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Invasive Plant Treatments

Final Supplemental Environmental Impact Statement

VOLUME 2 – APPENDICES

Deschutes and Ochoco National Forests
Crooked River National Grassland

Deschutes, Jefferson, Klamath, Lake, Crook, Wheeler, and Grant Counties, Oregon

St. John's-wort (Hypericum perforatum) on the Sisters Ranger District

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Table of Contents

APPENDIX A - Project Area Units, Invasive Species Information and Treatment Prescriptions *1*

Introduction **2**

Changes between the DSEIS and FSEIS **2**

Invasive Plant Species **2**

Types of Mechanical Treatments Proposed in Deschutes/Ochoco/Crooked River National Grassland Invasive Plant Treatment EIS **53**

APPENDIX B – Treatment Options and Common Control Measures for the Deschutes and Ochoco National Forests and Crooked River National Grassland *57*

References **72**

Biological Control **73**

APPENDIX C – Management Direction and Compliance with Forest Plan Standards *85*

Current Management Direction Relating to Invasive Plant Treatment: **86**

APPENDIX D – Herbicide Information and Project Design Feature Crosswalk *95*

Herbicide Information Summary and PDF Crosswalk **96**

Aminopyralid 98
Chlorsulfuron 101
Clopyralid 104
Glyphosate 107
Imazapic 110
Imazapyr 112
Metsulfuron methyl 114
Picloram 116
Sethoxydim 119
Sulfometuron methyl 121
Triclopyr 123
Water Solubility Chart 127
Mobility in Soil KOC 127
Livestock Use Restrictions by Herbicide 127

Summaries of Herbicide Characteristics that Influence Their Potential Effects on the Soil Resource **129**

Picloram 129
Sulfometuron methyl 129
Metsulfuron methyl 130
Chlorsulfuron 130
Triclopyr 131
Glyphosate 131
Clopyralid 132
Imazapic 133
Imazapyr 133
Sethoxydim 134

References **135**

APPENDIX E – Revegetation Planning and Implementation, and Excerpts from the 2003 "Draft Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest" ***137***

Revegetation Planning and Implementation **138**

Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest **139**

APPENDIX F – Project Implementation and Monitoring ***159***

Invasive Plant Treatment Implementation and Monitoring Guide Deschutes and Ochoco National Forests, Crooked River National Grassland **160**

Changes between DSEIS and FSEIS: 160
Annual Implementation Guidelines 160
Site Priority and Objectives 163
Treatment Prescription Examples 165

Post Implementation Reporting Guidelines **178**

Monitoring **178**

APPENDIX G – Deschutes and Ochoco National Forests and Crooked River National Grassland Invasive Plant Species Prevention Practices ***191***

Introduction **192**

Desired Future Condition **192**

Deschutes and Ochoco National Forest and Crooked River National Grassland Integrated Invasive Plant Prevention Practices **197**

Education 197
Project Need 198
Prevention – Minimize Transportation of Invasive Plant Seed 198
Project Planning, Design, and Special Use Permit Administration 199
Pre-Project Activity, Inventory, and Analysis 201
Project Implementation 202
Revegetation/Site Rehabilitation 203
Monitoring 203
Site Specific Examples of Prevention Measures 206

APPENDIX H – Fisheries Analysis by Watershed and Tabular Data ***211***

Introduction **212**

Lower Deschutes Watersheds **212**

Upper Trout Creek 212

Upper Deschutes Watershed **214**

Upper and Lower Metolius River Watersheds (HUC – Upper Metolius 1707030109 and Lower Metolius 1707030110) 214
Probability and Magnitude 219
Whychus (formerly Squaw) Creek Subwatersheds (HUC – Upper Whychus Creek 170703010802, Middle Whychus Creek 170703010808, Lower Whychus Creek 170703010809) 224

Odell Subwatersheds (HUC - Odell Lake 170703010201, Odell Creek 170703010202, Moore Creek 170703010203, and Davis Lake 170703010204) 227
McKay Creek and Allen Creek Subwatersheds (HUC –170703050501 and 170703050502) 230

Lower John Day Subbasin 233
Bridge Creek Watershed 233
Upper John Day Watersheds....236

APPENDIX I – Watershed Information.... 253

Stream Buffer Widths....257

APPENDIX J – Public Comments on the Draft Supplemental EIS and Forest Service Responses.... 261

Response to Comments 262
Comment Period 262
Responding to Comments....262
Government Agency Comment Letters....332
Table J-25 332

List of Tables

Table A-1. Invasive plant species....2
Table A-2. Project Area Summary Report....3
Table A-3. Treatment Areas for proposed mechanical treatments....54
Table A-4. Project Area Units planned for active revegetation of invasive plant sites....54
Table B-1. Treatment options 58
Table B-2. Invasive plant species proposed for biological control....74
Table B-3. Herbicides considered for use 78
Table B-4. Adjuvants and drift reduction agents approved for use 82
Table C-1. Current management direction for invasive plant treatments 86
Table F-1. Treatment prioritization strategy used annually to implement invasive plant treatments on the Deschutes and Ochoco National Forests and Crooked River National Grassland. 164
Table F-2. Top five priority invasive plant species for each district of the Deschutes and Ochoco National Forests and Crooked River National Grassland (as of September 2010). 165
Table F-3. Summary of results of simulations: Rimrock-Glyphosate on the dam output....170
Table F-4. Summary of results of simulation: Rimrock - Clopyralid use on the dam output 171
Table F-5. Summary of results of simulations: Rimrock-Clopyralid in the upland output 171
Table F-6. GLEAMS-Driver Input Parameters 176
Table F-7. Summary of results of simulations: Metolius alcove 0.5 cfs output 177
Table F-8. Summary of results of simulations: Metolius stream margin 1.8 cfs output....177
Table G-1. Goals and Objectives (from the R-6 IPEIS ROD) 192
Table G-2. New Forest Plan Standards (from the 2005 R6 IPEIS ROD)....194
Table G-3. Invasive plants prevention - Education....197
Table G-4. Invasive plants prevention - Project Needs....198
Table G-5. Invasive plants prevention – Minimize Transportation Of Seed 198
Table G-6. Invasive plant prevention – Project Planning, Design and Special Uses Permits 199
Table G-7. Invasive plants prevention - Pre-Project Activities....201
Table G-8. Invasive plants prevention - Project Implementation 202
Table G-9. Invasive plant prevention - Revegetation/Site Rehabilitation 203
Table G-10. Invasive plant prevention practices R6 FEIS Standards 204
Table G-11. Site-specific examples of prevention measures 206

Table H-1. Acres and number of locations infested invasive plant sites occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed. 213
Table H-2. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed....213
Table H-3. All PAU sites for the Upper Trout Creek Watershed by 6th field and potential areas of concern 213
Table H-4. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed. 215
Table H-5. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed....216
Table H-6. All PAU sites in the Upper and Lower Metolius Watershed by 6th field and potential areas of concern 217
Table H-7. Metolius River reed canary/ribbon grass infestations and other information collected during the 2006 survey....219
Table H-8. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed 225
Table H-9. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed....225
Table H-10. All PAU sites In the Whychus Watershed by 6th field and potential areas of concern....226
Table H-11. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed 228
Table H-12. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed....228
Table H-13. All PAU sites in the Wickiup Watershed by 6th field and potential areas of concern 229
Table H-14. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed 230
Table H-15. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed....231
Table H-16. All PAU sites in the McKay Watershed by 6th field and potential areas of concern 231
Table H-17. Acres and number of locations infested invasive plant sites occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed 233
Table H-18. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed. Results represent sites proposed for some form of herbicide treatment....234
Table H-19. All PAU sites in the Bridge Creek Watershed by 6th field and potential areas of concern....234
Table H-20. Acres and number of locations infested invasive plant sites occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed 237
Table H-21. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed....238
Table H-22. All PAU sites by 5th field, 6th field and potential areas of concern....238
Table H-23. Road miles in RR/RHCA and in invasive plant treatment area by subwatershed....240
Table H-24. Number of stream crossings by roads within infested invasive plant treatment sites on class 1, 2 and 3 TES fish steam....243
Table H-25. Subwatersheds with infested weed sites 300 feet or greater distance from Class 1, 2, or 3 streams and perennial lakes and ponds and reservoirs 245
Table H-26. Infested weed site acres and high risk road crossing sites for class 1, 2 and 3 streams, perennial lakes ponds and reservoirs by subwatershed. Subwatersheds with TE steelhead or bull trout are in bold....247

Table I-1. Watersheds *254*
Table J-1. List of commenters *263*
Table J-2. Response to comments – Toxicity of Herbicides *264*
Table J-3. Response to comments – Human Health *267*
Table J-4. Response to Comments – Water Quality *274*
Table J-5. Response to comments – Riparian Buffers *277*
Table J-6. Response to comments – Treatment Areas, Early Detection Rapid Response *282*
Table J-7. Response to comments – Treatment Method, Project Design Features *284*
Table J-8. Response to comments – Analysis Data *296*
Table J-9. Response to comments – Analysis, Human Health *302*
Table J-10. Response to comments – Analysis, Ecosystem *304*
Table J-11. Response to comments – Fish and Other Aquatic Resources *305*
Table J-12. Response to comments – Analysis, Wildlife *307*
Table J-13. Response to comments – Effects to Fish and Other Aquatic Resources *310*
Table J-14. Response to comments – Effects to Wildlife *311*
Table J-15. Response to comments – Effects to Soils *314*
Table J-16. Response to comments – Effects to Nontarget Plants *316*
Table J-17. Response to comments – Cumulative Effects *318*
Table J-18. Response to comments – Revegetation/Restoration *320*
Table J-19. Response to comments – Purpose and Need/Alternatives *320*
Table J-20. Response to comments – Prevention/Education *324*
Table J-21. Response to comments – Adaptive Management/Monitoring *326*
Table J-22. Response to comments – Laws, Regulation and Policy and Social Economics *327*
Table J-23. Response to comments – Comments Outside the Scope of This Analysis *329*
Table J-24. Response to Comments – General Comments, No Response Necessary *331*
Table J-25. Comments from Richard Artley received outside the comment period *333*

List of Figures and Exhibits

Figure F-1 part 1 ..... *167*
Figure F-1 part 2 ..... *168*
Figure F-2 part 1 ..... *173*
Figure F-2 part 2 ..... *174*
Figure F-2 part 3 ..... *175*
Exhibit 1: Invasive Plant Inventory Form *181*
Exhibit 2: FS2100-2, Pesticide Use Proposal Form *183*
Exhibit 3. Example of a Public Notice of Herbicide Use for Publication in Newspaper *186*
Exhibit 4: Inspection and Inventory Form for Mineral Material Sources *187*
Exhibit 5: Project Review for Heritage Resources under the Terms of the 2004 Programmatic Agreement among the USFS R6, ACHP, and SHPO, June 2004. ..... *188*
Exhibit 6. Project Consistency Evaluation Forms for treatment of PAUs that may affect federally ESA-listed species *189*

APPENDIX A - Project Area Units, Invasive Species Information and Treatment Prescriptions

Introduction

This appendix presents data tables that display information about each treatment area, such as description, species present, and acreage of infestation, comments, and preferred herbicides based on effectiveness. Prior to implementation, the project design features would be applied and application methods verified according to the implementation process in Appendix F.

Changes between the DSEIS and FSEIS

For appendix A, the changes between the draft and final supplemental EIS are:

- The Project Area Information Noting Resource Issues Present table was removed and is now located in the project file.
- The first choice chemical for Russian knapweed has been changed from picloram to clopyralid. This change did not result in measurable changes to the effects analysis.

Invasive Plant Species

Table A-1 that follows identifies invasive plant species present in the treatment areas.

Table A-1. Invasive plant species

Plant Code	Genus	Species	Common Name
ACRE3	*Acroptilon*	*repens*	Russian knapweed
ARMI2	*Arctium*	*minus*	lesser burdock
CADR	*Cardaria*	*draba*	whitetop
CANU4	*Carduus*	*nutans*	musk thistle
CAPU6	*Cardaria*	*pubescens*	hairy whitetop
CARDA	*Cardamine*	*spp*	bittercress
CEBI2	*Centaurea*	*biebersteinii*	spotted knapweed
CEDE5	*Centaurea*	*debeauxii*	meadow knapweed
CEDI3	*Centaurea*	*diffusa*	diffuse knapweed
CESO3	*Centaurea*	*solstitialis*	yellow star-thistle
CIAR4	*Cirsium*	*arvense*	Canada thistle
CIVU	*Cirsium*	*vulgare*	bull thistle
COAR4	*Convolvulus*	*arvensis*	field bindweed
CYOF	*Cynoglossum*	*officinale*	houndstongue
CYSC4	*Cytisus*	*scoparius*	Scotch broom
DIFU2	*Dipsacus*	*fullonum*	teasel
ELRE4	*Elymus*	*repens*	quackgrass
EUES	*Euphorbia*	*esula*	leafy spurge
HYPE	*Hypericum*	*perforatum*	St. Johnswort
IRPS	*Iris*	*psuedacoris*	yellow-flag iris
KOSC	*Kochia*	*scoparia*	kochia
LELA2	*Lepidium*	*latifolium*	perennial pepperweed
LEVU	*Leucanthemum*	*vulgare*	oxeye daisy
LIDA	*Linaria*	*dalmatica*	Dalmatian toadflax
LIVU2	*Linaria*	*vulgaris*	butter and eggs
MEOF	*Melilotus*	*officinalis*	yellow sweetclover
ONAC	*Onopordum*	*acanthium*	Scotch thistle
PHAR3	*Phalaris*	*arundinacea*	reed canarygrass

Plant Code	Genus	Species	Common Name
PHARP	*Phalaris*	*arundinacea*	ribbongrass
PORE5	*Potentilla*	*recta*	sulphur cinquefoil
RUDI2	*Rubus*	*discolor*	Armenian (Himalayan) blackberry
SAAE	*Salvia*	*aethiopis*	Mediterranean sage
SAKA	*Salsola*	*kali*	Russian thistle
SEJA	*Senecio*	*jacobaea*	tansy ragwort
SIAL	*Silphium*	*albiflorum*	white rosinweed
TACA8	*Taeniatherum*	*caput-medusae*	medusahead

Table A-2. Project Area Summary Report

11-01 Hwy 97 + 9701-100 Rd. + Rd. on west **PROJECT ACRES =** 635.25 **Infested ACRES =** 340.55
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 54%
COMMENTS: Major transportation route/vector for invasive plant spread. Knapweed greatly reduced from 98 EA-approved herbicide treatments, but SAKA has increased. Bisects Newberry National Volcanic Monument.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	
ONAC	Eradicate	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	
SAKA	Control	CHMA	Russian thistle	Chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-02 Rd. 18 **PROJECT ACRES =** 1,278. **Infested ACRES =** 12.82
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Major access route from Bend into eastern portions of Bend/Ft. Rock District. Small invasive plant sites scattered along road of 5 different invasive species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	
SAKA	Control	CHMA	Russian thistle	Chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-03 Rd. 21 + 10-mile sno-park **PROJECT ACRES =** 845.20 **Infested ACRES =** 6.33
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Within Newberry National Monument. Access road to Paulina and East Lakes; 10-mile snopark. Fourteen small sites along road, in snopark, & other recreation sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
HYPE	Eradicate	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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11-04 Pine Mountain **PROJECT ACRES =** 383.98 **Infested ACRES =** 172.67
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 45%
COMMENTS: Roads in Pine Mt. Area. Fourteen mapped sites of 4 species ranging in size from 0.01 ac. to 0.5 ac. (gross acres - GIS polygons).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
SAKA	Control	CHMA	Russian thistle	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-05 Hwy 31 **PROJECT ACRES =** 515.28 **Infested ACRES =** 379.87
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 74%
COMMENTS: Major transportation route from Hwy 97 east, from Deschutes NF into Fremont National Forest. Of the 13 mapped sites on Deschutes NF lands, CEBI2 is primary species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
SAKA	Control	CHMA	Russian thistle	Chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-06 Skyliner Road **PROJECT ACRES =** 442.71 **Infested ACRES =** 4.66
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Skyliner Rd. is a popular recreation access to Tumalo Falls and OMSI camp. Within Tumalo Creek Restoration Project; bare ground created by stream restoration project is high prevention priority. CEBI2 occurs along road & riparian area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-07 Hwy 46 **PROJECT ACRES =** 1,719. **Infested ACRES =** 25.89
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Major access route to Mt. Bachelor and high elevation trails/lakes; National Scenic Highway. CEBI2 infestations dense near Bend; isolated small plants pop up in widely scattered locations.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-08 Rd. 41 **PROJECT ACRES =** 365.90 **Infested ACRES =** 77.85
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 21%
COMMENTS: Access route between Sunriver Resort and Highway 46, though not as heavily used as Road 45 (Treatment Area 11-12). Of the 9 mapped sites, population sizes range from 10 plants to 5,000+.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-09 Rd. 40 **PROJECT ACRES =** 589.70 **Infested ACRES =** 4.37
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Another major access route between Sunriver Resort and Highway 46 (access to Cultus Lake, Crane Prairie Reservoir, Wickiup Reservoir). Mapped weed sites closer to Hwy 97, Sunriver.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-10 Rd. 42 **PROJECT ACRES =** 693.52 **Infested ACRES =** 7.09
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Arterial access route connects Hwy 97 and Hwy 46, accesses Deschutes River sites, Wickiup and Crane Prairie Reservoirs and other popular recreation spots. 12 mapped sites, largest near spur road to boat launch. RCG weed whack; spray after regrowth

