound from underwater detonations. According to the EIS for the NWTRC, the proposed aircraft overflights and underwater detonations may affect but are not likely to adversely affect the marbled murrelet. It was determined that activities in the NWTRC would not destroy or adversely modify critical habitat for the marbled murrelet. The USFWS does not expect essential or normal marbled murrelet behavior to be significantly impaired or disrupted by the activities associated with the military training in the NWTRC. Changes to flight operations associated with the NWTRC would be similar to ongoing operations at NAS Whidbey Island. Noise from aircraft training activities associated with the NWTRC EIS/OEIS would not have a significant impact on wildlife. Given that the nature and types of flight operations would not change, and given the less than significant increase in noise, the EIS concluded that no significant impacts to wildlife would occur. No new construction would be associated with the NWTRC at Ault Field; therefore, no impact would occur to vegetation at this installation.

Northwest Training and Testing EIS/OEIS

Underwater detonations at Crescent Harbor Explosive Ordnance Disposal Training Range, located approximately 2 miles southeast of NAS Whidbey Island, would increase from two, 2.5-lb. net explosive weight charges (E3 source class) per year to three, 2.5-lb. net explosive weight charges per year under both action alternatives. The potential for birds, including the marbled murrelet, to be impacted by

explosive detonations may increase slightly compared to baseline conditions. As such, the Navy determined that underwater detonations used during training activities under both alternatives under consideration may affect and are likely to adversely affect the ESA-listed marbled murrelet. In addition, while consultation has not yet occurred, the Navy determined that underwater detonations may affect but are not likely to adversely affect ESA-listed *salmonid* species.

The total number of explosive training events in Crescent Harbor would also increase from the additional use of 18 SWAGs. The SWAG is composed of a cylindrical steel tube, 3 inches long by 1 inch wide, containing approximately 0.033 lb. of explosives. The single explosive is highly focused. Divers place a single SWAG on the mine that is located mid-water column, within water depths of 10 to 12 feet. Serious injury or mortality to individual fish would be expected if present in the immediate vicinity of explosive ordnance use; however, despite the increase in training, impacts would be temporary and localized because the explosive training events would be infrequent and widely dispersed throughout Crescent Harbor, and the distribution of potentially affected fish would also vary. As such, the Navy determined that additional explosive training events in Crescent Harbor using SWAG charges may affect but are not likely to adversely affect the ESA-listed *salmonid* species, Pacific eulachon, green sturgeon, and rockfish species.

Replacement of the Expeditionary EA-6B Prowler Aircraft with the EA-18G Growler Aircraft

The replacement of the expeditionary EA-6B Prowler aircraft with the EA-18G Growler aircraft would include ground-disturbing activities for construction of new facilities. Construction would occur on existing paved surfaces and maintained lawn and landscaped areas that do not support a high diversity or abundance of wildlife species; therefore, impacts would not be significant. No construction-related impacts to the marbled murrelet or its habitat would occur under the proposed action. There would be an increased number of flight operations with the introduction of the EA-18G but a decrease in noise levels at Ault Field. The risk of collision with marbled murrelets could increase in the immediate vicinity of Ault Field while aircraft are operating below 500 feet agl, but aircraft spend a short time in marbled murrelet airspace. In a letter dated May 24, 2012, the USFWS concurred with the Navy's effect determination. Thus, no significant impacts to marbled murrelets are anticipated. Given the nature of the current NAS Whidbey Island operations, locally occurring wildlife species have likely become habituated to aircraft noise; therefore, changes in operations would not significantly impact wildlife.

Replacement of the C-9 Aircraft with the C-40 Aircraft

The replacement of the C-9 Skytrain II aircraft has not been fully developed, so potential impacts on wildlife from this action cannot be accurately assessed at this time. However, it would not be expected that the percentage of total aircraft operations conducted by the C-9 Skytrain II replacement aircraft, the C-40 Clipper, or the overall flight patterns of the aircraft would change significantly as a result of the replacement. Therefore, impacts on wildlife, including migratory birds, in the vicinity of Whidbey Island would be expected to be minor. No construction-related activities would be associated with this project.

Construction of an Oil, Petroleum, and Lubricants Pipeline at NAS Whidbey Island

Construction noise from the installation of a 4.4-mile petroleum, oil, and lubricants pipeline at NAS Whidbey Island could impact wildlife, including migratory birds and small mammals, and temporarily disturb vegetation along the pipeline right-of-way. This project could cause increased noise during the construction period, which would temporarily displace wildlife. However, this potential disruption would be expected to be short term, and terrestrial wildlife and avian species would likely return upon the completion of construction. Vegetation would re-establish along the right-of-way once construction is completed.

Construction of a Fuel Pier Breakwater and Demolition of a Finger Pier

The proposed demolition of the 536-foot finger pier and construction of the 420-foot partial depth sheet-pile breakwater at NAS Whidbey Island Seaplane Base would increase airborne noise levels during the construction period, temporarily displacing migratory birds. Demolition activities such as pile removal and installation and placement of the sheet-pile breakwater could result in temporary impacts on fish, particularly the ESA-listed Puget Sound Chinook and steelhead, from decreased water quality. Removal of the finger pier would suspend sediment and temporarily increase localized turbidity in the surrounding area. Impacts to aquatic species would be temporary, and species would likely return to the area after construction.

Improvements to the City of Oak Harbor's Water System

Construction-related noise could result from the replacement of the City of Oak Harbor's aging water system. This project could cause increased noise during the construction period, which would temporarily displace wildlife. However, this potential disruption would be expected to be short term. It is unlikely that noise from this terrestrial-based project would impact aquatic-based ESA-listed species, in particular the marbled murrelet. Impacts to vegetation would be negligible because this is a replacement project, not construction on a green field. If any vegetation impacts were to occur, they would be temporary.

Replacement of the City of Oak Harbor's Clean Water Facilities

Construction-related noise could result from the replacement of the City of Oak Harbor's two existing water treatment facilities under the City of Oak Harbor Water Systems Improvement project. This project could cause increased noise during the construction period, which would temporarily displace wildlife. However, this potential disruption would be expected to be short term, and wildlife, including the ESA-listed marbled murrelet, should return upon the completion of construction. The discharge of effluent into Oak Harbor as a result of improvement of the City of Oak Harbor's water supply infrastructure and the replacement of the City of Oak Harbor's two existing water treatment facilities would not be expected to impact the nearshore foraging areas used by marbled murrelets because all discharge would be treated before its release.

Proposed Action

The proposed action would permanently remove from 9.16 to 15.76 acres of herbaceous vegetation for construction of P-8A support facilities. There would be minor direct and no indirect adverse effects on wildlife from construction and aircraft noise. Aircraft noise will not increase under the projects collectively such that adverse impacts to any ESA-listed species are not expected.

Construction would not affect critical habitat of ESA-listed species or habitat used extensively by other wildlife species. The Navy determined that the proposed action may affect but is not likely to adversely affect the marbled murrelet and bull trout. There would be no effect on the golden paintbrush, streaked horned lark, Taylor's checkerspot, humpback whale, southern resident killer whale, Steller sea lion, Puget Sound/Georgia Basin bocaccio, Puget Sound Chinook salmon, Puget Sound steelhead, canary rockfish, yelloweye rockfish, southern eulachon, and southern North American green sturgeon populations. Furthermore, the Navy has determined the proposed action would not result in reasonably foreseeable "takes" of a marine mammal species by harassment, injury, or mortality as defined under the MMPA.

Combined Impacts of Past, Present, and Reasonably Foreseeable Actions

Construction-related impacts associated with the proposed action and the projects listed above would not result in the permanent removal of large areas of vegetation. The limited impacts to biological resources, including the removal of herbaceous vegetation, would not remove habitat used extensively by terrestrial wildlife, avian species, or ESA-listed species in the project areas. The proposed action and the proposed training activities in Crescent Harbor documented in the NWTRC and NWTT EISs/OEISs both have the potential to affect ESA-listed species, including the marbled murrelet and bull trout. However, none of the actions, either individually or collectively, would cause significant impacts to any ESA-listed species. Consequently, the proposed action when considered with other past, present, and future actions could cumulatively impact biological resources, but it would not be expected to have a significant cumulative impact.

9.3 MCB Hawaii Kaneohe Bay

As discussed in Chapter 8, environmental impacts resulting from implementation of the proposed action at MCB Hawaii Kaneohe Bay would be related to airspace and airfield operations, air quality, socioeconomics, and biological resources. Potential cumulative impacts related to each of these resources are evaluated below.

Based on a review of past, present, and reasonably foreseeable actions at MCB Hawaii Kaneohe Bay and in the local community, it was determined that several actions have the potential to result in cumulative impacts with the proposed action. The projects listed in this chapter are those that have the greatest potential to cumulatively impact the resources assessed in this SEIS. These projects are described below, and the impacts of these projects, in combination with the impacts of the proposed action, are described in Chapter 9.3.3.

9.3.1 Federal Actions

Table 9-4 describes actions at or near MCB Hawaii Kaneohe Bay that have been determined to be relevant to the analysis of cumulative impacts associated with the proposed action. In addition to the listed actions, other fixed-wing and helicopter aircraft would continue to operative at MCB Hawaii Kaneohe Bay for the foreseeable future.

9.3.2 Non-Federal Actions

To identify non-federal projects that should be included in the cumulative impacts analysis, the Navy reviewed community planning documents, including comprehensive plans, master plans, regional transportation plans, and other local planning board initiatives. The Navy has not identified any proposed, new, non-federal actions in the vicinity of MCB Hawaii Kaneohe Bay that would interact with the proposed action and contribute to cumulative impacts on airspace and airfield operations, air quality, socioeconomics, or biological resources. Ongoing non-federal activities in the vicinity of MCB Hawaii Kaneohe Bay related to the analysis of cumulative impacts include vehicle traffic on the regional roadway network and aircraft operating from the Honolulu International Airport and several other regional airports.

Table 9-4 Federal Actions Considered in the Cumulative Impacts Analysis for MCB Hawaii Kaneohe Bay

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
Federal Action			
Navy	Hawaii-Southern California Training and Testing EIS/OEIS	A ROD was signed on December 20, 2013. The HSTT EIS/OEIS evaluates the environmental impacts of training and testing throughout the in-water portions of the study area (including MV-22 and H-1 operations), including areas around the Hawaiian Islands. In addition to reassessing in-water activities previously addressed in the 2008 Hawaii Range Complex EIS/OEIS and the SOCAL EIS/OEIS, the HSTT EIS/OEIS adjusts baseline training and testing activities from current levels to levels needed to support Navy requirements beginning in January 2014; analyzes impacts in additional areas not covered in previous documents where activities historically occur—including Navy ports, naval shipyards, and transit channels serving these areas; implements enhanced range capabilities; and updates the analysis using the best available science and methods.	2014
USMC	MV-22 and H-1 Home Basing	A ROD was signed in August 2012 for the basing and training of MV-22 tilt-rotor Osprey and H-1 Cobra and Huey attack/utility aircraft squadrons in support of III MEF elements in Hawaii. The decision is to proceed with the preferred alternative to base and operate up to two VMM squadrons (up to 12 MV-22 Osprey aircraft per squadron, for a total of 24 aircraft) and one HMLA squadron (15 AH-1 Cobra attack and 12 UH-1 Huey utility helicopters, for a total of 27 aircraft). Facilities to accommodate the squadrons will be developed on the southeast side of the runway at MCB Hawaii Kaneohe Bay. Projects will include demolition, new construction, and renovation. Over 2,000 active duty personnel, civilians, and dependents will be associated with the VMM and HMLA squadrons. The preferred alternative takes into account the facilities modifications and new construction included in the P-8A FEIS and ROD.	2012 - 2018

Table 9-4 Federal Actions Considered in the Cumulative Impacts Analysis for MCB Hawaii Kaneohe Bay