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	
PHAR3	Suppress	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-11 Rd. 43 **PROJECT ACRES =** 219.94 **Infested ACRES =** 1.61
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Access road to Little Deschutes and Deschutes River recreation sites; connects with Road 42; crosses thru Pringle Falls Experimental Forest. 3 sites of CEBI2, LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-12 Rd. 45 **PROJECT ACRES =** 372.16 **Infested ACRES =** 0.52
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Major access road between Sunriver Resort and Mt. Bachelor, high elevation trails/lakes, winter snoparks, etc. Three small mapped sites of CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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11-13 Rd. 22 **PROJECT ACRES =** 1,252. **Infested ACRES =** 3.53
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Bull thistle currently only known invasive species. Road accesses Bend/Ft. Rock lands east of LaPine.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-14 Rd. 4603 **PROJECT ACRES =** 38.60 **Infested ACRES =** 0.17
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Access road from 4601 (Skyliner Rd.) to Tumalo Falls. Riparian access. Spotted knapweed along road and in riparian.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-15 Rd. 4606 South **PROJECT ACRES =** 59.55 **Infested ACRES =** 3.38
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 6%
COMMENTS: Collector roads that head north & south from Skyliner Rd. Five CEBI2 sites, ranging in size from < 30 plants to 2,500+ plants (as of 2005).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	

Imazapyr
LIDA Control CHMA Dalmatian toadflax Picloram Chlorsulfuron Imazapic
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11-17 Tumalo Creek **PROJECT ACRES =** 256.92 **Infested ACRES =** 3.38
SITE TYPE: FloodPlain **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Tumalo Creek is a stream restoration project. Dispersed use by public & Cascade Science School. CEBI2 on banks/islands within stream and along road. Bare ground created by stream channel restoration is high prevention priority.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-18 Ogden Group Camp **PROJECT ACRES =** 18.56 **Infested ACRES =** 5.88
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 32%
COMMENTS: Within Newberry National Volcanic Monument. Ogden Group Camp and trail along Paulina Creek used by public. Some areas quite disturbed and soil compaction/rocky ground makes hand-pulling difficult. Five CEBI2 sites; one CIVU.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-19 Cottonwood Road **PROJECT ACRES =** 32.87 **Infested ACRES =** 29.66
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 90%
COMMENTS: Cottonwood Road access from Hwy 97 to north part Sunriver resort. Dramatic decrease in CEDI3 since 1998-approved herbicide use. Seedbank & high use will require constant vigilance.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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11-21 Cultus Creek **PROJECT ACRES =** 1.19 **Infested ACRES =** 1.07
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 90%
COMMENTS: Cultus Creek - HYPE estimated at about 1 acre. Adjacent to Cultus River RNA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

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11-22 West side of Wickiup Reservoir **PROJECT ACRES =** 0.07 **Infested ACRES =** 0.07
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: West of Wickiup Reservoir along 120 spur road. One small site of LIDA (in 2005 estimated at 38 plants).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

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11-23 South side Dilman Meadow **PROJECT ACRES =** 1.73 **Infested ACRES =** 1.07
SITE TYPE: Meadow **Reveg:** PassiveRest **% TREATED =** 62%
COMMENTS: Dillman Meadow is northeast of Wickiup Reservoir. CIAR4 site at least 200 ft. from river; HYPE also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

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11-24 Southeast shore Wickiup Reservoir **PROJECT ACRES =** 87.60 **Infested ACRES =** 5.28
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 6%
COMMENTS: Ten mapped sites. One heavy infestation of CEBI2 (7,000+ plants), many seedlings underneath bitterbrush. PHAR majority of sites; weed whack; spray after regrowth

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-25 Sixteen Butte opal mine and vicinity **PROJECT ACRES =** 30.81 **Infested ACRES =** 1.49
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: CEBI2 occurs in flat open area where roads meet and may extend up road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-26 Coyote Flat **PROJECT ACRES =** 79.05 **Infested ACRES =** 4.01
SITE TYPE: HarvestUnit **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: Timber sale area. CIAR4, CEBI2, and CIVU.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-27 Horse Butte Rd. + Horse Butte **PROJECT ACRES =** 78.65 **Infested ACRES =** 12.61
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 16%
COMMENTS: Horse Butte Road (Rd. 1815) is close to Bend, highly used road. Horse Butte is popular dispersed rec site, very disturbed lands. CEBI2, CEDI3, LIDA & SAKA sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	
SAKA	Control	CHMA	Russian thistle	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-28 1800-019 Road **PROJECT ACRES =** 25.34 **Infested ACRES =** 0.46
SITE TYPE: Utility **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Between Rd. 18 (China Hat Rd.) and city of Bend. Two small mapped sites of CEBI2; 4 sites of LIDA, ranging from a few plants to about 500 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

11-29 ~1 mile NW of Horse Butte **PROJECT ACRES =** 63.13 **Infested ACRES =** 0.27
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Collector roads and adjacent areas on Forest boundary near southeast Bend. LIDA and CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic

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11-30 South shore Wickiup **PROJECT ACRES =** 11.82 **Infested ACRES =** 5.32
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 45%
COMMENTS: Large CIAR4 site in sand and rocky outcrops (latter makes manual treatment difficult). CEBI2 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

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11-31 Red Crater Quarry **PROJECT ACRES =** 0.49 **Infested ACRES =** 0.02
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 3%
COMMENTS: CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

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11-32 Sparks Lake **PROJECT ACRES =** 0.50 **Infested ACRES =** 0.11
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 22%
COMMENTS: Two sites of CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-33 West shore Paulina Lake **PROJECT ACRES =** 11.60 **Infested ACRES =** 5.17
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 45%
COMMENTS: High recreation use -- hiking, boating. PHAR3 mapped along west shore, near resort and by boat launch. CIVU also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
PHAR3	Suppress	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-34 West side Hosmer Lake **PROJECT ACRES =** 1.64 **Infested ACRES =** 1.00
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 61%
COMMENTS: PHAR3 mapped at 0.5 gross acres. Much of shoreline of Hosmer Lake is native vegetation.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHAR3	Suppress	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-35 Blue Lagoon **PROJECT ACRES =** 11.02 **Infested ACRES =** 7.47
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 68%
COMMENTS: Approximately 2 acres (GIS polygon) of PHAR3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHAR3	Suppress	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

****

11-37 Rd. 25 ~1,500' from jct. with Rd. 2510 **PROJECT ACRES =** 0.06 **Infested ACRES =** 0.01
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 17%
COMMENTS: Near Rd. 25 that connects Hwy 20 with Rd. 18 (China Hat Rd.), northwest of Pine Mt. One mapped site of CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A

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11-38 All Bull Thistle **PROJECT ACRES =** 173.76 **Infested ACRES =** 63.92
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 37%
COMMENTS: This Treatment Area covers numerous bull thistle sites on BFR. This species is a low priority for treatment and will be tolerated (no treatment) on some sites; pulled on others as opportunities allow.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

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11-39 Lava Lake **PROJECT ACRES =** 38.10 **Infested ACRES =** 22.16
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 58%
COMMENTS: Popular recreation spot. PHAR3 occupies about 2 acres along shoreline.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-40 Kelsey Butte Seed Orchard **PROJECT ACRES =** 25.38 **Infested ACRES =** 25.36
SITE TYPE: Admin **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: One mapped site that has CEBI2, LIDA and CIVU.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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11-41 18 Fire + Bessie Fire **PROJECT ACRES =** 1,256. **Infested ACRES =** 98.42
SITE TYPE: Fire **Reveg:** PassiveRest **% TREATED =** 8%
COMMENTS: 18 Fire area (2003). Very large SAKA site radiated out from quarry; other smaller sites of SAKA, CEBI2, LIDA, & CIVU scattered in area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	
SAKA	Control	CHMA	Russian thistle	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-42 1810 Road/Hazy TS #15 **PROJECT ACRES =** 0.39 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: Hazy Timber Sale unit along 1810 road (south of Bend, east of Deschutes River); one site of CEBI2 mapped in 2004.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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11-43 Geothermal test drilling **PROJECT ACRES =** 0.79 **Infested ACRES =** 0.20
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: Geothermal test drill sites in the Paulina Peak area. Along ponds created by geothermal testing. Two mapped sites of CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Contain	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

****

11-44 Road 25 at Forest Boundary **PROJECT ACRES =** 0.39 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: One relatively small site of SAKA (estimated at 75 plants in 2004).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

SAKA	Eradicate	CHMA	Russian thistle	chlorsulfuron	Metsulfuron methyl	Glyphosate

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11-45 Pine Mountain - Road 2017-300 **PROJECT ACRES =** 0.39 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: Small population of LIDA (estimated at 15 plants in 2004) in center of road where there had been recent downfall of ponderosa pine.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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11-46 Road 2268-600 **PROJECT ACRES =** 4.31 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: Two small sites of CEBI2 mapped along this network of roads in Pine Mt. area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

11-47 Road 4601-310/320 Jct. **PROJECT ACRES =** 0.54 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 18%
COMMENTS: South of Skyliners Road; one mapped site of CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A

****

11-48 Road 4615/4615-070 Jct. **PROJECT ACRES =** 0.54 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 18%
COMMENTS: Road travels north from Hwy 46 by Virginia Meissner Sno-Park. Only 2 plants of LIDA found in 2004.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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11-49 Proposed Midstate Electric Powerline **PROJECT ACRES =** 26.03 **Infested ACRES =** 0.52
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Five mapped weed sites of CEBI2 & LIDA. As of 2004, ranged in size from 40 to 300 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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11-50 Adjacent to Oregon Water Wonderland **PROJECT ACRES =** 3.30 **Infested ACRES =** 0.14
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: Two mapped sites of CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

11-51 SW of Pistol Butte **PROJECT ACRES =** 0.11 **Infested ACRES =** 0.06
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 59%
COMMENTS: LIDA site along road north of Rd. 42 and south of Pistol Butte.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

11-52 Rd 4180 **PROJECT ACRES =** 14.26 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Very small CEBI2 site when located in 2004 (only 2 plants). Rd. 4180 is east of Edison Butte (snopark) and northwest of Pitsua Butte.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A

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11-53 Rd 4285 + SE arm of Crane Prairie **PROJECT ACRES =** 158.82 **Infested ACRES =** 26.69
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 17%
COMMENTS: High recreational use. Several very large (1,000's of plants) sites of CEBI2. One site identified as a high district priority because potential vector source; occurs behind cabins, at dam, edge of Deschutes River. CIAR4, HYPE, PHAR3 occur also.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Contain	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-54 South Twin Lake **PROJECT ACRES =** 25.52 **Infested ACRES =** 1.78
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 7%
COMMENTS: Popular recreation site. One mapped site has CEBI2, CIAR4, PHAR3, and CIVU.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-55 Cabin Butte Cinder Pit **PROJECT ACRES =** 119.45 **Infested ACRES =** 1.48
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: CEBI2 and SAKA. As of 2005, CEBI2 had not spread beyond the mapped area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
SAKA	Contain	CHMA	Russian thistle	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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11-56 Crane Prairie Res - West **PROJECT ACRES =** 3.26 **Infested ACRES =** 3.26
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: Three different reed canarygrass sites along the west side of Crane Prairie Reservoir.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

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11-57 Tetherow Meadow **PROJECT ACRES =** 18.08 **Infested ACRES =** 18.08
SITE TYPE: Meadow **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: about one acre of ELRE.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ELRE4	Contain	MAMECH	quackgrass	Glyphosate	Chlorsulfuron+Sulfo	Sethoxydim	Imazapyr

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11-58 Old pits south of Phil's trailhead **PROJECT ACRES =** 118.98 **Infested ACRES =** 104.45
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 88%
COMMENTS: South of Skyliner Road and Phil's trailhead, close to Bend and popular recreation areas. Three mapped sites of CEBI2 & LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic

****

11-59 Coyote Butte Cinder Pit **PROJECT ACRES =** 58.03 **Infested ACRES =** 2.09
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: Three mapped large sites of CEBI2 (1,000's of plants). Some areas very compacted, manual treatment difficult. CEBI2 has spread from cinder pit to adjacent roads.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
SAKA	Contain	CHMA	Russian thistle	chlorsulfuron	Metsulfuron methyl	Glyphosate

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11-60 Area west of Entrada Lodge **PROJECT ACRES =** 39.31 **Infested ACRES =** 6.27
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 16%
COMMENTS: Access to public land just west of Entrada Lodge gets dispersed use. Eight mapped weed sites of CEBI2 & LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic

****

11-61 Deschutes River - Entrada **PROJECT ACRES =** 1.14 **Infested ACRES =** 0.35
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 31%
COMMENTS: Recreation site along Deschutes River close to Entrada Lodge. One mapped site of CEBI2 estimated at 500+ plants in 2004.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

****

11-62 Meadow Camp **PROJECT ACRES =** 30.82 **Infested ACRES =** 4.41
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 14%
COMMENTS: Popular day use area along the Deschutes River & access to Deschutes River Trail. Close to Bend. CEBI2, CIAR4, & CIVU occur. Manual treatments have occurred for years; difficult in areas with compacted ground & where plants under bitterbrush.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						

****

11-63 Inn of 7th Mtn - RD 41 Jct **PROJECT ACRES =** 44.96 **Infested ACRES =** 4.96
SITE TYPE: Trail_multi **Reveg:** PassiveRest **% TREATED =** 11%
COMMENTS: Dispersed recreation use in general area. This TA is by Inn of 7th Mt. Resort and junction Rds. 41 and 46. Two mapped CEBI2 sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

****

11-64 Arnold Ditch Access Road **PROJECT ACRES =** 2.02 **Infested ACRES =** 0.02
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Road access to water diversion used by Arnold Ditch Company. Three small sites of CEBI2 & LIDA occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic

****

11-65 Dillon Falls Day Use area **PROJECT ACRES =** 2.66 **Infested ACRES =** 1.96
SITE TYPE: Parking **Reveg:** PassiveRest **% TREATED =** 74%
COMMENTS: Dillon Falls Day Use area is a popular recreation spot (boat landing, hiking, mt. biking, etc.). CEBI2 & LIDA occur; some in trail in compacted areas.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

11-66 Ryan Ranch meadow **PROJECT ACRES =** 12.84 **Infested ACRES =** 10.63
SITE TYPE: Meadow **Reveg:** PassiveRest **% TREATED =** 83%
COMMENTS: Ryan Ranch meadow is along the Deschutes River, south of Dillon Falls Day Use Area. Hiking & biking mostly concentrated along trail by river. PHAR3 occurs throughout meadow. CIVU also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHAR3	Suppress	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

****

11-67 Slough Camp + Trail to North **PROJECT ACRES =** 14.38 **Infested ACRES =** 0.22
SITE TYPE: Trail_multi **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: This Treatment Area includes Slough Camp Day Use area and Deschutes River trails. CEBI2 & LIDA occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

11-68 Benham Falls complex **PROJECT ACRES =** 12.43 **Infested ACRES =** 0.85
SITE TYPE: Trail_multi **Reveg:** PassiveRest **% TREATED =** 7%
COMMENTS: Benham Falls area is high use recreation site for hiking, mt. biking, etc. Four mapped sites of CEBI2, CIAR4, CIVU, HYPE, LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

11-69 Deschutes River Party Site **PROJECT ACRES =** 2.79 **Infested ACRES =** 0.42
SITE TYPE: CampDispersed **Reveg:** PassiveRest **% TREATED =** 15%
COMMENTS: Dispersed camping site on west side of Deschutes River. Notorious party site. Large CEBI2 population (thousands of plants).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

11-70 North of Cardinal Bridge **PROJECT ACRES =** 0.35 **Infested ACRES =** 0.10
SITE TYPE: Meadow **Reveg:** PassiveRest **% TREATED =** 28%
COMMENTS: West side of Deschutes River, north of Cardinal Bridge, which adjoins to Sunriver. One mapped site of CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

****

11-71 Besson Road **PROJECT ACRES =** 30.00 **Infested ACRES =** 14.81
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 49%
COMMENTS: Besson Day Use Area is along west side of Deschutes River across from Sunriver Resort. Dispersed recreation area. CEBI2 occurs along road & in meadow; compacted ground makes handpulling difficult; small EUES site appears to have not spread much.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
EUES	Control	CHMA	leafy spurge	Picloram	Glyphosate	Imazapic	

****

11-72 Deer Run Seed Orchard **PROJECT ACRES =** 38.95 **Infested ACRES =** 37.77
SITE TYPE: Admin **Reveg:** PassiveRest **% TREATED =** 97%
COMMENTS: CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

11-73 Geothermal test drilling. **PROJECT ACRES =** 0.39 **Infested ACRES =** 0.10
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: One LIDA mapped site.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIDA	Contain	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

11-74 Rd 4613 **PROJECT ACRES =** 13.47 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Collector road runs from Edison Butte area northeast to Hwy 46. Small mapped CEBI2 site (< 30 plants in 2004).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

11-75 North Twin Lake **PROJECT ACRES =** 3.83 **Infested ACRES =** 1.07
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 28%
COMMENTS: High recreation use. One mapped site of CEBI2; one of CIVU.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A

****

11-76 Crane Prairie Res - NorthEast **PROJECT ACRES =** 0.19 **Infested ACRES =** 0.19
SITE TYPE: Lake **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: Reed canarygrass & Canada thistle along shoreline of Crane Prairie Reservoir.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

****

11-77 Quinn Gravel Pit **PROJECT ACRES =** 21.36 **Infested ACRES =** 4.26
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 20%
COMMENTS: Four acres (GIS polygon) of CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

11-78 Ice Rock Quarry **PROJECT ACRES =** 21.10 **Infested ACRES =** 19.62
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 93%
COMMENTS: ELRE mapped at 19 acres (GIS polygon).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ELRE4	Eradicate	CHMA	quackgrass	Glyphosate	Chlorsulfuron+Sulfo	Sethoxydim	

Imazapyr

****

11-79 Brown's Crossing **PROJECT ACRES =** 2.27 **Infested ACRES =** 0.18

SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 8%

COMMENTS: Popular recreation spot. Access to fishing and hiking. One mapped site that has CEBI2, CIAR4, CIVU, HYPE, PHAR3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	N/A
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
PHAR3	Suppress	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

****

11-80 Rd 44 at Bull Bend **PROJECT ACRES =** 1.38 **Infested ACRES =** 1.07

SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 78%

COMMENTS: A popular Deschutes River recreation area. PHAR3 occurs along river.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHAR3	Contain	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim	

****

12-01 Moore Creek timber sale units **PROJECT ACRES =** 379.67 **Infested ACRES =** 17.64

SITE TYPE: Plantation **Reveg:** PassiveRest **% TREATED =** 5%

COMMENTS: SEJA scattered throughout units. Hand-pulling has been effective & is preferred treatment. If herbicides needed, would be at specific sites that are expanding & selective backpack treatment.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A
SEJA	Eradicate	MACH	tansy ragwort	Clopyralid	chlorsulfuron	Picloram	

****

12-02 Hwy 58, west **PROJECT ACRES =** 185.23 **Infested ACRES =** 128.17

SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 69%

COMMENTS: West portion of Hwy 58 on east side of Odell Lake to Forest boundary. Major travel route. 13+ species occur along ROW. Numerous sites, mostly small, but some larger mapped sites of HYPE, CYSC, CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A
CYOF	Eradicate	CHMA	houndstongue	Metsulfuron methyl	Picloram	Glyphosate	N/A
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Eradicate	CHMA	Dalmatian toadflax	Picloram	Imazapic	N/A	
LIVU2	Suppress	CHMA	butter and eggs	Picloram	Imazapic	N/A	
ONAC	Eradicate	MA	Scotch thistle	N/A	N/A	N/A	N/A
SEJA	Eradicate	CHMA	tansy ragwort	Clopyralid	chlorsulfuron	Picloram	
SIAL	Suppress	MA	white rosinweed	N/A	N/A	N/A	N/A

****

12-03 Road 60 from 58 jct around Crescent lake, Crescent Lake Dam **PROJECT ACRES =** 269.58 **Infested ACRES =** 255.13

SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 95%

COMMENTS: Seven weed species mapped at 4 sites, ranging in size (GIS polygons) from 0.1 to 5 acres. CIAR4, LIDA, CIVU are the largest mapped sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	

Imazapyr							
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	
Imazapyr							
CIAR4	Eradicate	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	
Glyphosate							
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	
N/A							
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	
N/A							
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Eradicate	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

12-04 Hwy 58, east **PROJECT ACRES =** 275.23 **Infested ACRES =** 96.49
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 35%
COMMENTS: East portion of Hwy 58 from Hwy 97 west to Rd. 60. Major travel route. Eleven different species mapped at 6 sites. CEBI2 & HYPE dominate. Individual new plants of CESO3 found & pulled.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CAPU6	Eradicate	CHMA	hairy whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	
Imazapyr							
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	
Imazapyr							
CESO3	Eradicate	CHMA	yellow star-thistle	Clopyralid	Picloram	Glyphosate	
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	
Glyphosate							
COAR4	Eradicate	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	
Glyphosate							
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
KOSC	Eradicate	CHMA	Kochia	Chlorsulfuron	Metsulfuron methyl	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	
MEOF	Suppress	CHMA	yellow sweetclover	Clopyralid	Metsulfuron methyl	Glyphosate	
SAKA	Eradicate	CHMA	Russian thistle	Chlorsulfuron	Metsulfuron methyl	Glyphosate	

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12-05 Big Marsh **PROJECT ACRES =** 16.61 **Infested ACRES =** 2.74
SITE TYPE: Wetland **Reveg:** Revegetate **% TREATED =** 17%
COMMENTS: Though PHAR occurs throughout the marsh, the proposed treatment focuses on the east & west ditches where hydrologic restoration activities occur. reveg bare areas and treated areas with plugs or direct transplants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Eradicate	MA	Canada thistle	N/A	N/A	N/A	
N/A							
CIVU	Eradicate	MA	bull thistle	N/A	N/A	N/A	
N/A							
PHAR3	Suppress	CUME	reed canarygrass	N/A	N/A	N/A	N/A

****

12-06 Hwy 97 from Crescent to DES/WIN Forest Boundary **PROJECT ACRES =** 185.19 **Infested ACRES =** 116.34
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 63%
COMMENTS: Major travel route with new invasive species continually popping up. Currently, CEBI2, CEDI3, HYPE, CIVU occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	
Imazapyr							
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	
Imazapyr							
CIAR4	Eradicate	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	
Glyphosate							
CIVU	Tolerate	MA	bull thistle	N/A	N/A	N/A	
N/A							
HYPE	Control	MAMECH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

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12-07 Road 61 from Hwy 58 Jct east to Forest Boundary **PROJECT ACRES =** 108.06 **Infested ACRES =** 107.97
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: Five species occur within one mapped site; 2nd site of COAR occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIVU	Control	MA	bull thistle	N/A	N/A	N/A
N/A						
COAR4	Eradicate	CHMA	field bindweed	Picloram	Imazapic	Imazapyr
Glyphosate						
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
SAKA	Eradicate	MA	Russian thistle	N/A	N/A	N/A
N/A						

****

12-11 Hwy 46 from BFR boundary to 46/61 Jct **PROJECT ACRES =** 250.59 **Infested ACRES =** 137.49
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 55%
COMMENTS: Ten weed species have been found and pulled along this road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Eradicate	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron
Glyphosate						
CIVU	Control	CHMA	bull thistle	Clopyralid		
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A
N/A						
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
LELA2	Eradicate	MA	pepperweed	N/A	N/A	N/A
N/A						
LIVU2	Control	CHMA	butter and eggs	Picloram	Chlorsulfuron	Imazapic
ONAC	Eradicate	CHMA	Scotch thistle	Clopyralid	Chlorsulfuron	Metsulfuron methyl
SEJA	Eradicate	CHMA	tansy ragwort	Clopyralid	Chlorsulfuron	Picloram

****

12-12 Davis Lake Shoreline **PROJECT ACRES =** 17.10 **Infested ACRES =** 17.09
SITE TYPE: FloodPlain **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: Large CIAR4 site (7 ac. GIS polygon). PHAR3 also occurs but not proposed for treatment due to other higher priorities.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						

****

12-13 Along access road to RR T25S.R8E.S31 **PROJECT ACRES =** 1.45 **Infested ACRES =** 1.45
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: CIAR4 (0.5 gross mapped acres) occurs along a road that accesses the railroad.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CIAR4	Eradicate	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron
Glyphosate						

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12-14 Harvest unit between roads 62 and 730 **PROJECT ACRES =** 4.11 **Infested ACRES =** 4.11
SITE TYPE: Plantation **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: Tansy ragwort in harvest unit between roads 62 & 730.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
SEJA	Eradicate	CHMA	tansy ragwort	Clopyralid	Chlorsulfuron	Picloram

****

12-15 5800-017 road near RR tracks **PROJECT ACRES =** 1.00 **Infested ACRES =** 1.00
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: LIVU2 occurs along 5800-017 road near railroad tracks.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
LIVU2	Control	CHMA	butter and eggs	Picloram	Chlorsulfuron	Imazapic

****

12-16 RR ROW south of Odell Lake on Rd 6000-810 **PROJECT ACRES =** 193.47 **Infested ACRES =** 192.41
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 99%

COMMENTS: Railroad ROW runs east & NE of the Diamond Peak Wilderness and south of Odell Lake. 6 weed species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Glyphosate	
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A
CYSC4	Control	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	CH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

****

12-20 TS unit on the 6240010 road **PROJECT ACRES =** 1.00 **Infested ACRES =** 1.00

SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 100%

COMMENTS: LIDA occurs within a timber sale unit on the 6240010 rd.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIDA	Eradicate	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	

****

12-21 Rd 5835 just west of Little Deschutes River **PROJECT ACRES =** 3.58 **Infested ACRES =** 1.30

SITE TYPE: RangeAllot **Reveg:** PassiveRest **% TREATED =** 36%

COMMENTS: EUES occurs along Rd. 5835 just west of the Little Deschutes River (1 ac. GIS polygon).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
EUES	Contain	MAMECH	leafy spurge	Picloram	Glyphosate	Imazapic	

****

15-01 Little Montana, 800 Rd **PROJECT ACRES =** 430.15 **Infested ACRES =** 262.13

SITE TYPE: HarvestUnit **Reveg:** PassiveRest **% TREATED =** 61%

COMMENTS: Large CEBI2 site in old timber sale unit and along roads. HYPE, CIAR4, CEDI3, SEJA also occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	MECH	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A	N/A

****

15-02 Abbot Butte Area **PROJECT ACRES =** 428.35 **Infested ACRES =** 114.10

SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 27%

COMMENTS: Thirteen mapped sites; 6 species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A	N/A

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15-03 Rd. 16, Whychus Creek Wash areas **PROJECT ACRES =** 708.20 **Infested ACRES =** 238.76

SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 34%

COMMENTS: Well-traveled access route to Three Creeks Meadows and trailheads. CEBI2 & CEDI3 spreading along road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	MA	spotted knapweed	N/A	N/A	N/A	N/A
CEDI3	Control	MA	diffuse knapweed	N/A	N/A	N/A	N/A

****

15-04 Indian Ford, Sisters District, N Sisters Gravel Pit **PROJECT ACRES =** 255.48 **Infested ACRES =** 191.67
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 75%
COMMENTS: Includes a very disturbed former dump site often used by OHVs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
SAKA	Control	CHMA	Russian thistle	Chlorsulfuron	Metsulfuron methyl	Glyphosate	

****

15-05 Hwy 20 road corridor & adjacent areas **PROJECT ACRES =** 686.09 **Infested ACRES =** 480.30
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 70%
COMMENTS: CEBI2 greatly expanding especially within B&B Fire area. Encroaching onto Willamette NF. HYPE, CEDI3, CYSC, LIDA all occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Suppress	MA	bull thistle	N/A	N/A	N/A	N/A
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A	N/A

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15-06 Hwy 242, Reed's Ranch **PROJECT ACRES =** 342.55 **Infested ACRES =** 340.77
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 99%
COMMENTS: Access route to McKenzie Pass and over to Willamette NF. Heavy use in summer. Two mapped sites of CEBI2 & CEDI3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

15-07 Cache Fire Area **PROJECT ACRES =** 372.27 **Infested ACRES =** 76.15
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 20%
COMMENTS: HYPE sites along roads throughout Treatment Area and expanding since Cache Fire.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A	N/A
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	Chlorsulfuron	Imazapic	
SAKA	Eradicate	MA	Russian thistle	N/A	N/A	N/A	N/A

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15-09 Suttle Lake Area, including east of Blue Lake **PROJECT ACRES =** 128.62 **Infested ACRES =** 65.34
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 51%
COMMENTS: Major recreation area. CEBI2, CEDI3, HYPE occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

****

15-10 Rd 1230, "parking lot" and west BnB **PROJECT ACRES =** 827.89 **Infested ACRES =** 331.35
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 40%
COMMENTS: Rd. 1230 leaves Rd. 12; access eventually leads to Mt. Jefferson Wilderness (Jack Lake). Numerous (24) mapped sites of varying sizes of 7 weed species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A	N/A
CIAR4	Eradicate	MECH	Canada thistle	Clopyralid	Picloram	Chlorsulfuron	Glyphosate
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	MABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A	N/A

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15-11 Black Butte, Rd. 1110, 1105 **PROJECT ACRES =** 524.83 **Infested ACRES =** 140.95
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 27%
COMMENTS: Roads. Access popular Black Butte trail. Manual treatment proposed for 4 species that occur in small populations scattered along the roads.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A	N/A
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A	N/A

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15-12 Fly Creek area, including heli-pit, Rd 64 **PROJECT ACRES =** 482.76 **Infested ACRES =** 268.50
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 56%
COMMENTS: Only TACA8 site known on Deschutes NF. Fly Creek area had numerous weed sites, dry habitats, dispersed public use, different land ownerships = problem area. Goats used after Eyerly Fire to prevent seed production.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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15-13 1260 Rd CIAR4 **PROJECT ACRES =** 11.09 **Infested ACRES =** 0.54
SITE TYPE: Plantation **Reveg:** PassiveRest **% TREATED =** 5%

COMMENTS: Four mapped sites of CIAR4; largest in Roaring Ck. Riparian zone..

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	MECH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

****

15-14 Eyerly/Four Corners Area, Gunsight Pass **PROJECT ACRES =** 1,851. **Infested ACRES =** 337.07
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 18%
COMMENTS: Arterial & collector roads leading into NE portion Sisters District. Numerous small weed sites (mostly CEBI2, CEDI3, HYPE).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Control	CHMA	bull thistle	Clopyralid			
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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15-15 Round Lake, Rd. 1210 **PROJECT ACRES =** 313.46 **Infested ACRES =** 41.11
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 13%
COMMENTS: Ten mapped sites of CEBI2 & HYPE.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A

****

15-16 Rd. 1220 system **PROJECT ACRES =** 253.13 **Infested ACRES =** 56.07
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 22%
COMMENTS: Eight mapped sites of SEJA, CEBI2, CEDI3 & HYPE.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A	N/A
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A	N/A
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A	N/A

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15-17 Rd. 1499 **PROJECT ACRES =** 262.47 **Infested ACRES =** 235.05
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 90%
COMMENTS: Road leads to Horn of Metolius area. Four mapped sites of CEBI2 & HYPE; one of CYSC4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMABIO	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A	N/A
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A	N/A
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

****

15-18 Rd. 1419/1420 **PROJECT ACRES =** 116.19 **Infested ACRES =** 42.35
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 36%
COMMENTS: Largest weed concentration near jnct. w/ 1216.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3

HERBICIDE4						
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A
N/A						
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A
N/A						
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A
N/A						
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A
N/A						

****

15-19 Rd. 14 **PROJECT ACRES =** 325.30 **Infested ACRES =** 317.91
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 98%
COMMENTS: Major access route into Metolius River Area. Six species mapped in Treatment Area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A
N/A						
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A
N/A						
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A
N/A						

****

15-20 Rd. 1216 and Rd. 1217 **PROJECT ACRES =** 93.04 **Infested ACRES =** 53.40
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 57%
COMMENTS: CEBI2 & HYPE occur. Rd. 1216 runs through private land.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A
N/A						
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate

****

15-21 Rd. 12 and Dahl vicinity **PROJECT ACRES =** 634.93 **Infested ACRES =** 132.76
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 21%
COMMENTS: Access route for various recreation areas. Numerous sites (18) of CEBI2, CEDI3, CYSC4, HYPE, CIAR4, LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	MA	spotted knapweed	N/A	N/A	N/A
N/A						
CEDI3	Eradicate	MA	diffuse knapweed	N/A	N/A	N/A
N/A						
CIAR4	Eradicate	MECH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYSC4	Eradicate	MA	Scotch broom	N/A	N/A	N/A
N/A						
HYPE	Eradicate	MA	St. Johnswort	N/A	N/A	N/A
N/A						
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A
N/A						

****

15-22 Trout Creek Butte, swamp **PROJECT ACRES =** 468.96 **Infested ACRES =** 89.01
SITE TYPE: RoadMeadow **Reveg:** Revegetate **% TREATED =** 19%
COMMENTS: Though TA appears to be mostly roads, it also includes large PHAR3 infestation in Trout Ck. Swamp; SEJA & CIAR4 occur in treatment Area also. PHAR sites in Trout Creek Swamp are proposed for revegetation. RCG – weed whack; spray after regrowth

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CIAR4	Eradicate	MECH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CIVU	Control	MA	bull thistle	N/A	N/A	N/A
N/A						

PHAR3	Control	MECHMACU	reed canarygrass	Glyphosate	Imazapyr	Sethoxydim
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A
N/A						

****

15-24 Brooks Scanlon Rd. (Gist Rd. neighborhood) incl 4606 Rd. **PROJECT ACRES =** 269.60 **Infested ACRES =** 72.76
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 27%
COMMENTS: Two mapped sites of CEDI3 and CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

15-25 North of Dry Creek Swamp, 1028 Rd. **PROJECT ACRES =** 120.49 **Infested ACRES =** 30.13
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: One mapped site of CEBI2; one site of LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A	N/A

****

15-27 Glaze Meadow **PROJECT ACRES =** 81.32 **Infested ACRES =** 71.21
SITE TYPE: Meadow **Reveg:** PassiveRest **% TREATED =** 88%
COMMENTS: Small LIDA population. CIVU is more dominant species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A
LIDA	Control	MA	Dalmatian toadflax	N/A	N/A	N/A	N/A

****

15-30 Corbett Sno-Park, Meadow Lakes Area **PROJECT ACRES =** 370.52 **Infested ACRES =** 161.63
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 44%
COMMENTS: HYPE greatly expanding since B&B Fire. High dispersed recreation use throughout area. Lot of HYPE radiating out from Corbett Sno-Park; large CEBI2 (> 1,000 plants as of 2004), plus smaller CEBI2 populations, CIAR4, and some CEDI3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Eradicate	MECH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
HYPE	Control	CHMABIO	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
SEJA	Eradicate	MA	tansy ragwort	N/A	N/A	N/A	N/A