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
USMC	FY 2013 Aviation Plan (AvPlan)	The FY 2013 AvPlan is a consolidated action plan providing an overview of USMC aviation forces/readiness and planned organizational, aircraft, and equipment transitions over the next 10 years. This document outlines the USMC's overall strategy and schedule for equipment upgrades, potential movement of personnel, and new aviation capabilities across the USMC. Currently, there are three HMH squadrons of CH-53Ds and one Marine Transport Squadron Detachment (VMR Det) with one C-20G aircraft. In addition to the squadrons and aircraft described in this AvPlan, it is anticipated that there will be one HMH squadron of CH-53Es by FY 2013. VMR Det will continue to be based at MCB Hawaii Kaneohe Bay but will transition from C-20G to C-20RA aircraft by FY 2016. Also included in the AvPlan is the future relocation of a VMU squadron in existing restricted airspace to the State of Hawaii.	2012 – 2022
USMC	Grow the Force (GTF, or 202K)	In January 2007, the president of the United States, on the recommendation of the secretary of defense, announced the USMC would increase its end strength from approximately 180,000 to 202,000 by 2011 (an initiative known as Grow the Force [GTF or 202K]). The goal is to achieve a 1 to 2 deployment-to-dwell 3 ratio for active forces and a 1 to 4 ratio for the reserves. GTF initiatives that have already been implemented at MCB Hawaii Kaneohe Bay are the introduction of an additional artillery battery (Echo Battery, 2nd Battalion, 12th Marines [2/12 Marines]) and a radio company (Bravo Company, 3D Radio Battalion). The aviation ground support squadron (Marine Wing Support Detachment, MAG-24) arrival would be phased from FY 2012 and beyond. Adequate living, working, and training facilities would be constructed, or existing facilities would be renovated to support the additional ground combat personnel assigned to MCB Hawaii Kaneohe Bay.	Ongoing

Table 9-4 Federal Actions Considered in the Cumulative Impacts Analysis for MCB Hawaii Kaneohe Bay

Action Proponent (Agency/ Individual)	Project Name	Location and Description	Year Occurred/ To Occur
USMC	Force Realignment Initiatives	Between October 2010 and March 2012, the USMC conducted a Force Structure Review to assess the future structure of the USMC and "right-size" the force relative to its future mission. That review resulted in a decision to reduce the overall size of the USMC from 202,000 to 182,100 by FY 2018. The impacts of this reduction in force for specific USMC installations is still being evaluated; however, changes in force structure as a result of the Force Structure Review for MCB Hawaii Kaneohe Bay appear to be minimal.	2018
Navy	Disestablish Special Projects Patrol Squadrons	The Navy has made the decision to disestablish two VPU squadrons operating P-3C aircraft. VPU-1 disestablished in April 2012 at NAS Jacksonville. A portion of the squadron's aircraft and personnel were absorbed by VPU-2 at MCB Hawaii Kaneohe Bay. VPU-2 will disestablish at MCB Hawaii Kaneohe Bay before 2020.	2020
Air Force	Air Force Initiatives	Air Force C-17 aircraft routinely train at MCB Hawaii Kaneohe Bay. The Air Force is currently preparing an EA for C-17 training, including development of a short, austere airfield (SAAF), and is considering several alternative sites in Hawaii. MCB Hawaii Kaneohe Bay and PMRF, currently being used for C-17 training, could be considered as alternative SAAF sites. The F-22 will be a replacement for the existing F-15 aircraft in use by the Hawaii Air National Guard (HIANG). The F-22 will be "shared" between HIANG and Air Force squadrons. Training activities for the F-22 will be similar to those for the F-15, including training at PMRF.	TBD

9.3.3 Cumulative Impact Analysis

9.3.3.1 Airspace and Airfield Operations

The past, present, or reasonably foreseeable actions that have a potential to interact with the proposed action and cumulatively impact airspace and airfield operations are those described in the MV-22 and H-1 Home Basing EIS, disestablishment of VPU squadrons operating P-3C aircraft at MCB Hawaii Kaneohe Bay, and the HSTT EIS/OEIS training activities.

MV-22 and H-1 Home Basing

A ROD was signed in August 2012 for the home basing and training of MV-22 tilt-rotor Osprey and H-1 Cobra and Huey attack/utility aircraft squadrons in support of III MEF elements in Hawaii. The decision is to proceed with the preferred alternative to base and operate up to two VMM squadrons (up to 12 MV-22 Osprey aircraft per squadron, for a total of 24 aircraft) and one HMLA squadron (15 AH-1 Cobra attack and 12 UH-1 Huey utility helicopters, for a total of 27 aircraft) at MCB Hawaii Kaneohe Bay.

These new aircraft will increase annual air operations at MCB Hawaii Kaneohe Bay by 29 percent (17,918 operations).

Disestablish Special Projects Patrol Squadrons

The potential changes to airfield operations associated with the disestablishment of VPU-2 would result in an elimination of aircraft operations associated with this mission.

Hawaii/Southern California Training and Testing EIS

The airspace-related activities associated with the HSTT EIS/OEIS project include additional operations in airspace offshore of MCB Hawaii Kaneohe Bay. Aircraft are already operating in this airspace, and no significant changes in the types of airspace classifications or uses will occur.

Proposed Action

The total number of Navy aircraft operations at MCB Hawaii Kaneohe Bay under the proposed action would decrease from 20,189 under 2014 baseline conditions to 208 operations at the 2020 end-state, a 99-percent decrease.

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

The reduction in air operations at MCB Hawaii Kaneohe Bay as a result of the proposed action and disestablishment of VPU-2 would be almost entirely offset by the projected increase in air operations related to the MV-22 and H-1 home basing. No changes in the types of classifications or civilian and commercial use of the airspace around MCB Hawaii Kaneohe Bay would occur as a result of any of the actions listed above. Therefore, when considered in combination, cumulative impacts on airspace and airfield operations could occur but would not be expected to be significant.

9.3.3.2 Air Quality

Under all alternatives, the proposed action would result in a decrease in total emissions, or, in the case of construction emissions, that any increase in emissions would be temporary. As discussed above in 9.3.3.1, Airspace and Airfield Operations, overall operations would generally remain the same as a result of cumulative actions, resulting in no significant change in overall emissions. Therefore, the proposed action would not contribute to a cumulative impact on air quality in the region.

Other current aircraft operations at MCB Hawaii Kaneohe Bay and ongoing non-federal actions in the vicinity of the installation (i.e., vehicle and air traffic) would continue in the future at reasonably foreseeable current levels. Consequently, these actions, when combined with the proposed action, would not have a significant cumulative impact on air quality.

Greenhouse Gases

As discussed in Chapter 7.3.1, scientific studies correlate the observed rise in global annual average temperature and the resulting change in global climate patterns with the increase in GHGs in the Earth's atmosphere, and world-wide use of fossil fuel is the primary cause of that increase. On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and EOs. Most recently, EO 13423 Strengthening Federal Environmental, Energy, and Transportation Management, and EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, were enacted to address GHGs, including GHG emissions inventory, reduction, and reporting. GHG emissions occur locally, but GHG impacts are global in both impacts and scale and cumulative over time.

Hawaii's Global Warming Solution Act of 2007 sets a statewide GHG emission limit to reduce and then maintain GHG emissions to 1990 levels by 2020, and the DOH has recently proposed rule changes to implement reductions (Hawaii DOH 2012).