****

15-31 NW 1290 and vicinity **PROJECT ACRES =** 100.40 **Infested ACRES =** 49.72
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 50%
COMMENTS: 1292 & associated rds. End at Mt. Jefferson Wilderness (Cabot Creek area). Four mapped sites of CEBI2, HYPE, CYSC, & LIDA.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CARDA	Eradicate	MA	bittercress	N/A	N/A	N/A	N/A
CEBI2	Eradicate	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYSC4	Eradicate	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
HYPE	Control	MA	St. Johnswort	N/A	N/A	N/A	N/A
LIDA	Eradicate	MA	Dalmatian toadflax	N/A	N/A	N/A	N/A

****

15-32 Metolius River **PROJECT ACRES =** 119.28 **Infested ACRES =** 1.0
SITE TYPE: Stream **Reveg:** Revegetate **% TREATED =** 100%
COMMENTS: Metolius River ribbongrass sites. Many unique natural values and high recreation use.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
PHARP	Control	CHMAME	ribbongrass	Glyphosate	Imazapyr	Sethoxydim	N/A
IRPS	Eradicate	CHMA	yellow flag iris	Imazapyr	Glyphosate	N/A	N/A

****

71-01 North Fork Pit **PROJECT ACRES =** 8.63 **Infested ACRES =** 0.10
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

71-02 Hwy 26 **PROJECT ACRES =** 274.77 **Infested ACRES =** 1.57
SITE TYPE: Road and Stream **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: High traffic corridor. Weeds can pop up anywhere along and adjacent to this road. Currently, 17 mapped sites, 8 weed species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron	Glyphosate
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-03 Hon Spring **PROJECT ACRES =** 1.11 **Infested ACRES =** 0.40
SITE TYPE: Meadow **Reveg:** PassiveRest **% TREATED =** 36%
COMMENTS: CADR.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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71-04 Koch Butte **PROJECT ACRES =** 1.10 **Infested ACRES =** 0.24
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 22%
COMMENTS: EUES.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
EUES	Control	CHMA	leafy spurge	Picloram	Glyphosate	Imazapic	

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71-05 2600-160 Rd **PROJECT ACRES =** 1.11 **Infested ACRES =** 0.24
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 22%
COMMENTS: CADR.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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71-06 2730-501 Rd Pit **PROJECT ACRES =** 2.97 **Infested ACRES =** 0.10
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 3%
COMMENTS: About 3 acres of CEBI2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate Imazapyr

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71-07 Walton Lk. Loop **PROJECT ACRES =** 19.05 **Infested ACRES =** 0.2
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** %
COMMENTS: Walton Lake Loop Rd. Heavy recreation use. CEBI2, CIAR4, SEJA occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3 HERBICIDE4
CEBI2	Control	MA	spotted knapweed	N/A	N/A	N/A N/A
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A N/A
SEJA	Control	MA	tansy ragwort	N/A	N/A	N/A N/A

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71-08 Rd. 42 + s. portion of Rd. 30 + 42-320 **PROJECT ACRES =** 81.08 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Rd. 42 + s. portion of Rd. 30 + 42-320; One ONAC site estimated at 0.5 ac.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3 HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate Imazapyr
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram Glyphosate
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl

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71-10 2200-459 Rd. **PROJECT ACRES =** 32.62 **Infested ACRES =** 18.27
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 56%
COMMENTS: CESO3 on 5 ac. Site; TACA8 on 0.5 ac.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3 HERBICIDE4
CESO3	Eradicate	CHMA	yellow star-thistle	Clopyralid	Picloram	Glyphosate
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic Glyphosate

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71-11 4215 Rd. **PROJECT ACRES =** 78.18 **Infested ACRES =** 44.59
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 57%
COMMENTS: Crosses Horse Heaven, Buck, & Lodgepole Creeks. CADR & HYPE occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3 HERBICIDE4
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate

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71-12 4235 Rd. **PROJECT ACRES =** 49.09 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Western edge of TA by a creek (not named) has CADR. Road crosses Lost Creek. TACA8 also mapped. ACRE3, CEBI2 & LIVU2 also occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3 HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron Glyphosate
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate Imazapyr
LIVU2	Control	CHMA	butter and eggs	Picloram	chlorsulfuron	Imazapic
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic Glyphosate

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71-13 4240-200 **PROJECT ACRES =** 30.02 **Infested ACRES =** 0.39
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Two sites of ONAC & one site of SAAE currently mapped.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3 HERBICIDE4

ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl
SAAE	Control	CHMA	Mediterranean sage	Metsulfuron methyl	chlorsulfuron	Picloram

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71-14 2630 Rd System **PROJECT ACRES =** 46.27 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Small CESO3 (as of 1998) site; one CYOF site mapped; TACA8 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CESO3	Eradicate	CHMA	yellow star-thistle	Clopyralid	Picloram	Glyphosate	
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-15 2630 system **PROJECT ACRES =** 17.27 **Infested ACRES =** 9.60
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 56%
COMMENTS: A portion of the 2630-450 Rd. has houndstongue along it. Road adjacent to Bridge Creek Wilderness. CYOF mapped length of Treatment Area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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71-16 2210 System **PROJECT ACRES =** 437.19 **Infested ACRES =** 243.77
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 56%
COMMENTS: Two large houndstongue sites (5 & 2 ac. Infestations; high priority LOM species) plus numerous smaller CYOF sites. ARMI2 & CEBI2 also occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ARMI2	Control	CHMA	Lesser burdock	Metsulfuron methyl	Picloram	chlorsulfuron	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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71-17 2610 Rd. and Coyle Material Source **PROJECT ACRES =** 51.61 **Infested ACRES =** 3.87
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 7%
COMMENTS: Eleven mapped sites of 6 different species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron	Glyphosate
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
SAAE	Control	CHMA	Mediterranean sage	Metsulfuron methyl	chlorsulfuron	Picloram	
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-18 42 Rd. **PROJECT ACRES =** 186.56 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIVU2	Control	CHMA	butter and eggs	Picloram	chlorsulfuron	Imazapic	
SAAE	Control	CHMA	Mediterranean sage	Metsulfuron methyl	chlorsulfuron	Picloram	

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71-19 22 Rd. **PROJECT ACRES =** 679.16 **Infested ACRES =** 11.74
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Primary access route; access to Walton Lake; extensive road network with 29 mapped weed sites, 8 species. (TACA8, CYOF, ONAC, CEBI2 are in the top 5 priority species for treatment on LOM).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	
SAAE	Control	CHMA	Mediterranean sage	Metsulfuron methyl	chlorsulfuron	Picloram	
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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********** **71-22** 2300-200 System **PROJECT ACRES =** 126.35 **Infested ACRES =** 0.39
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Currently, 3 mapped sites of CEBI2 and one mapped site of CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	BIO	Canada thistle	N/A	N/A	N/A	N/A

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71-23 2200 Rd. System & 2630, 2630-358, 2630-368 Rds **PROJECT ACRES =** 187.29 **Infested ACRES =** 0.30
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Accesses south side Bridge Ck. Wilderness & Mt. Pisgah Lookout. CEBI2 & CYOF occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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71-24 3010 Rd System **PROJECT ACRES =** 28.19 **Infested ACRES =** 21.96
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 78%
COMMENTS: CEBI2 occurs along road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-25 4240 Rd System **PROJECT ACRES =** 172.33 **Infested ACRES =** 0.24
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Access rd. from Rd. 42 to North Fork Crooked River Wild & Scenic River. CYOF near river, near upper falls. CIVU, LIVU2, CEDI3

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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71-28 2600-700 System **PROJECT ACRES =** 38.42 **Infested ACRES =** 0.99

SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 3%
COMMENTS: Snowshoe Point area. Ten mapped weed sites, 9 < 0.1 ac.; largest site, TACA8, is 0.5 acre.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-29 2600-100 **PROJECT ACRES =** 52.62 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Access to Mill Creek Wilderness. Two CEDI3 mapped sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-30 2600-250 **PROJECT ACRES =** 30.19 **Infested ACRES =** 0.06
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: One CEBI2 site mapped at north end of Treatment Area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-31 2600-450 **PROJECT ACRES =** 21.64 **Infested ACRES =** 0.30
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Rd. runs from Hwy 26 east towards Ochoco Divide RNA. Three mapped CYOF sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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71-32 2600-600 System **PROJECT ACRES =** 223.03 **Infested ACRES =** 13.85
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 6%
COMMENTS: Roads access north portion of Ochoco Divide RNA. CYOF & TACA are high priority spp. for LOM.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-33 2630 Rds.-- 150, 155, 350, 400, 415, 420. **PROJECT ACRES =** 274.89 **Infested ACRES =** 1.77
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Various roads that travel north off of the 2630 Rd. CYOF (high priority LOM species).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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71-34 Sears Creek Material Source **PROJECT ACRES =** 5.85 **Infested ACRES =** 0.10
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	

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71-35 Blevins Seed Orchard **PROJECT ACRES =** 7.06 **Infested ACRES =** 0.00
SITE TYPE: Clearing **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Suppress	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

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71-36 2600-050 **PROJECT ACRES =** 32.68 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Currently, one mapped site of CEBI2 and one site of CIAR4 mapped.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A

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71-37 4200-050 **PROJECT ACRES =** 13.40 **Infested ACRES =** 0.19
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Currently one mapped site of CEBI2, one DIFU2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
DIFU2	Tolerate	NO	teasel	N/A	N/A	N/A	N/A

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71-38 Independent Mine **PROJECT ACRES =** 4.82 **Infested ACRES =** 0.10
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Quarry and trailhead. One mapped site of LIVU2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
LIVU2	Control	CHMA	butter and eggs	Picloram	Chlorsulfuron	Imazapic	

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71-39 4200-170 **PROJECT ACRES =** 42.69 **Infested ACRES =** 0.53
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: CEBI2 - estimated on about 0.25 ac..

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-40 FS 1610, 1620 Rd. System **PROJECT ACRES =** 141.28 **Infested ACRES =** 0.67
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: 7 CIAR4 mapped sites, ranging in size from 0.1-0.5 gross ac.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron	Glyphosate
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	

Imazapyr
CIAR4 Suppress BIO Canada thistle N/A N/A N/A
N/A
CIVU Tolerate NO bull thistle N/A N/A N/A
N/A
DIFU2 Tolerate NO teasel N/A N/A N/A
N/A
PORE5 Control CHMA sulphur cinquefoil Picloram Triclopyr Glyphosate

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71-41 4230-500, 600 **PROJECT ACRES =** 118.81 **Infested ACRES =** 1.18
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: CEBI2 & CEDI3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-42 2200-856 **PROJECT ACRES =** 8.08 **Infested ACRES =** 0.66
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 8%
COMMENTS: Only mapped site of CANU4 on LOM. TACA8 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CANU4	Control	CHMA	musk thistle	Clopyralid	Metsulfuron methyl	chlorsulfuron	
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-43 4230-100 and Lutsey Pit **PROJECT ACRES =** 41.02 **Infested ACRES =** 0.05
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-44 2600-300 and McGinnis Pit **PROJECT ACRES =** 15.11 **Infested ACRES =** 0.10
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: teasel also present in waste piles in pit

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	

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71-45 2620-150, 020, Hamilton Pit **PROJECT ACRES =** 89.51 **Infested ACRES =** 1.97
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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71-46 2610 Rd. System **PROJECT ACRES =** 162.27 **Infested ACRES =** 0.27
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: CYOF, CEBI2, and DIFU2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	

Imazapyr							
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
DIFU2	Tolerate	NO	teasel	N/A	N/A	N/A	N/A

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71-48 27, 33 Rd System, West **PROJECT ACRES =** 341.06 **Infested ACRES =** 14.67
SITE TYPE: RoadForestStream **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: At least 11 invasive species have been found along this primary access route to western parts of Lookout Mt. District.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	BIO	Canada thistle	N/A	N/A	N/A	N/A
COAR4	Control	CH	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
DIFU2	Tolerate	NO	teasel	N/A	N/A	N/A	N/A
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
PORE5	Control	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-49 33 Rd. System, East **PROJECT ACRES =** 141.23 **Infested ACRES =** 1.16
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Primary access route to some trailheads, including Mill Ck. Wilderness. Twelve mapped sites; 8 different weed species occur at scattered locations along Rd. 33.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
EUES	Control	CHMA	leafy spurge	Picloram	Glyphosate	Imazapic	
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-50 2730, 2735 Rd System **PROJECT ACRES =** 571.68 **Infested ACRES =** 1.94
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Extensive network of roads with 22 mapped weed sites, 7 species. Access to northern part of Mill Ck. Wilderness.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron	Glyphosate
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
PORE5	Control	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	

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71-51 FS 16, 17, 1680 Rd. System **PROJECT ACRES =** 650.24 **Infested ACRES =** 36.04
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 6%
COMMENTS: Road network in Maury Mts., including Antelope Reservoir. 36 mapped invasive plant sites; 8 species; scattered locations.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron	Glyphosate
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A
DIFU2	Tolerate	NO	teasel	N/A	N/A	N/A	N/A
PORE5	Control	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	

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71-52 3360 Rd. System **PROJECT ACRES =** 57.58 **Infested ACRES =** 0.10
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Eight invasive species occur along the road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
EUES	Control	CHMA	leafy spurge	Picloram	Glyphosate	Imazapic	
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-53 3370 Rd. System **PROJECT ACRES =** 60.83 **Infested ACRES =** 0.42
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Five HYPE sites along the 3380 rd. that branches off of the 3370 rd.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
EUES	Control	CHMA	leafy spurge	Picloram	Glyphosate	Imazapic	
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-54 E. Maury Mts Rd. System **PROJECT ACRES =** 126.07 **Infested ACRES =** 1.24
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: This road system that accesses the east portion of the Maury Mts. has 14 mapped, small (0.1 or < ac.) sites of 7 invasive species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron
Glyphosate						
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic

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71-55 2720, 2725, 752 spur and Trout Timber Sale Roads **PROJECT ACRES =** 566.34 **Infested ACRES =** 4.07
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Network of roads for Trout Timber Sale. Numerous sites; 6 weed species; majority of sites 0.1 or < acres.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
PORE5	Control	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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71-56 2730, 2745, 2725 Rd. System **PROJECT ACRES =** 525.37 **Infested ACRES =** 1.79
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: This road complex accesses northern portion of Mill Creek Wilderness. Numerous, small, scattered invasive plant sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDE5	Control	CH	meadow knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						
PORE5	Control	CH	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate

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71-57 Mill Cr. Wilderness **PROJECT ACRES =** 31.58 **Infested ACRES =** 0.49
SITE TYPE: Trail **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Accesses Mill Creek Wilderness (southwest portion). CEDI3 mapped on 5 sites estimated between 0.1-0.5 ac.in size.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	MA	spotted knapweed	N/A	N/A	N/A
N/A						
CYOF	Control	MA	houndstongue	N/A	N/A	N/A
N/A						
CEDI3	Control	MA	diffuse knapweed	N/A	N/A	N/A
N/A						

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71-58 Allen Cr. **PROJECT ACRES =** 15.41 **Infested ACRES =** 0.28
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Less than 1/2 a section of FS land surrounded by private land. Road follows Allen Creek. CEBI2 mapped (2 sites, both estimated at 0.1 ac.).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate

Imazapyr

71-59 27 and 3320 Rd. System **PROJECT ACRES =** 364.52 **Infested ACRES =** 3.30
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Access to recreation sites (trailheads), Mill Creek Wilderness. Numerous weed sites, ranging from 0.1 - 1 ac. in size.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
DIFU2	Tolerate	NO	teasel	N/A	N/A	N/A	N/A
PORE5	Control	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	

71-60 3300-213 Rd. **PROJECT ACRES =** 34.57 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: One site of CEDI3 mapped (estimated at 0.1 ac.).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

71-61 3300-500 Rd. System **PROJECT ACRES =** 524.79 **Infested ACRES =** 3.90
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: This network of roads has numerous, scattered sites, 4 different species. Sites range from 0.1 ac.to 5 acres in size. CEBI2, CEDI3, CYOF, HYPE.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	

71-62 1750-100, 150, 250 Rd. **PROJECT ACRES =** 237.70 **Infested ACRES =** 21.04
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 9%
COMMENTS: In southwest portion of Maury Mts.; 11 mapped weed sites ranging from 0.1 or < gross acres (CEDI3, CEBI2, ONAC, CIAR4) to 0.5 ac. (TACA8, CIAR4) to 5 ac. (SAAE).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	
SAAE	Control	CHMA	Mediterranean sage	Metsulfuron methyl	chlorsulfuron	Picloram	

71-63 1700-159 Rd. **PROJECT ACRES =** 15.02 **Infested ACRES =** 0.20
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: CIAR4 (2 mapped sites).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A

71-65 FS 16, 1670 Rd. System **PROJECT ACRES =** 385.02 **Infested ACRES =** 4.54
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Maury Mts. Numerous sites scattered along roads; 6 species. Majority of sites are 0.1 ac. Infestation or less; a few are estimated at0.5 ac.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
PORE5	Control	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	

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71-66 Appears to be a quarry on map **PROJECT ACRES =** 2.04 **Infested ACRES =** 0.10
SITE TYPE: RoadForest **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: EUES - one site mapped.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
EUES	Control	CH	leafy spurge	Picloram	Glyphosate	Imazapic	

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71-67 Rd 2200-903 **PROJECT ACRES =** 22.84 **Infested ACRES =** 0.39
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Four mapped sites of TACA8, each estimated at 0.1 gross acres.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-68 Gibson Spring Quarry **PROJECT ACRES =** 5.89 **Infested ACRES =** 0.10
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: About 5 acres CIAR4 infestation within quarry.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Eradicate	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

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71-69 Upper Hedgepath Creek **PROJECT ACRES =** 0.40 **Infested ACRES =** 0.10
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A

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71-70 Rd 2610-012 **PROJECT ACRES =** 11.75 **Infested ACRES =** 2.36
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 20%
COMMENTS: One mapped site of TACA8.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-71 Rd 4230-924 **PROJECT ACRES =** 0.42 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 23%
COMMENTS: CIVU occurs but not proposed for treatment.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A

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71-72 Rd 4230-921 **PROJECT ACRES =** 0.42 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 23%
COMMENTS: CIVU occurs but not proposed for treatment.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A

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71-73 Rd 2300-220 **PROJECT ACRES =** 1.62 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 6%
COMMENTS: One mapped site of CEDI3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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71-74 Rd 3350 **PROJECT ACRES =** 21.99 **Infested ACRES =** 0.34
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: CYSC, CYOF, TACA8 (one mapped site of each). TACA8 estimated at 0.5 ac. Other sites about 0.1 ac.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
CYSC4	Control	CHMA	Scotch broom	Triclopyr	Picloram	Glyphosate	
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-75 Rd 4200115,2630,2630370,2200147,2610300,2300220,2300226 **PROJECT ACRES =** 63.72 **Infested ACRES =** 4.80
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 8%
COMMENTS: Treatment Area database lists numerous roads with numerous CIAR4 sites, not all sites are on current GIS layer

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A

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71-76 Rd 3300-522 **PROJECT ACRES =** 15.77 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: One mapped site of TACA8.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-77 Rd 4240-211 **PROJECT ACRES =** 0.42 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 23%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A

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71-78 Rd 2610-050 **PROJECT ACRES =** 24.10 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: One mapped site of CEDI3; one site of TACA8.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Eradicate	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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71-80 200 RD - MAURY **PROJECT ACRES =** 0.35 **Infested ACRES =** 0.10
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 28%

COMMENTS: ONAC site in SE Maury Mts.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl

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71-81 Blaster Fire **PROJECT ACRES =** 22.95 **Infested ACRES =** 0.49
SITE TYPE: Fire **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: fire occurred 1995. 5 sites of 4 species.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
DIFU2	Tolerate	NO	teasel	N/A	N/A	N/A
N/A						
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate

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72-01 58, 5870, 58-800 roads **PROJECT ACRES =** 582.90 **Infested ACRES =** 45.13
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 8%
COMMENTS: Primary Rd. through Rager. Numerous small weed sites widely scattered along roads in this TA. 7 weed species mapped.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Eradicate	CH	Russian knapweed	clopyralid	picloram	chlorsulfuron
Glyphosate						
CADR	Eradicate	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						
HYPE	Eradicate	CH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
PORE5	Control	CH	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate

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72-02 3810 road (& 42 from Miller's to Wolf Cr) **PROJECT ACRES =** 155.77 **Infested ACRES =** 14.25
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 9%
COMMENTS: Includes portion of Rd. 42. Numerous relatively small sites of 8 species scattered along TA.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Eradicate	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
HYPE	Eradicate	CH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
LIDA	Eradicate	CH	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic
PORE5	Suppress	CHMA	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate

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72-03 42 Road **PROJECT ACRES =** 361.91 **Infested ACRES =** 16.75
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: Primary access route bisecting Paulina District. Numerous mapped sites mapped; one large, dense CYOF (#419) listed in TA 72-03, 72-15, & 72-37, but mostly in 72-37; 2nd large CYOF site (#324) mostly in 72-39.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Eradicate	CH	Russian knapweed	clopyralid	picloram	chlorsulfuron
Glyphosate						
CADR	Eradicate	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYOF	Eradicate	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
HYPE	Eradicate	CH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate

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72-04 4250 road to 4256 jct. and the 4250-100 road **PROJECT ACRES =** 144.43 **Infested ACRES =** 10.35
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 7%
COMMENTS: Six weed species are found along this road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
COAR4	Eradicate	CH	field bindweed	Picloram	Imazapic	Imazapyr
Glyphosate						
CYOF	Eradicate	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
CYSC4	Eradicate	CH	Scotch broom	Triclopyr	Picloram	Glyphosate
LIDA	Eradicate	CH	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic
PORE5	Control	CH	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate

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72-05 30 Road and 30-750 **PROJECT ACRES =** 195.11 **Infested ACRES =** 26.96
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 14%
COMMENTS: 3 small populations mapped. Herbicide spraying has occurred along road & in plantations. Both CEBI2 & CEDI3.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

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72-06 2630 Rd and 12 Rd to Forest Boundary **PROJECT ACRES =** 235.79 **Infested ACRES =** 1.12
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Small sites of 4 different weed species scattered along roads & in plantation.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYOF	Eradicate	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
DIFU2	Eradicate	MA	teasel	N/A		

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72-07 38 Road, 3820 rd, 38-120 road **PROJECT ACRES =** 434.20 **Infested ACRES =** 4.93
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Provides access to roads that lead to Black Canyon Wilderness. Rock Ck. 2 CIAR4 sites near trailhead, 1/8 and ¼ mile away.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CESO3	Eradicate	CH	yellow star-thistle	Clopyralid	Picloram	Glyphosate
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						

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72-08 5820 Road **PROJECT ACRES =** 254.83 **Infested ACRES =** 1.35
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: 5 weed species. One TACA site has 1,000's of plants - Highest priority species for control on Paulina District.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CADR	Eradicate	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A

N/A
CYOF Eradicate CH houndstongue Metsulfuron methyl chlorsulfuron Picloram
Glyphosate
TACA8 Eradicate CH medusahead Sulfometuron methyl Chlorsulfuron+Sulfo Imazapic
Glyphosate

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72-09 5840 and the 5830-400 system **PROJECT ACRES =** 303.69 **Infested ACRES =** 1.73
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Access to Wolf Mt. Lookout & SW of Black Canyon Wilderness. Five weed species. Two TACA sites on 5830-400 road are high district priority.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A
HYPE	Eradicate	CH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate	
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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72-10 5850 and 5850-400 roads **PROJECT ACRES =** 267.44 **Infested ACRES =** 0.49
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Access to SE Black Canyon Wilderness. Four weed species occur, relatively widely dispersed along roads.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
DIFU2	Eradicate	MA	teasel	N/A			
PORE5	Tolerate	NO	sulphur cinquefoil	N/A	N/A	N/A	N/A

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72-11 58-550 Road **PROJECT ACRES =** 111.24 **Infested ACRES =** 1.65
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Below (SE) of Hardscrabble Ridge. Sites of four species mapped, but large CEBI2 site also occurs on both sides of 550 rd. near jnct. w/ 58 Rd. (also CEBI2 at jnct.).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
EUES	Eradicate	CH	leafy spurge	Picloram	Glyphosate	Imazapic	
PORE5	Control	CH	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	

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72-12 `Parts of the 12, 4250 and 4274 roads **PROJECT ACRES =** 281.13 **Infested ACRES =** 0.87
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Three weed species widely scattered along roads in treatment area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

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72-13 4270 road, part of 4274 road and 4254 road **PROJECT ACRES =** 271.31 **Infested ACRES =** 1.11
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Numerous small weed sites scattered along roads; 6 different weed species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYOF	Eradicate	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
HYPE	Eradicate	CH	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate
LIDA	Eradicate	CH	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic
PORE5	Control	CH	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate

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72-14 4260 Road **PROJECT ACRES =** 324.33 **Infested ACRES =** 13.60
SITE TYPE: RoadPlus **Reveg:** Revegetate **% TREATED =** 4%
COMMENTS: Road crosses other treatment areas/weed sites (overlap with TA 72-20, 38, 42, & 44). Mostly numerous CYOF scattered along road, but also TACA, CIAR4, and very small DIFU2.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
DIFU2	Eradicate	MA	teasel	N/A		
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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72-15 4280 road, 4280-060 and 4280-061 **PROJECT ACRES =** 187.21 **Infested ACRES =** 58.73
SITE TYPE: RoadStream **Reveg:** Revegetate **% TREATED =** 31%
COMMENTS: Both CYOF & CIAR; bisects large, dense CYOF in plantations- infestation is mostly in TA 72-37. Only small portions of the plantations are planned for mechanical (disking) where conifer stocking is low and CYOF density is high.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYOF	Control	MEFICHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-16 4260-570 **PROJECT ACRES =** 14.12 **Infested ACRES =** 0.20
SITE TYPE: RoadPlus **Reveg:** Revegetate **% TREATED =** 1%
COMMENTS: Two TACA8 sites mapped in 1998; one on the FS ROW road shoulder going through private land.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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72-17 4260-560 system **PROJECT ACRES =** 50.80 **Infested ACRES =** 21.17
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 42%
COMMENTS: TACA8 site at lower portion of TA by Forest boundary. Other CYOF sites dispersed along rd.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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72-18 4260-650 road **PROJECT ACRES =** 106.41 **Infested ACRES =** 35.34
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 33%
COMMENTS: Mostly CYOF; small population of CEDI3 by northern portion of road. Largest CYOF sites overlap with TA 72-38 & 72-39.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-19 4260-500 and 4260-501 Roads **PROJECT ACRES =** 34.44 **Infested ACRES =** 5.61
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 16%
COMMENTS: Three mapped CYOF sites (2 > 500 plants in 2004; 1 about 100 plants in 2005).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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72-20 4260-400, 4260-300 and 4260-360 roads **PROJECT ACRES =** 369.29 **Infested ACRES =** 245.58
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 66%
COMMENTS: Several CYOF sites, all > 500 plants (as observed in 2004 & 2005; one site > 1,000 seedlings). One PORE site. One CYOF site north of 4260 Rd. overlaps with TA 72-14.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
PORE5	Control	MA	sulphur cinquefoil	N/A	N/A	N/A	N/A

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72-21 4260-100, 200 and 300 roads **PROJECT ACRES =** 65.23 **Infested ACRES =** 6.55
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 10%
COMMENTS: CYOF occurs in Treatment Area. One large site (estimated at > 500 plants in 2005); at several sites no plants were observed in 2005. Paulina weed site #369 on 300 rd. also has CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Eradicate	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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72-22 4290 road **PROJECT ACRES =** 38.95 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Two mapped weed sites: one CYOF site at a cattle guard and one CIAR4 site.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CYOF	Eradicate	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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72-23PVT 12 road from the forest boundary to highway 26 **PROJECT ACRES =** 73.92 **Infested ACRES =** 0.00
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: USFS ROW going through private land, so no data in NRIS. Partnership to treat this section with Crook County.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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72-25 4280-067 road **PROJECT ACRES =** 11.71 **Infested ACRES =** 2.56
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 22%
COMMENTS: One small (as of 2005) site of CYOF (about 10 plants).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

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72-26 4260-754 and 4280-050 roads **PROJECT ACRES =** 38.53 **Infested ACRES =** 4.78
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 12%
COMMENTS: Three mapped sites of CYOF, occuring on both sides of road and on bank edge of trail. One mapped site of CIAR west side of Dipping Vat Creek that also occurs in Treatment Area 72-15.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-27 4260-750 road **PROJECT ACRES =** 68.63 **Infested ACRES =** 13.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 19%
COMMENTS: Several mapped sites of CYOF. Site 444 is > 1,000 plants (2002 observation) & moving SE down drainage along skid trails. Other populations were estimated in 2004 to be < 100 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-28 42-660 road **PROJECT ACRES =** 35.84 **Infested ACRES =** 8.90
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: In 2004, there were < 25 CYOF plants very scattered in roadbed and along sides of 660 Rd.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-29 4260-700 road **PROJECT ACRES =** 36.67 **Infested ACRES =** 0.28
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Three very small (as of 2005) CYOF sites (each < 15 plants).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-30 4260-320 system **PROJECT ACRES =** 52.87 **Infested ACRES =** 0.39
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Four CYOF sites; larges (#374) > 500 plants; other 3 very small (as of 2005), < 25 plants each.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram
Glyphosate						

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72-31 4290-028 ROAD **PROJECT ACRES =** 35.28 **Infested ACRES =** 4.79
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 14%
COMMENTS: Four mapped weed sites of 3 species.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CADR	Eradicate	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
SAAE	Eradicate	CH	Mediterranean sage	Metsulfuron methyl	chlorsulfuron	Picloram

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72-32 3810-500 SYSTEM **PROJECT ACRES =** 69.32 **Infested ACRES =** 0.29
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: Follows East Wolf Creek. Three mapped CADR sites. Two sites are small; one site > 500 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CADR	Eradicate	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate

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72-33 58-806 ROAD **PROJECT ACRES =** 12.43 **Infested ACRES =** 0.62
SITE TYPE: RoadPlantation **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: One site of CEDI3 mapped towards west end of Treatment area; another site of CEDI3 in adjacent TA 72-01 at jct. 58-800/58-806.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3

HERBICIDE4

CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

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72-34 5870-300 **PROJECT ACRES =** 36.04 **Infested ACRES =** 0.20
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Two sites of CIAR4 & PORE (both < 0.01 ac. In 1998).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
PORE5	Control	CH	sulphur cinquefoil	Picloram	Triclopyr	Glyphosate	

****

72-35 58-800 SYSTEM **PROJECT ACRES =** 73.35 **Infested ACRES =** 0.69
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Five sites of CIAR4; 2 sites of CADR. Though sites scattered along road, most of sites within lower (south) portion of Treatment Area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Contain	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A

****

72-36 1280 ROAD SYSTEM **PROJECT ACRES =** 25.02 **Infested ACRES =** 0.18
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Barnhouse Campground in Treatment Area. Two sites of CIAR4 mapped in 2002.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

****

72-37 DIPPING VAT TRIB AND 4260-565 ROAD **PROJECT ACRES =** 202.84 **Infested ACRES =** 90.54
SITE TYPE: RoadStream **Reveg:** Revegetate **% TREATED =** 45%
COMMENTS: Large dense CYOF pop in T14S, R 23 E, S34 (also listed in TA 72-03 & 72-15 because roads bisect it. Only small portions of the plantations are planned for mechanical (disking) where conifer stocking is low and CYOF density is high.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	MEFICHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-38 Hewed Log Creek east of 4260-650 road **PROJECT ACRES =** 121.62 **Infested ACRES =** 27.27
SITE TYPE: StreamForest **Reveg:** PassiveRest **% TREATED =** 22%
COMMENTS: CYOF along creek and in uplands.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-39 TRIB OF ROBA CREEK AND CLOSED ROADS OFF 4260-651 **PROJECT ACRES =** 384.49 **Infested ACRES =** 153.24
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 40%
COMMENTS: CYOF only species recorded; several sites. Large CYOF site (4 ac.) occurs s. Rd. 42 & also listed in TA 72-03. Largest CYOF (10 ac.; site #252) is also listed in TA 72-18 due to overlap.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-41 4260-656 ROAD AND ROBA CREEK TRIBUTARY **PROJECT ACRES =** 113.57 **Infested ACRES =** 34.82
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 31%
COMMENTS: Two CYOF sites mapped; largest occurs on skid trails and very heavy infestation at spring upstream at drainage confluence.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-42 ROBA CREEK SOUTH OF 42560-500 **PROJECT ACRES =** 44.95 **Infested ACRES =** 14.77
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 33%
COMMENTS: One CYOF site, northern end of population on private land, also occurs in TA 72-14 (Rd. 4260) which traverses Project Area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-43 ROBA CREEK SOUTH OF 4260-650 ROAD **PROJECT ACRES =** 21.33 **Infested ACRES =** 3.90
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 18%
COMMENTS: One CYOF site > 500 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-44 Indian Creek and 4260-420 road **PROJECT ACRES =** 191.64 **Infested ACRES =** 38.32
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 20%
COMMENTS: Four mapped sites of CYOF. 2 sites overlap with TA 72-14 (Rd. 4260).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-46 PAULINA CREEK, SOUTH OF MARBLE RESERVOIR **PROJECT ACRES =** 13.07 **Infested ACRES =** 0.49
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: One site of CYOF estimated (in 2005) between 250-500 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Eradicate	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-47 Head of Paulina Creek **PROJECT ACRES =** 35.37 **Infested ACRES =** 5.77
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 16%
COMMENTS: One site of CYOF (about 500 plants seen in 2005).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Eradicate	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-48 Cottonwood Trail near Forest Boundary **PROJECT ACRES =** 10.55 **Infested ACRES =** 0.75
SITE TYPE: Trail_hike **Reveg:** PassiveRest **% TREATED =** 7%
COMMENTS: Only known site of RUDI2 on Paulina District and only site in our EIS.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
RUDI2	Eradicate	CH	Himalayan	Triclopyr	Glyphosate	Picloram	

****

72-49 12-300 road **PROJECT ACRES =** 10.75 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: One site of CEDI3 mapped (.25 ac.).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

72-50 Burnt Corral Creek south of 4260-300 to Burnt Corral Spring **PROJECT ACRES =** 98.31 **Infested ACRES =** 54.48
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 55%
COMMENTS: Large CYOF site (1,000 seedlings seen in 2005); has been manually treated by NW Youth Corps.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-52 Black Canyon Wilderness **PROJECT ACRES =** 117.09 **Infested ACRES =** 0.92
SITE TYPE: Trail_hike **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Black Canyon Wilderness Area. One CIAR4 site proposed CHMA; othere 8 CIVU sites proposed for manual treatment.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	MA	Canada thistle	N/A	N/A	N/A	N/A
CIVU	Control	MA	bull thistle	N/A	N/A	N/A	N/A