The draft CEQ NEPA GHG guidance, "Draft Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions," dated February 18, 2010, recommends that projects with an increase in GHGs over 25,000 MT be evaluated with a quantitative assessment. Since all emissions from the proposed action decrease, GHGs would decrease. Therefore, the proposed action would not contribute to an increase in GHG emissions in the region.

9.3.3.3 Socioeconomics

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the proposed action and cumulatively impact socioeconomics and environment justice include the MV-22 and H-1 Home Basing EIS, Grow the Force EIS, and subsequent Force Realignment Initiatives. A summary of relevant impacts of each action is described below.

MV-22 and H-1 Home Basing

Per the ROD signed for this action, approximately 1,000 active-duty personnel, 22 civilian personnel, and 1,106 dependents would be associated with the VMM and HMLA squadrons. This represents an estimated 16-percent increase in the existing population at MCB Hawaii Kaneohe Bay.

Grow the Force

In January 2007, the USMC began plans to increase its end strength from approximately 180,000 to 202,000 by 2011, an initiative known as Grow the Force (GTF, or 202K). GTF initiatives that have already been implemented at MCB Hawaii Kaneohe Bay are the introduction of an additional artillery battery (Echo Battery, 2nd Battalion, 12th Marines [2/12 Marines]) and a radio company (Bravo Company, 3D Radio Battalion). The aviation ground support squadron (Marine Wing Support Detachment, MAG-24) arrival would be phased from FY 2012 and beyond. Adequate living, working, and training facilities would be constructed, or existing facilities would be renovated to support the additional ground combat personnel assigned to MCB Hawaii Kaneohe Bay.

Force Realignment Initiative

Between October 2010 and March 2012, the USMC conducted a Force Structure Review to assess the future structure of the USMC and "right-size" the force relative to its future mission. The result was a decision to reduce the overall size of the USMC from 202,000 to 182,100 by FY 2018. The impacts of this reduction for specific USMC installations are still being evaluated; however, changes in force structure as a result of the review for MCB Hawaii Kaneohe Bay appear to be minimal.

Proposed Action

The proposed action alternatives would result in moderate impacts on the personnel loading at MCB Hawaii Kaneohe Bay and minor impacts on total population in the region. Total P-8A personnel loading at MCB Hawaii Kaneohe Bay would be expected to decline under each alternative when compared to baseline P-3C personnel loading. Under Alternatives 1 and 2, 102 P-8A personnel would be at the base. These personnel loading levels represent a decrease of 1,341 personnel under Alternatives 1 and 2 (a 99-percent decrease).

Combined Impacts from Past, Present, and Reasonably Foreseeable Actions

While the proposed action would result in a decrease in personnel from baseline loading, when taken in combination with the actions of the MV-22 Home Basing EIS, the Grow the Force EIS, and the Force Realignment Initiative, an overall increase would occur in personnel and various construction projects, resulting in increased employment and income levels in the local and regional economies. The decrease in personnel levels associated with the proposed action would serve to offset the cumulative impact of increased personnel levels when considered with the combined impacts of the other projects. Further, the increased personnel levels associated with those actions would offset the negative impact on the regional economy and education related to the relocation of personnel associated with the proposed action.

9.3.3.4 Biological Resources

The past, present, or reasonably foreseeable actions that have the greatest potential to interact with the proposed action and cumulatively impact biological resources include the MV-22 Osprey and H-1 Cobra and Huey Squadrons. A summary of relevant impacts of each action is described below.

MV-22 and H-1 Home Basing

Facilities to accommodate the new MV-22 and H-1 aircraft will be developed on the southeast side of the runway at MCB Hawaii Kaneohe Bay. Projects will include demolition, new construction, and renovation. The EIS anticipates that ESA-listed terrestrial plant species at MCB Hawaii Kaneohe Bay and endemic seagrass found offshore (not ESA-listed), wetlands, or coral reefs are not in the vicinity of proposed construction. Compliance with regulatory measures (i.e., BMPs) would prevent or minimize runoff into wetlands or offshore waters during construction.

Proposed Action

The proposed action alternatives would result in minor effects on vegetation. Approximately up to 1.1 acres of maintained Bermuda grass would be removed to expand existing facilities. The vegetation permanently removed would total less than 1 percent of the currently vegetated area at the base. The proposed construction areas do not provide suitable habitat to support a diverse or abundant terrestrial wildlife population because there is little vegetation cover or habitat diversity; both areas contain maintained Bermuda grass. Therefore, the proposed construction would have a negligible effect on terrestrial wildlife. The proposed new construction would not directly affect any species of bird protected under the MBTA or remove habitat that is important to migratory bird populations and would have no effect on the Hawaiian monk seal, humpback whale, sperm whale, Newell's shearwater, green sea turtle, and hawksbill sea turtle. The Navy determined that the proposed action would not result in reasonably foreseeable "takes" of a marine mammal species by harassment, injury, or mortality as defined under the MMPA.

Combined Impacts of Past, Present, and Reasonably Foreseeable Actions

Construction-related impacts associated with the proposed action and the projects listed above would not result in the permanent removal of large areas of vegetation. The limited impacts to biological resources, including the removal of herbaceous vegetation, would not remove habitat used extensively by terrestrial wildlife, avian species, or ESA-listed species in the project areas. Proper implementation of control measures for storm water discharge from new impervious surface at MCB Hawaii Kaneohe Bay would avoid significant impacts to marine based ESA-listed species. Consequently, the proposed action when considered with other past, present, and future actions could cumulatively impact biological resources, but would not be expected to have a significant cumulative impact.

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10 Other Considerations Required by NEPA

10.1 Consistency with Other Federal, State, and Local Plans, Policies, and Controls

This chapter summarizes the laws, implementing regulations, and EOs applicable to the proposed action. Where appropriate, the tables included below provide direction for further information on the impact analysis for potentially affected resources. As described below, activities associated with the proposed action at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay would comply with applicable federal, state, and local requirements with regard to the human environment.

National Environmental Policy Act

NEPA (42 U.S.C. 4321, *et seq*.) is the basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. The Navy has prepared this SEIS in compliance with NEPA, the CEQ regulations implementing NEPA (40 CFR 1500-1508), and the Navy regulations described in the Chief of Naval Operations Instruction, 32 CFR 775. This SEIS considers environmental consequences of the proposed action to provide facilities and functions to support the proposed home basing of the P-8A aircraft. The Draft SEIS was distributed to appropriate federal, state, and local agencies, organizations, and interested persons. Comments from these agencies and the public have been considered and incorporated into this Final SEIS.