****

72-53 Trailhead on So. Fork John Day River **PROJECT ACRES =** 34.36 **Infested ACRES =** 11.90
SITE TYPE: RoadStream **Reveg:** PassiveRest **% TREATED =** 35%
COMMENTS: On edge of Black Canyon Wilderness. Though appears as one large weed site on our maps, actually 5 sites of 4 different weed species (ONAC, CIAR4, CYOF, & DIFU2).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	BIO	Canada thistle	N/A	N/A	N/A	N/A
CYOF	Eradicate	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate
DIFU2	Control	MA	teasel	N/A			
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	

****

72-59 5820-011 road (closed) area. Sensitive plant site (ACHE10) **PROJECT ACRES =** 1.38 **Infested ACRES =** 0.10
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 7%
COMMENTS: Small TACA8 site - no plants seen in 2005.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Eradicate	MA	medusahead	N/A	N/A	N/A	N/A

****

72-60 4260-250 road. Old skid trail and landing **PROJECT ACRES =** 17.88 **Infested ACRES =** 0.10
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: One CYOF site with between 250-500 plants.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CH	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

****

72-61 2630-726 and 729 roads. **PROJECT ACRES =** 33.09 **Infested ACRES =** 0.96
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 3%
COMMENTS: Two weed sites mapped; 1 is primarily CEDI3 but also includes a few CEBI2 plants; other is CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

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72-62 Murray Fire **PROJECT ACRES =** 15.66 **Infested ACRES =** 0.10
SITE TYPE: Fire **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: CIAR4 (BIOC treatment). Fire year 2002.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A
N/A						

72-63 4260-700 road near North Wolf Creek **PROJECT ACRES =** 2.81 **Infested ACRES =** 0.10
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: One mapped site of CIAR4.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Suppress	BIO	Canada thistle	N/A	N/A	N/A	N/A

72-64 Turnpike Pit 5840-780 Rd. **PROJECT ACRES =** 26.92 **Infested ACRES =** 3.51
SITE TYPE: Quarry **Reveg:** Revegetate **% TREATED =** 13%
COMMENTS: Road accesses quarry. TACA8 (Paulina priority species for treatment). Infestation on the rocky soil. A second small TACA8 site is adjacent to this pit, in TA 72-09.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Eradicate	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

72-65 Paulina Reservoir, 4260-345 rd **PROJECT ACRES =** 5.19 **Infested ACRES =** 0.10
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: One CYOF site < 50 plants in 2005.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

72-66 Roba Cr. trib above 4260-500 jct **PROJECT ACRES =** 2.61 **Infested ACRES =** 0.10
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: One mapped CYOF site estimated between 100-250 plants in 2004.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

72-67 4260-230 rd, dispersed site **PROJECT ACRES =** 2.07 **Infested ACRES =** 0.10
SITE TYPE: RoadPlus **Reveg:** PassiveRest **% TREATED =** 5%
COMMENTS: Dispersed recreation use. One CYOF site, no plants seen in 2005; CIAR4 also in area; lot of cheatgrass observed in 2005.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

72-68 NF Crooked trib, east of 4260-200 rd **PROJECT ACRES =** 0.91 **Infested ACRES =** 0.10
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 11%
COMMENTS: One small CYOF site, < 25 plants (in 2005); CIAR4 also.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIAR4	Control	CH	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate
CYOF	Control	CHMA	houndstongue	Metsulfuron methyl	chlorsulfuron	Picloram	Glyphosate

72-69 Sunflower Pit **PROJECT ACRES =** 2.74 **Infested ACRES =** 0.00
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 0%
COMMENTS: CEBI2 occurs in pit and is adjacent to pit in TA 72-01 (Paulina Weed Site #281).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4

CEBI2	Eradicate	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

****

72-70 Podo Meadows Material Source **PROJECT ACRES =** 2.00 **Infested ACRES =** 1.79
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 89%
COMMENTS: CEDI3 estimated about 0.25 ac.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Eradicate	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

****

75-02 Hwy 26 **PROJECT ACRES =** 224.36 **Infested ACRES =** 2.44
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: This major highway had numerous scattered weed sites of 4 different species. Majority is CEDI3, but also CEBI2, HYPE, & TACA8.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
HYPE	Control	CHMA	St. Johnswort	Metsulfuron methyl	Picloram	Glyphosate

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75-03 Road 51 **PROJECT ACRES =** 37.31 **Infested ACRES =** 11.64
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 31%
COMMENTS: Two mapped sites of CEBI2 on Monner Spring Rd. & at Monner Spring Exclosure; ACRE3 also occurs.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron
Glyphosate						
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

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75-05 N Combs Spring **PROJECT ACRES =** 194.11 **Infested ACRES =** 3.82
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Treatment Area follows County Roads. TACA8, CEBI2, CADR, CIAR4. Lower portion of TA runs along east edge of Rimrock Springs Wildlife Management Area.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	CHMA	Canada thistle	Clopyralid	Picloram	chlorsulfuron
Glyphosate						
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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75-07 Cyrus Spring area **PROJECT ACRES =** 66.67 **Infested ACRES =** 2.98
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 4%
COMMENTS: Large CEBI2 site (300 gross acres). Western edge of another large CEBI2 site in TA 72-44 overlaps with this Treatment Area. LIDA also occurs in this Treatment Area.

TARGET OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
LIDA	Control	CH	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic

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75-08 Old Hwy 97 Roadside **PROJECT ACRES =** 109.51 **Infested ACRES =** 74.86

SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 68%
COMMENTS: Jefferson County road 1-27 leads to Haystack Reservoir. As with TA 75-23, CEDI3 in Hwy 97 corridor area at Juniper Butte. CEBI2 on Old Culver Hwy and access to Haystack Reservoir.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

****

75-10 Rd 6120 and Geneva MS **PROJECT ACRES =** 257.21 **Infested ACRES =** 109.02
SITE TYPE: Quarry **Reveg:** PassiveRest **% TREATED =** 42%
COMMENTS: TACA8 occurs as isolated piece on east side of Crooked River Gorge, NW of Opal Springs storage tanks; ONAC on isolated piece of CRNG land at Opal Springs access to Crooked River Gorge; CEBI2 & CEDI3 also occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-14 Cotter Pond **PROJECT ACRES =** 43.72 **Infested ACRES =** 0.49
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Portion of Treatment Area follows Jefferson Co. Rds. No mapped weed sites in Terra, but CEBI2 occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
ONAC	Control	CH	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	

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75-17 Boyce Corral area + **PROJECT ACRES =** 44.68 **Infested ACRES =** 0.57
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Six weed species; 6 mapped sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMA	Russian knapweed	clopyralid	picloram	chlorsulfuron	Glyphosate
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIVU	Tolerate	No	bull thistle				
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate

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75-20 Rimrock Springs Dam **PROJECT ACRES =** 226.62 **Infested ACRES =** 4.8
SITE TYPE: Stream **Reveg:** Revegetate **% TREATED =** 2%
COMMENTS: ACRE occurs on the dam for the Rimrock Springs reservoir within Rimrock Springs Wildlife Management Area. CIAR4 & CEBI2 also occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CHMACU	Russian knapweed	clopyralid	chlorsulfuron	Glyphosate	
CEBI2	Control	CHMACU	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	CHMACU	Canada thistle	Clopyralid	Picloram	chlorsulfuron	Glyphosate

****

75-22 Skull Hollow **PROJECT ACRES =** 44.19 **Infested ACRES =** 1.46

SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 3%
COMMENTS: Mostly CEBI2; 1 mapped site of KOCH. All along Lone Pine Road, varying distances from Skull Hollow Rd. turnoff.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
KOSC	Control	CHMA	Kochia	Chlorsulfuron	Metsulfuron	Glyphosate	

****

75-23 Hwy 97, Juniper Butte **PROJECT ACRES =** 60.25 **Infested ACRES =** 60.13
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: CEDI3 in Hwy 97 corridor at Juniper Butte. CEBI2 on old Culver Hwy & cut-across to Haystack Reservoir, scattered along road ROW.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

****

75-24 Haystack CG + Rd 7130 **PROJECT ACRES =** 188.01 **Infested ACRES =** 107.06
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 57%
COMMENTS: Seven weed species, most along roads. CEDI3 in campground. ACRE (20 gross ac.) in draw which parallels Haystack reservoir road.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ACRE3	Control	CH	Russian knapweed	clopyralid	chlorsulfuron	Glyphosate	
CADR	Control	CHMA	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CIAR4	Control	BIO	Canada thistle	N/A	N/A	N/A	N/A
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate
LIDA	Control	CHMA	Dalmatian toadflax	Picloram	chlorsulfuron	Imazapic	

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75-25 57-500 Road. Gray Butte Trailhead. McCoin Orchard. **PROJECT ACRES =** 89.32 **Infested ACRES =** 30.17
SITE TYPE: Trail **Reveg:** PassiveRest **% TREATED =** 34%
COMMENTS:

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr

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75-28 Mud Springs **PROJECT ACRES =** 153.17 **Infested ACRES =** 1.93
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: No mapped weed sites in Terra, but CEBI2, CEDI3 & TACA8 occur.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-29 Grizzly **PROJECT ACRES =** 5,313. **Infested ACRES =** 3,560.0
SITE TYPE: GeneralForest **Reveg:** ActiveRest **% TREATED =** 67%
COMMENTS: This large Treatment Area encompasses 5,000+ acres due to 2 huge TACA8 sites, each 1,000 gross ac. Containment strategy will treat perimeter and access routes; revegetation at some treatment sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3

HERBICIDE4

CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CIAR4	Control	BIO	Canada thistle	N/A	N/A	N/A
N/A						
COAR4	Control	CHMA	field bindweed	picloram	imazapic	imazapyr
glyphosate						
KOSC	Control	CHMA	Kochia	chlorsulfuron	Metsulfuron methyl	Glyphosate
TACA8	Control	CUCH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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75-37 Upper Wychus Cr. **PROJECT ACRES =** 0.61 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 16%
COMMENTS: HYPE approx. 0.25 mi. west of Wychus Ck. & 0.25 mi. north of southern CRNG boundary.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
HYPE	Control	BIO	St. Johnswort	N/A	N/A	N/A
N/A						

****

75-38 Grandview cemetery **PROJECT ACRES =** 18.03 **Infested ACRES =** 0.10
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Jordan Rd. that goes by Grandview cemetery. One mapped site of CEBI2 (5 ac. GIS polygon).

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

****

75-42 Tai Flat **PROJECT ACRES =** 84.94 **Infested ACRES =** 36.51
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 43%
COMMENTS: CEBI2 and CEDI3, occurs on Tai Flat road & spur, adjacent to Tai Flat.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
CEDI3	Control	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						

****

75-43 Tai Flat part1 **PROJECT ACRES =** 697.95 **Infested ACRES =** 552.91
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 79%
COMMENTS: Encompasses 700 gross ac. Of TACA8, which is all of the CRNG land surrounding Lynne Miller's private land. CEDI3 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic
Glyphosate						

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75-44 Scales Corral **PROJECT ACRES =** 752.66 **Infested ACRES =** 236.62
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 31%
COMMENTS: Two CEBI2 sites, one is 300 gross acres in Scales pasture and overlaps with TA 72-07.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3
HERBICIDE4						
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate
Imazapyr						
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr
Glyphosate						

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75-47 The Island RNA **PROJECT ACRES =** 46.51 **Infested ACRES =** 46.51
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 100%
COMMENTS: FS parcel within BLM ACEC (Area of Critical Environmental Concern) - The Island. Flat-topped peninsula

overlooking Lake Bill Chinook. TACA8. BLM, FS, & Native Plant Society partner to pull medusahead.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Control	Manual	medusahead	N/A	N/A		

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75-50 Buck Butte **PROJECT ACRES =** 554.24 **Infested ACRES =** 217.18
SITE TYPE: General Forest **Reveg:** PassiveRest **% TREATED =** 39%
COMMENTS: This TA occurs SE of Buck Butte. Large TACA8 (170 gross ac.) adjacent to Buck Butte, includes powerline & gas ROWs; 2nd (60 ac.) is in powerline ROW NW thru mouth of Wagonblast Canyon. Two CEBI2 sites within & adjacent to gas pipeline ROW.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CH	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CUCH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

****

75-54 Schmaker Spring **PROJECT ACRES =** 270.03 **Infested ACRES =** 132.74
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 49%
COMMENTS: Large TACA8 (160 acres) site occurs in and around Schmoker Spring, from edge of spring to top of local hills. Distance to water is 0-2,000 ft.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

****

75-56 Wychus Creek and Trail Area **PROJECT ACRES =** 1,411. **Infested ACRES =** 646.79
SITE TYPE: Stream **Reveg:** PassiveRest **% TREATED =** 46%
COMMENTS: CEDI3 (100 gross ac.) all over area from the ridge down to Alder Springs Trail & up to road crossing. TACA8 (40 gross acres) along access road to Alder Sprgs. Trailhead. Also, 4 CEBI2 sites.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CHMA	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-57 Lithgow Area **PROJECT ACRES =** 31.87 **Infested ACRES =** 2.49
SITE TYPE: General Forest **Reveg:** PassiveRest **% TREATED =** 8%
COMMENTS: Two CEBI2 sites mapped, one on closed road, both in Scales pasture. TACA8 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEBI2	Control	CH	spotted knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-58 7130 road **PROJECT ACRES =** 39.24 **Infested ACRES =** 32.79
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 84%
COMMENTS: COAR & CIVU west of Hwy 26.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A	N/A
COAR4	Control	CHMA	field bindweed	Picloram	Imazapic	Imazapyr	Glyphosate

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75-59 89 road **PROJECT ACRES =** 92.12 **Infested ACRES =** 1.14
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 1%
COMMENTS: Local Adams Rd., Irving Dr., Imbler Lane. Three species (CADR, CIVU, COAR) mapped on 12 sites along roads.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3

HERBICIDE4

CADR	Control	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate
CIVU	Tolerate	NO	bull thistle	N/A	N/A	N/A
N/A						

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75-60 55 road **PROJECT ACRES =** 18.33 **Infested ACRES =** 0.28
SITE TYPE: Road **Reveg:** PassiveRest **% TREATED =** 2%
COMMENTS: Two mapped sites of CADR; one mapped site of CIVU. Only CADR targeted for treatment.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CADR	Control	CH	whitetop	chlorsulfuron	Metsulfuron methyl	Glyphosate	

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75-61 South Haystack Butte **PROJECT ACRES =** 17.61 **Infested ACRES =** 6.47
SITE TYPE: General Forest **Reveg:** PassiveRest **% TREATED =** 37%
COMMENTS: ONAC on the south side of Haystack Butte near route to the saddle where water storage tank is, north of the Henderson flat motorized recreation area. Top of Haystack Butte is RNA, but not yet threatened by this ONAC site.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
ONAC	Control	CHMA	Scotch thistle	Clopyralid	chlorsulfuron	Metsulfuron methyl	

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75-62 Round Butte Dam Entrance **PROJECT ACRES =** 34.82 **Infested ACRES =** 4.45
SITE TYPE: General Forest **Reveg:** PassiveRest **% TREATED =** 13%
COMMENTS: Two mapped weed sites on east side of Jefferson County Rd. 1-13 (Belmont Lane) that leads to Round Butte Dam. CEDI2 & TACA8 both along spur roads.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-63 Round Butte **PROJECT ACRES =** 197.93 **Infested ACRES =** 49.99
SITE TYPE: General Forest **Reveg:** PassiveRest **% TREATED =** 25%
COMMENTS: Two mapped weed sites, both adjacent to subdivisions. CEDI3 at Round Butte cinder pits; TACA8 at Round Butte overlook.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CHMA	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-65 Tai Flat part2 **PROJECT ACRES =** 64.10 **Infested ACRES =** 28.88
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 45%
COMMENTS: TACA8 - 0.5 gross acres along unnumbered road in draw going into back side of Miller's private land. Several small patches of medusahead in that burned area.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-66 Tai Flat part3 **PROJECT ACRES =** 83.39 **Infested ACRES =** 58.85
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 71%
COMMENTS: Two gross acres mapped of TACA8. Scattered patches.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-67 Tai Flat part4 **PROJECT ACRES =** 22.65 **Infested ACRES =** 10.91
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 48%
COMMENTS: TACA8 on flat, north of the head of Carcass Canyon, east of Dry Lake (south of Dry Lake Rd.). CEDI3 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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75-68 Tai Flat part5 **PROJECT ACRES =** 31.17 **Infested ACRES =** 24.55
SITE TYPE: GeneralForest **Reveg:** PassiveRest **% TREATED =** 79%
COMMENTS: TACA8 about 0.25 mi. NW of Geneva townsite (50 ac.). CEDI3 also occurs.

TARGET	OBJECTIVE	TREATMENT	COMMON NAME	HERBICIDE1	HERBICIDE2	HERBICIDE3	HERBICIDE4
CEDI3	Control	CHMA	diffuse knapweed	Clopyralid	Picloram	Glyphosate	Imazapyr
TACA8	Control	CH	medusahead	Sulfometuron methyl	Chlorsulfuron+Sulfo	Imazapic	Glyphosate

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Types of Mechanical Treatments Proposed in Deschutes/Ochoco/Crooked River National Grassland Invasive Plant Treatment EIS

Summary: Mechanical treatments are proposed for six species: reed canarygrass (PHAR3), ribbongrass (PHARP), St. Johnswort (HYPE), leafy spurge (EUES), Canada thistle (CIAR4) and houndstongue (CYOF).