Endangered Species Act

The ESA of 1973 (16 U.S.C. 1531, *et seq*.) was designed to prevent the extinction of native and foreign species of wild flora and fauna. The act defines an endangered species as any animal or plant in danger of extinction and a threatened species as any animal or plant likely to become extinct within the reasonably foreseeable future. The ESA makes it illegal to harass, harm, or kill listed species and to possess, transport, buy, or sell the species or parts thereof in the course of an interstate or foreign commercial activity.

The National Defense Authorization Act of 2004 was enacted into law during the 108th Congress on November 24, 2003 (Public Law 108-136). Section 318 of the act, *Military Readiness and Conservation of Protected Species*, amended the ESA by making military lands ineligible for critical habitat designation provided the Secretary of the Department of the Interior or the Department of Commerce finds in writing that an INRMP provides conservation benefits to the species for which critical habitat is proposed. The amendment does not affect consultation requirements and does not allow the military to take an action that would harm an endangered or threatened species. The provision also does not affect current existing critical habitat areas.

The Navy has determined the potential effect on threatened and endangered species from construction and noise, where applicable, associated with the proposed home basing of the P-8A aircraft. For information on impacts on threatened and endangered species under the various home basing alternatives, please refer to the chapters listed in Table 10-1.

Table 10-1 List of EIS Chapters Containing Information on Threatened and Endangered Species Impacts

Florida: NAS Jacksonville	Chapter 4.8.4
Washington: NAS Whidbey Island	Chapter 6.8.4
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.8.4

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, *et seq.*) governs the conservation and management of ocean fishing. The act established regional fishery management councils comprising federal and state officials, including the USFWS. The act became effective March 1, 1977, by establishing exclusive U.S. management authority over all fishing within the exclusive economic zone, all anadromous fish (species of fish that spawn in U.S. fresh or estuarine waters and migrate to ocean waters) throughout their migratory range except when in a foreign nation's waters, and all fish on the Continental Shelf. The act establishes eight regional fishery management councils responsible for the preparation of fishery management plans to achieve the optimum yield from U.S. fisheries in their regions. Congress amended the act extensively when it passed the Sustainable Fisheries Act in 1996. On January 12, 2007, the president signed the Magnuson-Stevens Fishery Conservation and Management Act of 2006.

Neither of the proposed action alternatives would directly or indirectly affect marine or tidal habitats. Consequently, EFH, as defined under the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, would not be adversely affected.

Marine Mammal Protection Act

The MMPA of 1972 (13 U.S.C. 1361), as amended, establishes a national policy designated to protect and conserve marine mammals and their habitats. This policy is intended to prevent diminishment of marine mammal populations beyond the point at which they cease to be a significant functioning element in the ecosystem or below their optimum sustainable population. The NMFS is responsible for reviewing federal actions for compliance with the MMPA.

The Navy has determined the potential effect on marine mammals from construction and noise, where applicable, associated with the proposed home basing of the P-8A aircraft. For information on impacts on marine mammals under the home basing alternatives, please refer to the chapters listed in Table 10-2.

Table 10-2 List of EIS Chapters Containing Information on Marine Mammal Impacts

Florida: NAS Jacksonville	Chapter 4.8.7
Washington: NAS Whidbey Island	Chapter 6.8.7
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.8.5

Fish and Wildlife Coordination Act

Section 10 of the Fish and Wildlife Coordination Act of 1996 (16 U.S.C. 661) directs federal agencies to consult with the USFWS, the NOAA Fisheries (formerly NMFS), and state agencies before authorizing alterations to water bodies. Neither of the proposed home basing alternatives would involve direct alterations of any natural watercourses.

Clean Air Act (42 U.S.C. 7401, *et seq.*)

The CAA (42 U.S.C. 7401, *et seq.*) dictates the NAAQS that must be maintained nationwide. The act delegates authority to state and local agencies to enforce NAAQS and to establish air quality standards and regulations of their own. The adopted state standards and regulations must be at least as restrictive as the federal requirements.

In compliance with the CAA, potential impacts on air quality were evaluated for both of the alternatives. For information on impacts on regional and local air quality under the home basing alternatives, please refer to the chapters listed in Table 10-3.

Table 10-3 List of EIS Chapters Containing Information on Air Quality Impacts

Florida: NAS Jacksonville	Chapter 4.3
Washington: NAS Whidbey Island	Chapter 6.3
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.3

National Historic Preservation Act

The NHPA (16 U.S.C. 470 [f]) established historic preservation as a national policy and defined it as the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, or engineering. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. It requires federal agencies to preserve and use historic buildings "to the maximum extent feasible" and to have in place Section 106 compliance procedures.

In accordance with Section 106, the Navy and USMC are consulting with the appropriate SHPOs regarding the effects on historic resources resulting from implementation of the proposed action. For information on impacts on cultural, archaeological, and historical resources under the home basing alternatives, please refer to the chapters listed in Table 10-4.

Table 10-4 List of EIS Chapters Containing Information on Cultural Resources Impacts

Florida: NAS Jacksonville	Chapter 4.9
Washington: NAS Whidbey Island	Chapter 6.9
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.9

Clean Water Act and Executive Order 11990, Protection of Wetlands

The CWA (33 U.S.C. 1251, *et seq*.) established the basic structure for regulating discharges of pollutants into the waters of the United States. The CWA also continued requirements to set water quality standards for all contaminants in surface waters and made it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit was obtained under its provisions. This statute specifies permitting requirements for discharges of wastewater and storm water to waters of the United States under NPDES—delegated by individual states—and for the protection of ambient water quality. It also specifies permitting requirements for dredging and filling of wetlands (Section 404), a program administered by the USACE and the individual state regulatory authority and EPA oversight. Section 401 deals with water quality issues. EO 11990 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

In compliance with the CWA and EO 11990, development in wetland areas has been avoided to the extent practicable. The proposed home basing alternatives at NAS Jacksonville and MCB Hawaii Kaneohe Bay would have no direct or indirect effect on wetlands. Some unavoidable wetland impacts would occur at NAS Whidbey Island under Alternatives 1 and 2. Accordingly, the Navy will coordinate with the USACE and the Washington Department of Ecology to obtain the necessary permits and approval for any unavoidable impacts on wetlands and associated mitigation. For information on wetland impacts at NAS Whidbey Island, please refer to Chapter 6.7.5.