PHAR3 and PHARP: A gas-powered weed whacker would be used to cut tall stems to reduce the biomass prior to herbicide spraying, and prevent plants from going to seed.

HYPE: Of the numerous HYPE sites proposed for treatment, mechanical treatment is only proposed on this species in one Treatment Area on the Crescent District on the southern portion of Hwy 97. HYPE would be mowed along the highway.

EUES: Crescent is the only district proposing mechanical treatment at one EUES site, using a gas-powered weed whacker to cut stems prior to herbicide treatment.

CIAR4: Mechanical treatment is proposed at three sites on Sisters District using a gas-powered weed whacker to cut tall stems prior to herbicide treatments.

CYOF: Proposed in two Project area units (72-15; 72-37) in portions of timber sale plantations where there are very dense stands of CYOF. In these areas, the proposed treatment is to burn the units, broadcast spray the germinating CYOF seedlings, then disc/harrow the site to scarify and promote revegetation efforts. This would be the only ground-disturbing mechanical treatment; weed whacking and mowing are above-ground treatments.

The following table lists Treatment Areas where mechanical treatments are proposed.

Codes: WW =gas-powered weed whacker; RM = roadside brush/mower equipment; D = disking

Table A-3. Treatment Areas for proposed mechanical treatments

Project Area	Location	Target Species	Type Mechanical Treatment
11-10	Road 42	PHAR3	WW
11-24	SE shore Wickiup Reservoir	PHAR3	WW
11-33	West shore Paulina Lake	PHAR3	WW
11-34	West side Hosmer Lake	PHAR3	WW
11-35	Blue Lagoon	PHAR3	WW
11-39	Lava Lake	PHAR3	WW
11-53	Road 4285 & SE arm of Crane Prairie	PHAR3	WW
11-54	South Twin Lake	PHAR3	WW
11-56	Crane Prairie Reservoir - West	PHAR3	WW
11-66	Ryan Ranch Meadow	PHAR3	WW
11-80	Road 44 at Bull Bend	PHAR3	WW
12-05	Big Marsh	PHAR3	WW
12-06	Hwy 97 from Crescent to DES/WIN Forest boundary	HYPE	RM
12-21	Road 5835 west of Little Deschutes River	EUES	WW
15-01	Little Montana, 800 Road	CIAR4	WW
15-07	Cache Fire Area	CIAR4	WW
15-10	Road 1230, “parking lot” & west B&B Fire	CIAR4	WW
15-21	Road 12 and Dahl vicinity	CIAR4	WW
15-22	Trout Creek Swamp	PHAR3	WW
15-30	Corbett Sno-Park, Meadow Lakes area	CIAR4	WW
15-32	Metolius River	PHARP	WW
72-15	Roads 4280, 4280-060, 061	CYOF	D
72-37	Dipping Vat Tributary & Road 4260-565	CYOF	D

The following table lists units proposed for active revegetation. See Appendix E for a discussion of restoration and revegetation in the project area.

Table A-4. Project Area Units planned for active revegetation of invasive plant sites

Project Area #	Location	Invasive Species	Comments
12-05	Big Marsh	Reed canarygrass	Very wet site with unique values. PHAR Infestations throughout the marsh with dense monoculture especially at the north end. Drainage ditches on the east and west sides of the marsh are being filled in to restore historic hydrologic function. These areas will be revegetated using adjacent native sedges, grasses, forbs and shrubs.
15-22	Trout Creek Swamp	Reed canarygrass	Very wet site with unique values. Dense monoculture of PHAR at northern end will be revegetated using adjacent plugs of adjacent native sedges and grasses.
15-32	Metolius River	Ribbongrass	Due to the unique qualities of the Metolius River, any ribbongrass treatments would be followed up with planting of locally native sedges, grasses, forbs, and/or shrubs.
72-14	Rd. 4260	Medusahead	Areas where medusahead occurs on road cutbanks, ditches and the transition to forest habitat, would be revegetated with cultivar grass

Project Area #	Location	Invasive Species	Comments
			species to compete with this aggressive grass.
72-15	Rd. 4280 (& 060, 061)	Hounds-tongue	Dense areas of houndstongue within forest plantations and other disturbed areas would be revegetated with a grass and forb cultivar mix, to occupy the site and compete with the weeds.
72-16	Rd. 4260-570	Medusahead	Areas where medusahead occurs on road cutbanks, ditches and the transition to forest habitat, would be revegetated with cultivar grass species.
72-37	Dipping Vat Trib.	Hounds-tongue	Dense areas of houndstongue within forest plantations and other disturbed areas would be revegetated with a grass and forb cultivar mix, to occupy the site and compete with the weeds.
72-64	Turnpike Pit	Medusahead	Some areas within the material source would be revegetated with native bunchgrasses and forbs. If native seed were not available, grass cultivars would be used. Most areas of the weed site are down to bedrock, and revegetation is not practical.
75-20	Rimrock Springs Dam	Russian thistle, spotted knapweed, Canada thistle	Revegetate to protect adjacent Rimrock Springs Wildlife Area.

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APPENDIX B – Treatment Options and Common Control Measures for the Deschutes and Ochoco National Forests and Crooked River National Grassland

Table B-1 displays the treatment options for invasive plant species, Deschutes and Ochoco National Forest and Crooked River National Grassland Invasive Plant EIS. Most information comes from Mazzu (2005) and Oregon Department of Agriculture (Langland 2005, personal communication); other references are cited. Species are grouped based on similar biology and treatment methods and are listed alphabetically by the common name of the first species listed.

Table B-1. Treatment options

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
Bull thistle *Cirsium vulgare* (CIVU) Musk (nodding) thistle *Carduus nutans* (CANU4) *Biennial (musk thistle can be a winter annual, annual, or biennial)*	Bull thistle is common, and a lower priority species for treatment. The majority of sites will be tolerated (no treatment) or manually controlled. Currently only one known site of musk thistle on Lookout Mt. District, Ochoco NF.	- Any manual method that severs the root below the soil surface will kill these plants. Hand-pull bolting plants prior to onset of flowering but after fully bolting. Bag & remove from site if plant has a flower head. - Repeated visits at weekly intervals over the 4 to 7 week blooming period provide most effective control. - Mowing is an option, but timing of mowing is critical (within 2 days of full flowering for musk thistle). - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Biological controls may be helpful to suppress populations in combination with other methods. - Bull thistle sites do not usually need revegetation; at most sites, will be replaced as successional changes take place.	Upland Bull Thistle: 1. Clopyralid Upland Musk Thistle: 1. Clopyralid 2. Metsulfuron methyl 3. Chlorosulfuron Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier, upland Site Types (Roads, Quarries, Upland Forest/Rangeland):* Spot spray whenever possible. *Wetter site types (wet meadows, riparian)*: Wick application. *Timing*: Apply to rosettes in either the spring or fall.
Canada thistle *Cirsium arvense* (CIAR4) *Rhizomatous Perennial*	Very common on Lookout Mt. District, Ochoco NF (> 250 sites); less common on other districts.	- Herbicide treatment is most effective. - The only manual technique would be hand cutting of flower heads, which only suppresses seed production. -Mowing may be effective in rare cases if done monthly (this intensity is likely to damage native plant species). -Covering with plastic tarping may also work for small infestations. - Revegetate high priority sites with desirable species if possible.	Upland: 1. Clopyralid 2. Picloram 3. Chlorosulfuron 4. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* If feasible, weed whack first to reduce biomass. Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Sensitive Sites or Special Management Areas where more selective treatment is desired:* Spot spray or wick application to target

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
			glyphosate (best in fall)	individual plant. *Timing*: Apply in spring to rosettes and prior to flowering, or apply in fall to rosettes. Season is dependent upon herbicide used.
Dalmatian toadflax *Linaria dalmatica* (LIDA) Butter 'n' eggs *Linaria vulgaris* (LIVU2) *Rhizomatous Perennials*	Dalmatian toadflax is most common on Bend/Ft. Rock District (> 60 sites). Only 10 sites currently known of butter 'n' eggs (7 on Crescent District; 3 on Lookout Mt. District).	- Hand pull or dig small, easily accessible populations. Multiple entries per year are required. Plants can be left on site, but may reduce germination of desirable species due to mulching effect. Success will depend on consistent labor for each growing season until plants are eradicated. If flowers are present, bag and remove from site. -Cutting stands in spring or early summer will eliminate plant reproduction, but not the infestation. - These treatments may take up to ten years due to long term seed viability. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate with desirable species at high priority sites when possible. Plant communities in good condition may recover without replanting.	Upland: 1. Picloram 2. Chlorosulfuron 3. Imazapic (Use in native grass stands; fall application only) Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	Broadcast spray in dense cover, where dominant plant community is non-native. However, this species tends to be scattered, so spot spraying (backpack or on OHV) is usually more appropriate. Timing: Apply during active growth in spring before bloom or in late summer or fall during re-growth. Notes: Revisits will be necessary; the number of which is dependent on the chemical used and the seedbank. This control could vary by site. Even after three years of consecutive treatments, control may range widely.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
Diffuse knapweed *C. diffusa* (CEDI) Spotted knapweed *Centaurea biebersteinii* (CEBI2) Meadow knapweed *Centaurea debeauxii* ssp. *thuillieri* (CEDET) *Tap rooted Biennials or Perennials*	Diffuse & spotted knapweeds are very common and high priority species on all units. Meadow knapweed occurs on Lookout Mt. District; has been treated since 1998 and is now in maintenance mode. Five plants of meadow knapweed were found & pulled on Crescent District along Hwy 58 in the Odell Lake area.	- Hand pull or dig small, easily accessible populations. Multiple entries per year are required. Pull bolting plants prior to seed set. Bag flowering plants and dispose of properly. Success will depend on consistent labor for each growing season until plants are eradicated. - Mowing is possible, but timing is critical. - These treatments may take up to ten years due to long term seed viability. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate with desirable species at high priority sites when possible.	Upland: 1. Clopyralid 2. Picloram 3. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate (will require the most repeated treatments)	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Wet Meadows, Riparian:* Selective spot spraying to target specific plants. *Timing:* Preferred treatment is spring before bud stage or early summer so use less herbicide.
Field bindweed *Convolvulus arvensis* (COAR4) *Rhizomatous perennial*	25 sites are mapped, most occurring on CRNG.	- Successful control is most likely if the above-ground biomass is removed (by tillage, hand-pulling or herbicide application) followed by competition from other species (e.g., the surround vegetation or restoration efforts), and continuous monitoring for resprouts (The Nature Conservancy 1998b). - Tilling may be useful for ridding infestations; for small areas this may be done using hand-held tools, but for large areas machinery is required. - Mowing is unsuccessful because plants can be missed and it encourages ground-hugging plants. - Seedlings should be cultivated or hoed before they are a month old. - The Nature Conservancy (2004) mentioned that pulling field bindweed should be done frequently and timing is important; the goal would be to continually (throughout the growing	Upland: 1. Picloram 2. Imazapic 3. Imazapyr 4. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate.	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Wet Meadows, Riparian:* Selective spot spraying to target specific plants. *Timing:* Herbicide application should be applied when the herbicide will be translocated to the

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
		season) pull the above-ground portion. This may only be feasible for very small, easily accessible populations.		roots, but before seed set.
Himalayan blackberry *Rubus discolor* (RUDI2) *Rhizomatous Perennial (canes die off annually)*	One mapped site occurs on Paulina District in Project Area 72-48, along Cottonwood Trail. In 2006, found one plant along Hwy 58 adjacent to Odell Lake; pulled it & will monitor.	- Chemical treatment can be followed up with manual and/or mechanical treatment. Relative amounts of herbicide to manual treatments would decline over time. - On large populations, mechanical removal of large biomass in the summer (using a mower, brush hog or brush claw), followed by manual removal of resprouting canes and roots, then herbicide treatment of new growth in the fall/winter is most effective. - The massive root crown must be fully dug out at some point if using only manual/mechanical techniques. - The cultural technique of grazing with goats is also a technique proving successful if goats can be confined to the blackberry area. - Revegetate high priority sites with desirable species if possible.	Upland: 1. Triclopyr 2. Glyphosate 3. Picloram Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Cut and paint larger canes. Boom broadcast spray is possible after canes are cut if non-target species are not an issue. Spot spray whenever possible. *Moist to Wet meadows and Riparian*: Wick application. *Timing*: Remove large biomass in summer; herbicide treatment of new growth in fall/winter.
Houndstongue *Cynoglossum officinale* CYFO) *Taprooted Biennial or Short-lived Perennial*	Occurs on both Lookout Mt. and Paulina Districts, with the majority of sites/acres on Paulina.	- Hand pull or dig for small populations. Entire root system must be removed. Plants could be left on site if no seed pods are present (seed can remain viable for more than one year). If seed pods present, bag and remove from site. - These treatments may take up to five years. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate high priority sites with desirable species when possible.	Upland: 1. Metsulfuron methyl 2. Chlorosulfuron 3. Picloram 4. Glyphosate Riparian/High Water Table/Porous	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Sensitive Sites and moist to wet meadows (high water table), wetlands/riparian:* Spot spray or wick application to target individual plants.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
			Soils: Aquatic labeled glyphosate	*Timing:* Apply during active growth, preferably basal rosette stage.
Kochia *Kochia scoparia* (KOSC) *Annual*	Three sites are inventoried and proposed for treatment (on Crescent and CRNG). This species is relatively abundant in drier disturbed areas.	- Because kochia is an annual, small populations could be hand pulled, with the goal being prevention of seed production. Mowing or slashing plants before flowering is effective in reducing seed production. - If chemicals are used, timing of treatment may be important, ensuring that treatment is done before seed set. Manual treatment could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate high priority sites with desirable species when possible.	Upland: 1. Chlorsulfuron 2. Metsulfuron methyl 3. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Moist to wet meadows (high water table), wetlands/riparian:* Spot spray or wick application to target individual plants. *Timing:* Treatment should occur before plants set seed.
Leafy spurge *Euphorbia esula* (EUES) *Rhizomatous perennial*	There are very few sites of leafy spurge. Bend/Ft. Rock, Crescent, Lookout Mt. and Paulina each have one mapped site.	- Requires combination of techniques for successful control. Multiple entries per year are required. - Manual treatment is rarely effective. - Repeated mowing or hand cutting can control seed production but must be used with herbicides for adequate control of the site. - Repeated mowing could reduce competitive ability of desirable species. - Some success has been found with using biological control (flea beetle) with fall herbicide treatments. - Grazing when managed carefully (timing, livestock species, etc.) may help control leafy spurge (*see Common Control Measures)*.	Upland: 1. Picloram 2. Glyphosate 3. Imazapic Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Spot spray whenever possible. Broadcast spray in dense cover, where dominant plant community is non-native and leafy spurge population is large. *Moist to Wet meadows (high water table) and Riparian*: Wick application to target individual plants. *Timing*: All three herbicides can be used in the spring or fall, however, ODA would usually spray Picloram