Coastal Zone Management Act

The CZMA (16 U.S.C. 1451, *et seq*.), as amended, provides for preservation, protection, development, and, where feasible, restoration or enhancement of the nation's coastal zone. The first step in the CZMA

federal consistency process is to determine whether the proposed action will have "reasonably foreseeable direct, indirect, or cumulative effects on a state's coastal uses or resources." This is called an "effects test." Coastal uses include activities such as public access, recreation, fishing, coastal development, and scenic enjoyment. Coastal resources include any biological or physical resources found within the state's coastal zone; examples include wetlands, air, estuaries, birds, mammals, and shellfish. If the Navy determines there are "effects" on any state's coastal uses or resources, even when a federal action is occurring outside a state's territorial waters or inland coastal zone boundary or only within the federal installation boundary, then the action is potentially subject to the federal consistency requirement. Based on a factual determination of "effects" for each of the states, the Navy has determined the proposed action may have a reasonably foreseeable direct, indirect, or cumulative effect on the state's coastal uses and resources. Therefore, the Navy has prepared a coastal consistency determination (CCD) for each affected area. The Navy's CCDs for NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay are located in Appendix G.

The Florida State Clearinghouse reviewed the Navy's CCD for NAS Jacksonville and determined that the proposed action at the installation is consistent with the Florida Coastal Management Program (Milligan 2014). A copy of the state's concurrence with the Navy's CCD is provided in Appendix C.

The Navy will submit the CCD for NAS Whidbey Island to the Washington Department of Ecology as part of the Joint Aquatic Resources Permit Application (JARPA) process, after a ROD has been signed for the proposed action.

Safe Drinking Water Act

The Safe Drinking Water Act of 1974 (42 U.S.C. 300f, *et seq*.) sets forth a classification system for groundwater used for potable water supply and specifies requirements for the quality of groundwater that can be used for water supply. The implementation of the Safe Drinking Water Act is delegated to the states.

Resource Conservation and Recovery Act

Subsection III of RCRA (42 U.S.C. 6901, *et seq*.) sets forth hazardous waste management provisions; Subsection IV sets forth solid waste management provisions; and Subsection IX sets forth underground storage tank provisions with which federal agencies must comply.

Comprehensive Environmental Response, Compensation, and Liability Act

The CERCLA (42 U.S.C. 9601, *et seq*.) establishes the liability and responsibilities of federal agencies for emergency response measures and remediation when hazardous substances are known to have been released into the environment.

Proposed construction projects under the home basing alternatives were reviewed in reference to the locations of the ERP sites. It has been concluded there would be no involvement with existing ERP sites, munitions program sites, or long-term monitoring protocols for these sites under either home basing alternative. For information on impacts on ERP sites under the home basing alternatives, please refer to the chapters listed in Table 10-5.

Table 10-5 List of EIS Chapters Containing Information on IRP Site Impacts

Florida: NAS Jacksonville	Chapter 4.10
Washington: NAS Whidbey Island	Chapter 6.10
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.10

Sikes Act Improvement Act of 1997 (16 U.S.C. 670)

The Sikes Act was amended to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. In accordance with this, INRMPs are developed at installations in order to achieve these goals. The INRMPs for NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay were developed in accordance with the Sikes Act Improvement Act of 1997 (16 U.S.C. 670). The proposed action would be consistent with the INRMP goals of protecting the natural ecosystems of NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay and would have no significant impacts on natural resources.

Federal Aviation Act of 1958 (49 U.S.C. 1301, *et seq*.)

This federal legislation was issued in 1958, created the FAA, and charged the agency's administrator with ensuring the safety of aircraft and the efficient utilization of navigable airspace within the jurisdiction of the United States (49 U.S.C. 130,1 *et seq*.). The Navy has evaluated the potential increase in safety risk associated with the alternatives at each home basing location. It has been concluded that there would be no increase in the potential safety risk from the proposed action at any of the home base locations. For information on safety impacts under the home basing alternatives, please refer to the chapters listed in Table 10-6.

Table 10-6 List of EIS Chapters Containing Information on Safety Impacts

Florida: NAS Jacksonville	Chapter 4.11.1
Washington: NAS Whidbey Island	Chapter 6.11.1
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.11.1

Federal Noxious Weed Act of 1970 (7 U.S.C. 2803 and 2809)

This federal legislation was established in 1970. The act institutes the control and eradication of noxious weeds and regulates them in interstate and foreign commerce as part of the U.S. Code, Title 7, Agriculture, Noxious Weeds (7 U.S.C. 2803 & 2809). The proposed action would neither impact nor result in the spread of any species or populations of noxious weeds.

Migratory Bird Treaty Act (16 U.S.C. 701-715s)

All birds, with the exception of non-native species, that occur at each of the three home basing locations, are protected under the MBTA (16 U.S.C 701-715s) of 1918 and EO 13186. This is the primary federal legislation in the United States established to conserve migratory birds. The MBTA prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation. The species of birds protected by the MBTA appear in Title 50, Section 10.13, of the Code of Federal Regulations (50 CFR 10.13).

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires federal agencies to support the conservation intent of migratory bird conventions by integrating bird-conservation principles, measures, and practices into agency activities and by avoiding or minimizing adverse impacts on migratory bird resources and to minimize the intentional take of species of concern.

The Navy has evaluated the potential for the alternatives to adversely affect migratory birds. It has been concluded that there would be undetectable impacts on migratory bird species at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay from removal of habitat and no increased mortality of migratory birds from construction activities or aircraft operations. For information on impacts on migratory birds at the various home basing locations, please refer to the chapters listed in Table 10-7.

Table 10-7 List of EIS Chapters Containing Information on Impacts on Migratory Birds

Florida: NAS Jacksonville	Chapter 4.8.3
Washington: NAS Whidbey Island	Chapter 6.8.3
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.8.3

Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978).

The BGEPA of 1940, as amended in 1959, 1962, 1972, and 1978 (16 U.S.C. 668-668d), prohibits the taking or possession of or commerce in bald and golden eagles, with limited exceptions. "Taking" includes pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing. "Commerce" would include selling, purchasing, bartering, or transporting, i.e., conveying or carrying by any means or delivering or receiving for conveyance (16 U.S.C. 668c). The 1972 amendments increased penalties for violating provisions of the BGEPA or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation. The 1978 amendment authorizes the Secretary of the Interior to permit the taking of golden eagle nests that interfere with resource development or recovery operations. See Chapters 4.8.6 and 6.8.5 for more details concerning bald eagles at NAS Jacksonville and NAS Whidbey Island, respectively.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act was passed in 2007. Title IV, Subtitle C, Section 438, provides that "the sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow." This provision should increase focus on LID in federal development projects and, as a consequence, help foster increased use, technical improvements, and potential cost reductions for LID practices nationwide.

Executive Orders 13423 and 13514

EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, sets goals for federal agencies in areas such as energy efficiency, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, and water conservation. EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, expands on the EO 13423 requirements with mandates for federal agencies to meet numerical and non-numerical targets. For example, EO 13514 requires that 95 percent of all new contracts require the use of water-efficient fixtures, low-flow fixtures, non-toxic or less toxic products, and energy-efficient products. EO 13514 also requires that all new construction comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. This includes employing design and construction strategies that increase energy efficiency, eliminate solid waste, and reduce storm water runoff. All new construction would be designed to comply with EO 13423 and EO 13514.

Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 provides for notification procedures when a release of a hazardous substance occurs, sets up community response measures to a hazardous substance release, and establishes inventory and reporting requirements for toxic substances at all facilities as part of the U.S. Code, The Public Health and Welfare (42 U.S.C. 11001 to11050).

Pollution Prevention Act of 1990

The Pollution Prevention Act of 1990 establishes source reduction as the preferred method of pollution prevention, followed by recycling, treatment, and then disposal into the environment. It also establishes reporting requirements to submit with EPCRA reports (42 U.S.C. 13101 to 13109). Federal agencies are required to comply.

Executive Order 11988

EO 11988, *Floodplain Management* (as amended by EO 12148 in 1979), requires federal agencies to avoid activities directly or indirectly resulting in development of floodplain areas. In accordance with EO 11988, neither of the proposed action alternatives would result in direct or indirect development within a floodplain.

Executive Order 13045

In 1997, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was issued. This EO (which was amended by EO 13229 in 2001) requires each federal agency to "…make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and …ensure that its policies, programs, activities and standards address disproportionate risks to children…."

The research reviewed suggests that environments with sustained high background noise can have variable effects on learning and cognitive abilities and reports various noise-related physiological changes. The proposed action would not result in environmental health risks and safety risks that may disproportionally affect children. For information on impacts to the protection of children at the different home basing locations, please refer to the chapters listed in Table 10-8 below.

Executive Order 12898

EO 12898, *Federal Actions to Address Environmental Justice to Minority Populations and Low-Income Populations* (as amended by EO 12948 in 1995), directs all federal departments and agencies to incorporate environmental justice considerations in achieving their mission. Each federal department or agency must identify and address disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority populations and low-income populations.

Criteria, methods, and practices used in the preparation of this EIS to evaluate the significance of impacts resulting from the proposed action do not discriminate either directly or indirectly on the basis of income, race, color, or national origin. This environmental justice analysis was conducted assuming that:

- Adverse impacts would result from aircraft noise, and
- The alternatives that would result in the largest number of individuals exposed to the greater than 65 dB DNL noise zone present the worst-case analysis.

Analysis of Minority Populations

The White House Office of Environmental Justice defines minority populations as "individuals who are Black/African-American, Hispanic, Asian, Pacific Islander, American Indian, Eskimo, Aleut, or other non-white persons." The Office of Environmental Justice indicates that for populations to be considered minority, the minority composition should either exceed 50 percent or be greater than the minority population percentage of the general population for the geographic area under analysis. The appropriate unit of analysis may be a governing body's jurisdiction, a neighborhood, a census tract, or other similar unit.

Analysis of Low-Income Populations

The CEQ (1997) defines low-income populations as populations considered by the U.S. Census Bureau to be "below poverty level." For purposes of the analyses in this EIS, the U.S. Census Bureau data were used to assess low-income populations.

Minority and Low-Income Population Access to Public Information

One goal of EO 12898 is to provide minority communities and low-income communities with access to public information on, and an opportunity for public participation in, matters relating to human health or the environment.

The Navy determined that the proposed action would not result in disproportionally high and adverse human health or environmental effects on minority populations and low-income populations under either of the home basing alternatives at NAS Jacksonville, NAS Whidbey Island, or MCB Hawaii Kaneohe Bay. For information on impacts on socioeconomic resources (local economy, housing, minority populations, etc.) under the alternatives, refer to the chapters listed in Table 10-8.

Table 10-8 List of EIS Chapters Containing Information on Impacts on Socioeconomic Resources

Florida: NAS Jacksonville	Chapter 4.5
Washington: NAS Whidbey Island	Chapter 6.5
Hawaii: MCB Hawaii Kaneohe Bay	Chapter 8.5

10.2 Required Permits, Approvals, and Consultations

A list of federal and state permits and agency approvals required for implementation of the proposed action under both of the alternatives is included in Table 10-9.

10.3 Unavoidable Adverse Impacts and Considerations that Offset these Impacts

Unavoidable adverse impacts would vary by home base sites and replacement alternatives. Adverse impacts are discussed in the environmental consequences chapter for each home base site and are summarized below.

10.3.1 Alternative 1

The number of personnel stationed at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay would decrease under Alternative 1. Loss of personnel and payroll would have an adverse impact on the regional economy surrounding each home base. The total direct losses of annual earnings within the regional economies are estimated at $28.3 million for NAS Jacksonville, $5.3 million for NAS Whidbey Island, and $114.0 million for MCB Hawaii Kaneohe Bay. The impacts at NAS Jacksonville and NAS Whidbey Island would be partially offset by an increase of $20.8 million and $111.1 million, respectively, in economic benefits generated by one-time construction expenditures. Likewise at MCB Hawaii Kaneohe Bay, the impact would be partially offset by an increase of $11.3 million in economic benefits generated by one-time construction expenditures.

Construction of support facilities at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay under Alternative 1 would cause the permanent loss of approximately 12.89 acres, 9.16 acres, and 1.1 acres, respectively, of herbaceous vegetation, primarily maintained grass. A loss of approximately 0.8 acre of wetland would also occur at NAS Whidbey Island. Impacts on wetlands would be offset by incorporating wetland avoidance and mitigation measures into final facility designs and by using BMPs during construction. In addition, wetland mitigation would be completed in accordance with permits from the USACE and Washington Department of Ecology.

Table 10-9 Required Permits and Approvals

			ALT 1	ALT 2
Federal				
USFW ESA Section 7 Consultation	U.S. Fish and Wildlife Service	Effect determination on threatened and endangered species (NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay)	X	X
NMFS ESA Section 7 Consultation	National Marine Fisheries Service	Effect determination on threatened and endangered species (NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay)	X	X
Section 404 of the Clean Water Act (33 U.S.C. §1251, *et seq.*)	U.S. Army Corps of Engineers	Impacts on jurisdictional wetlands (NAS Whidbey Island)	X	X
Objects Affecting Navigable Airspace (14 CFR 77)	Federal Aviation Authority	Notice of proposed construction forms 7460-1 and 7460-2 (NAS Whidbey Island and MCB Hawaii Kaneohe Bay)	X	X
State of Florida (NAS Jacksonville)				
Coastal Consistency Determination	Florida Department of Community Affairs	Activities affecting the coastal zone	X	X
NPDES Construction Storm Water Permit	Florida Department of Environmental Protection	Ground disturbance exceeding 1 acre	X	X
Section 106 Review (National Historic Preservation Act, §106, 16 U.S.C. 470 *et seq.*)	Florida Division of Historical Resources	Ground disturbance	X	X
State of Washington (NAS Whidbey Island)				
Coastal Consistency Determination	Washington Department of Ecology	Activities affecting the coastal zone	X	X
Section 401 Water Quality Certification	Washington Department of Ecology	Impacts on jurisdictional wetlands	X	X
NPDES Construction Storm Water Permit	Washington Department of Ecology	Ground disturbance exceeding 1 acre	X	X
Section 106 Review (National Historic Preservation Act, §106, 16 U.S.C. 470 *et seq.*)	Washington Department of Archaeology and Historic Preservation	Ground disturbance	X	X
State of Hawaii (MCB Hawaii Kaneohe Bay)				
Coastal Consistency Determination	Office of State Planning	Activities affecting the coastal zone	X	X
NPDES Construction Storm Water Permit	Hawaii Department of Health	Ground disturbance exceeding 1 acre	X	X
Section 106 Review (National Historic Preservation Act, §106, 16 U.S.C. 470 *et seq.*)	Hawaii State Department of Land and Natural Resources, Historic Preservation Division	Ground disturbance	X	X

Implementation of Alternative 1 at MCB Hawaii Kaneohe Bay would have the potential to result in direct and permanent impacts to an NRHP-eligible structure (Hangar 104) from renovation activities. Hangar 104 is a contributing element of the NRHP-eligible NAS Kaneohe Bay Aviation District. The Navy evaluated the potential for direct and indirect impacts on Hangar 104 and determined that there would be no adverse effects on historic properties. The Navy consulted with the Hawaii SHPO regarding the potential direct and indirect effects of proposed construction activities on Hangar 104 and the NAS Kaneohe Bay Aviation District, and the Hawaii SHPO concurred that Alternative 1 would have no adverse effect on Hangar 104 (George 2013, Westfall 2013).

10.3.2 Alternative 2

The number of personnel stationed at NAS Jacksonville and MCB Hawaii Kaneohe Bay would decrease under Alternative 2. Loss of personnel and payroll would have an adverse impact on the regional economy surrounding the station and base. The total direct losses of annual earnings within the regional economies are estimated at $8.1 million for NAS Jacksonville and $211.8 million for MCB Hawaii Kaneohe Bay. The impact at MCB Hawaii Kaneohe Bay would be partially offset by an increase of $11.3 million in economic benefits generated by one-time construction expenditures.

Construction of support facilities at NAS Whidbey Island under Alternative 2 would cause the permanent loss of approximately 15.76 acres of herbaceous vegetation, primarily maintained grass. A loss of approximately 2.44 acres of wetland would also occur at NAS Whidbey Island. Impacts on wetlands would be offset by incorporating wetland avoidance and mitigation measures into final facility designs and by using BMPs during construction. In addition, wetland mitigation would be completed in accordance with permits from the USACE and the Washington Department of Ecology.

Construction of support facilities at NAS Jacksonville and MCB Hawaii Kaneohe Bay under Alternative 2 would cause the permanent loss of approximately 12.89 acres and 1.1 acres, respectively, of herbaceous vegetation, primarily maintained grass.

Implementation of Alternative 2 at MCB Hawaii Kaneohe Bay would result in direct and permanent impacts to an NRHP-eligible structure (Hangar 104) from renovation activities. Hangar 104 is a contributing element of the NRHP-eligible NAS Kaneohe Bay Aviation District. If Alternative 2 is selected as the preferred alternative and as part of the effects determination pursuant to Section 106 of the NHPA and implementing regulations for Section 106 at 36 CFR Part 800, the Navy will initiate consultation with the Hawaii SHPO regarding potential direct and indirect effects of proposed construction activities on Hangar 104 and the NAS Kaneohe Bay Aviation District.

10.4 Relationships between Short-Term Uses of the Environment and Enhancement of Long-Term Productivity

Short-term uses of the environment associated with the proposed action would include changes to the physical environment and energy and utility use during the construction of administrative, training, and other facilities to support the P-8A. Construction at NAS Jacksonville, NAS Whidbey Island, and MCB Hawaii Kaneohe Bay would involve short-term increases in fugitive dust emissions and construction-generated noise and increase the use of fossil fuels to power construction equipment. In addition, expenditures of public funds/resources and the use of labor would be required. Long-term changes would include alterations to land uses that would exist for the life of the facility.

The P-8A would result in long-term productivity improvements in performance, training, and, ultimately, defending the United States. The P-8A would be dual-sited at two established maritime patrol home bases under Alternatives 1 and 2. The dual-site home basing under these alternatives would provide potential

cost savings from the three siting locations analyzed in the 2008 FEIS while still meeting current strategic operational objectives.

10.5 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. An irreversible effect primarily results from the use or destruction of a specific resource (e.g., energy or minerals) that cannot be replaced within a reasonable timeframe. The proposed action would not result in the long-term irreversible commitment of resources. Only a short-term irreversible commitment of resources would occur including use of energy resources and utilities during construction, generation of fugitive dust emissions, and creation of temporary construction noise.

Irretrievable commitments of resources are those resources that would be lost for a period of time, in this case, the life of the facilities. Irretrievable commitments of resources associated with the proposed action would result in the loss of wetlands due to the construction of support facilities at NAS Whidbey Island under Alternatives 1 and 2. Impacts on wetlands would be minimized, and appropriate permits would be secured; however, impacts would still occur.

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