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
				and Imazapic in the spring; glyphosate in the fall (Langland, 2005, *personal communication*). *Notes*: Must be careful about herbicide rates – use lowest rate possible ((Langland, 2005, *personal communication*).
Lesser burdock *Arctium minus* (ARMI2) *Biennial*	One mapped site exists on Lookout Mt. District in Project Area 71-16.	- Use a combination of manual and herbicide. - Hand pull or dig small populations or when regular volunteers are available. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate high priority sites with desirable species if needed. * Very little was found on this species.*	Upland: 1. Metsulfuron methyl 2. Picloram 3. Telar Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier Upland Site Types*: Spot spray whenever possible. *Riparian and wet/moist meadows*: Spot or wick application to target individual plants. *Timing*: Treat as a biennial. Treat in spring after rosettes are formed when non-targets are dormant or treat fall rosettes. *Notes*: * Very little information was found on this species.*
Mediterranean sage *Salvia aethiopis* (SAAE) *Biennial*	Five sites are mapped on Lookout Mt. District; two sites are mapped on Paulina District.	- An integrated combination of control methods will be needed to successfully manage Mediterranean sage. - Individual plants can be dug out. When the plant begins to bolt, cut or dig up the taproot two to three inches below the crown. This prevents re-sprouting. (Moser and Crisp 2000). - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time.	Upland: 1. Metsulfuron methyl 2. Chlorsulfuron 3. Picloram	Broadcast spray in dense cover, where dominant plant community is non-native. Use more selective techniques (e.g., spot spraying or selective patch broadcast) if good native plant cover.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
Medusahead *Taeniatherum caput-medusae* (TACA8) *Annual*	Majority occurs on CRNG (> 3,000 acres mapped).	- First priority should be to keep uninfested sites weed-free. Second priority would be to treat sites that have enough native plant species to recolonize the site (at least 15% of native plant cover) (Sheley 2005, *personal communication*). For sites that have lost the native plant component, set up a containment strategy based on accessibility to do annual surveys and keep medusahead from moving into adjacent areas. - Management should be focused at replacing medusahead with perennial plant cover. Revegetation strategy should strive to incorporate functional components of the ecosystem that should be on that site (e.g., combination of perennial taprooted forbs, bunchgrasses, rhizomatous grasses, annuals, or whatever components would normally be there (Sheley 2005, *personal communication*). - Requires integrated management using a variety of techniques. - Heavy spring grazing by sheep during the green stage has been reported to assist in control.	Upland: 1. Sulfometuron methyl 2. Landmark (Oust + Telar) 3. Imazapic 4. Glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Selective patch broadcast spray or spot spay if good native cover. *Sensitive Sites (e.g., adjacent to moist meadows or riparian areas) or Special Management Areas where more selective treatment is desired:* Spot spray or wick application to target individual plants. *Timing*:
Quackgrass *Elymus repens* (ELRE4) *Rhizomatous perennial*	Two sites occur on Bend/Ft. Rock District.	- Manual control is ineffective because root pieces can produce new plants. - Fabric mulches or roofing paper have been useful for small infestations. - Mowing is recommended when conditions are too wet for tilling (to reduce seed production). -Tilling forces plants to use reserves, but can also spread plant; therefore multiple tillings will be needed. - Prescribed burning can increase population vigor. - Use of herbicides (glyphosate) alone has shown some effectiveness. - Using a combination of mowing, burning, herbicide and reseeding may be the most effective. For example, tilling in early October before a hard frost, then treating with glyphosate has been effective. - Revegetate high priority sites with desirable species if needed and possible.	Upland: 1. Glyphosate 2. Landmark (Telar + Oust) 3. Sethoxydim 4. Imazapic Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Spot spray whenever possible. Broadcast spray in dense cover, where dominant plant community is non-native. *Moist to Wet meadows (high water table) and Riparian*: Spot and wick application to target individual plants. *Timing*: Apply in spring or fall during active growth.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
Reed canarygrass *Phalaris arundinacea* (PHAR3) Ribbongrass *Phalaris arundinacea* var. *picta* (PHARP3 *Rhizomatous Perennials*	Reed canarygrass is much more abundant of the 2 species; only certain sites are proposed for treatments. Ribbongrass is only known from the Metolius River in Sisters.	- Successful treatment has been to mow or weed-whack plants down to about 4"tall; let stems grow back for 1-2 months to about 10-12" tall, then fall application of aquatic labeled glyphosate (Tu 2005, *personal communication*). Repeat this treatment in year two. Follow-up with planting of intermittent plugs of desirable species. Requires a combination of techniques, which might include herbicides, manual, mechanical, or cultural. Prescribed burning can be used as a pretreatment before tilling, applying shade cloth, or herbicide application, since the fire will remove the aboveground dead litter and standing vegetation. However, in a fen on the Deschutes NF, Tu did not recommend burning because of potential damage to soil and native plant species (Tu, 2005, *personal communication*). - Choice of techniques will depend on what you are able/willing to do for how long, as well as timing, and logistics. - Manual or mowing treatments by themselves are only practical for small populations when multiple entries per year can be made. The entire population must be removed 2 to 3 times per year for at least five years. - Mechanical methods (mowing, weed wacking) can be used to reduce biomass, reduce the amount of herbicide used, and to ensure more direct foliar application of herbicides (Tu 2005, *personal communication*). - Discing or plowing can be effective especially after herbicide treatment. - Solarization (covering populations with clear or black plastic or use of a thick woven geotextile shade cloth) may be effective if shoots are not allowed to grow beyond tarps. This technique could take over two years to be effective. It may work on distinct patches of reed canarygrass that exist within a matrix of native vegetation (Tu 2004). However, this technique is reported to kill soil mycorrhizal fungi, etc.	Riparian/High Water Table/Porous Soils: 1. Aquatic labeled Glyphosate 2. Imazapyr (Habitat formulation) 3. Sethoxydim Upland: Highly unlikely this species would occur in upland sites. These species need to be in wet conditions.	Reed canary grass will be found in wetter site types (wet meadows and riparian). Depending on the size and distribution of the infestation, herbicide can be foliar-applied using a dripless wick applicator, backpack sprayer, or selective patch broadcast spray technique. *Timing*: Application can occur in mid-summer (just prior to summertime dormancy) or preferably in late fall (just prior to frost and wintertime dieback). This will time herbicide application when reed canarygrass is most actively translocating carbohydrates (along with the herbicide) down into the root system. *Notes*: Much of treatment information comes from Tu (2004, 2005).

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
Russian knapweed *Acroptilon repens* (ACRE3) *Perennial with adventitious shoots*	Six sites are mapped on CRNG, Lookout Mt. and Paulina Districts.	- Hand-pulling Russian knapweed is very difficult, but can be effective for small infestations during the establishment year only. Pull plants when soil is wet and before seeds have formed. Remove all plant parts from site. - Cutting or mowing reduces the current year growth and will eliminate seed production, but will not kill the roots of this species. Cut/mow several times annually to control existing top growth; re-emerging plants will be smaller in size and lower in vigor. Must be frequently repeated (at least 3 times per year – spring, summer, and fall). - Discing or plowing produces broken root fragments that spread quickly and resprout. - Russian knapweed is poisonous to horses. Livestock will graze, but it is usually avoided. Grazing provides only a negligible effect on vigor and viability of root system. - In most situations, Russian knapweed cannot be effectively managed by herbicides alone. - Lasting control requires an integration of techniques (mechanical, manual, chemical, and possibly biological control), proper land management, and revegetation to outcompete the thistle (The Nature Conservancy 1998). - Competitive plantings are usually necessary.	Upland: 1. Picloram 2. Clopyralid 3. Telar 4. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Moist to Wet meadows (high water table) and wetlands/ riparian:* Spot spray or wick application to target individual plants; follow-up with manual treatments. *Timing*: *Notes*:
Russian thistle *Salsola kali* (SAKA) *Annual*	This is an abundant species that is only proposed for treatment on selective, priority sites.	- Pull or uproot young plants or hoe just below ground level before seed set (The Nature Conservancy 1999). Cutting flowers before maturity has worked for some Nature Conservancy preserve stewards. - Mowing tends to cause the plant to grow low but repeated mowing may provide control.	Upland: 1. Chlorsulfuron 2. Metsulfuron methyl 3. Glyphosate	This species occurs in upland, drier site types. Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray wherever possible, especially in areas with good native plant cover. *Timing:* *Notes:* The Nature Conservancy (1999) states that some plants in the Pacific Northwest are resistant to sulfonylurea herbicides and resistance to the trazine herbicides

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
				has also been observed. If these types of herbicides are used, need to monitor for treatment effectiveness.
Scotch broom *Cytisus scoparius* (CYSC4) *Woody Perennial*	Most of the mapped scotch broom sites are on Sisters District (10 sites), but other mapped sites are proposed for treatment on Crescent, Bend/Ft. Rock, Lookout Mt. and Paulina.	- Hand pull, cut, weed wrench or dig small populations or when regular volunteers are available. Hand pulling or weed wrenching is most effective in moist soils. Plants can be left on site if no seed pods are present (seed can remain viable for more than one year). Cutting will require multiple visits in one year. - These treatments may take up to ten years due to long term seed viability. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate high priority sites with desirable species when possible.	Upland: 1. Triclopyr 2. Picloram 3. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Roads, Quarries and other drier, upland Site Types:* Larger plants: Cut and paint herbicide on stump. Smaller plants: Spot spray where hand pulling or weed wrenching is not feasible. Broadcast spray of triclopyr not permitted. *Riparian, meadows (high water table):* Same as other sites with either cut/stump method or selective spot spray technique. *Timing:* Apply during active growth preferably in the spring to young plants.
Scotch thistle *Onopordum acanthium* (ONAC) *Taprooted Biennial or Short-lived Perennial*	16 sites of Scotch thistle are mapped on all units except Sisters, with the majority (8 sites) on Lookout Mt. District.	- Only reproduces by seed, so preventing seed production & spread should be main focus. - Severing the root below the soil surface will kill the plant. - Mowing to ensure seed heads don't form can work, but need to mow more than once since plants do not mature uniformly. Mow after plants bolt and before flower since seed from cut flowers can mature (University of Idaho 2005). - Goats will graze Scotch thistle; sheep and cattle will not. Proper grazing management can allow grasses to compete with Scotch thistle, but continuous stocking of animals tends to reduce grass health and allow Scotch thistle a competitive advantage.	Upland: 1. Clopyralid 2. Chlorosulfuron 3. Metsulfuron Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate. (Tends to like drier	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Wet Meadows, Riparian:* Spot or wick applications to target specific plants. *Timing:* Preferred treatment is spring before bud stage or early summer so use less herbicide.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
			sites but can occur in wet places).	
St. Johnswort *Hypericum perforatum* (HYPE) *Rhizomatous Perennial*	Occurs on all units, with the majority (65 mapped sites) on Sisters District. Has expanded after recent wildfires.	- Hand removal of small populations or isolated stems is possible, but repeated treatments will be necessary as lateral roots give rise to new plants. Remove plants from the site and dispose of properly. - These treatments may take up to ten years due to long term seed viability. - Biological controls will most likely not be effective in damp, cool climates. - Revegetate high priority sites if needed with desirable species if possible.	Upland: 1. Metsulfuron methyl 2. Picloram 3. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate (not found as effective in the literature)	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Spot spray whenever possible. Boom broadcast spray in dense cover, where dominant plant community is non-native. *Moist to Wet meadows (high water table) and Riparian*: Wick application to target individual plants. *Timing:* Apply metsulfuron methyl when plants are fully emerged and in active growth. Apply picloram in early growth stages before bloom.
Sulfur cinquefoil Potentilla recta (PORE5) *Taprooted perennial that may have several shallow, spreading branch roots but no rhizomes*	Occurs on Lookout Mt. and Paulina Districts.	- Hand-digging may effectively control small infestations (The Nature Conservancy 2004). - There are no approved biological controls for this species. - In large infestations, selective herbicides applied at recommended label rates are likely the only method of effective control (The Nature Conservancy 2004). - Using prescribed fire alone does not appear to be effective; however, integrated approaches incorporating prescribed fire, herbicide application, and seeding of native seeds may be effective. - This species is a strong competitor and is capable of suppressing native vegetation. If sulfur cinquefoil populations are reduced (i.e., by herbicide, hand-pulling), native plants are usually able to rapidly re-colonize sites if sufficient native seed	Upland: 1. Picloram 2. Triclopyr 3. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	From Mazzu (2005): On dry sites, picloram is preferred; backpack or wick to minimize drift, though broadcast spray may be necessary for large infestations. *Timing*: Apply picloram in fall or spring prior to late bud stage.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
		is still viable in the soil. Seeding of native species under adequate environmental conditions, reducing grazing pressure, and continued spot herbicide re-treatments will result in a more rapid and stable restored native plant community (The Nature Conservancy 2004).		
Tansy ragwort *Senecio jacobaea* (SEJA) *Taprooted biennial or short-lived perennial*	Occurs on Crescent and Sisters Districts. All 20 sites will be manually treated. On Crescent, chemical would only be used if tansy spreads & manual no longer effective.	- Hand-pulling is effective if done in moist soils. This is most effective after the population has been brought under control. - Manual Disposal: Plants with flower heads should be removed from site, as young cut flower heads will continue to mature, producing viable seeds if moisture is present. - If chemicals are used, manual treatments should be used for follow-up treatment. Relative amounts of herbicide to manual treatments would decline over time. - Treatments may take up to ten years due to long-term seed viability. - Revegetate with desirable species if needed; most of areas already have good native plant species component.	Upland: 1. Clopyralid 2. Chlorsulfuron 3. Picloram	Manual treatment is preferred. If chemicals used, spot spray to target individual plants. If broadcast spray was needed, a selective "patch broadcast" technique would be used.
Teasel *Dipsacus fullonum* (DIFU2) *Taprooted Biennial*	15 sites are mapped on Ochoco NF. Populations on Lookout Mt. are not proposed for treatment (10 sites). Five sites on Paulina are proposed for treatment in places where high priority invasives are also being treated.	- Little information was found on treatment of teasel. - Cutting, digging, and cultivation can work if repeated enough to eliminate seed production (Stevens County Noxious Weed Control Board 2006). - If chemicals are used, manual treatments should be used for follow-up treatment.	Upland: 1. Metsulfuron methyl 2. Chlorosulfuron 3. Clopyralid + Triclopyr (= Redeem) Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	Spot spray to target individual plants. If dense cover of teasel, a selective patch broadcast spray might be used. *Timing:* Apply to rosettes or early season growth; control is difficult later in growth cycle.

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
Whitetop *Cardaria draba, C. pubescens* (CADR) Hairy whitetop *Cardaria pubescens* (CAPU6) *Rhizomatous Perennial*	Whitetop occurs on the Ochoco NF and CRNG, with the majority of sites on Paulina District. One site of hairy whitetop occurs on Crescent District.	- Diligent hand pulling or digging can control small infestations, but plants must be completely removed within 10 days after emergence throughout growing season for two to four years. - Mowing followed a month later by herbicide may be effective. Mowing must be done during full flowering. - If chemicals are used, manual treatments could be used for follow-up. Relative amounts of herbicide to manual treatments would decline over time. - Revegetate high priority sites with desirable species if needed & possible.	Upland: 1. Chlorosulfuron 2. Metsulfuron methyl 3. Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Spot spray whenever possible. Broadcast spray in dense cover, where dominant plant community is non-native. *Moist to Wet meadows (high water table) and Riparian*: Wick application to target individual plants. *Timing*: Apply at pre-bloom to bloom growth stage or to rosettes in the fall
Yellow flag iris *Iris pseudacorus* (IRPS) *Rhizomatous perennial*	Occurs on Sisters District (Metolius River); occurs on non-FS land along Deschutes River (Bend/Ft. Rock District)	- Manual or mechanical methods that remove the entire rhizome mass can successfully control small, isolated patches (The Nature Conservancy 2003). These methods, however, are very time and labor-intensive, since even small rhizome fragments can resprout. - Can be effectively controlled by herbicides (The Nature Conservancy 2003).	Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate; Habitat formulation of Imazapyr	*Moist to Wet meadows (high water table) and Riparian*: Wick application to target individual plants.
Yellow sweet clover *Melilotus officinalis* (MEOF) *Annual, winter annual or biennial*	This species is relatively abundant and only proposed for treatment along Hwy 58 on Crescent District, where it occurs with other high priority invasive species.	- Burning (and sometimes a combination of cutting and burning) was the focus of sweet clover treatments in prairies by The Nature Conservancy (1987). Our one site proposed for treatment is along a highway and does not lend itself to burning. - Hand pulling is effective on small infestations when the soil is moist (Minnesota Dept. of Natural Resources 2006). - Cutting should be done before flowers emerge. The goal is to halt flowering and then concentrate on depleting viable seeds in the soil. - If chemicals are used, hand pulling and/or cutting flowers may be used as a follow-up.	Upland: 1. Clopyralid	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Spot spray whenever possible. Broadcast spray in dense cover, where dominant plant community is non-native. *Moist to Wet meadows (high water table) and Riparian*: Wick application to target individual plants. *Timing:* Sweet clover enters a "critical growth period" about the 1st of September, when root weight begins to increase rapidly as food is translocated from the tops for

Target Species	Notes specific to Deschutes, Ochoco, CRNG	General Notes & Prescription	Herbicide Options	When/How to treat chemically
				storage overwinter.
Yellow starthistle *Centaurea solstitialis* (CESO3) *Annual*	Lookout Mt. and Paulina Districts each have one mapped site. Lookout Mt. site is treated under the 1998 EA has been reduced to hand-pulling after 5 years of treatment. Crescent District finds individual plants each year on Highway 58, pulling them to prevent spread onto the Deschutes NF; they found 2 sites in 2003; 1 site in 2004; not found again in 2005 & 2006.	- Hand-pull small patches or maintenance programs where plants are sporadically located. Remove all above ground material (leaving even a two inch piece of stem can result in recovery if leaves and buds are still attached at base of plant). Pull after bolted but before it produces viable seed. On relatively large populations of < 40 acres, start removing plants at outward edge of population and work toward interior (Bradley Method). - Mowing can be useful but timing is critical (before viable seed production, but too early can result in rapid re-growth). - In areas with many non-target species, early summer tillage will control yellow starthistle provided roots are detached from the shoots; repeated cultivation will be necessary in same season when rainfall stimulates germination. - Mazzu (2005) discusses biological control, prescribed burning, and grazing. Timing and intensity of grazing and type of grazing animal needs to be considered. Prescribed burning may be best used after herbicide treatment. Two biological control insects have reduced seed production by up to 76% in California. - Revegetate high priority sites if needed with desirable species if possible.	Upland: 1 - Clopyralid 2 - Picloram 3 - Glyphosate Riparian/High Water Table/Porous Soils: Aquatic labeled glyphosate	*Drier upland sites (Road, Quarries & Upland Forest/Rangeland):* Boom broadcast spray in dense cover, where dominant plant community is non-native. Spot spray whenever possible, especially in areas with good native plant cover. *Sensitive Sites (e.g., adjacent to moist meadows or riparian areas) or Special Management Areas where more selective treatment is desired:* Spot spray or wick application to target individual plants. *Timing*: Spring application.

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Biological Control

Biological control agents undergo a rigorous testing procedure prior to being available for release. Initial testing occurs in quarantine laboratories abroad and in the United States. The agents are tested for their effectiveness in controlling the target organism and for their host specificity. Testing includes potential effects on economic crops, rare plants, and similar species found in North America. An agent can be released only after it has been determined that it is unlikely that the agent will feed or cause injury to any native or agronomic species. It generally takes between ten and fifteen years for an agent to be cleared for release. The analyses for effects of such tools have already been completed under documents developed by Animal and Plant Health Inspection Service (APHIS) for approval of entry of such organisms.

The APHIS analysis assumes that agents will spread throughout North America, to wherever the target species exists. It is intended that this analysis will satisfy the intent of NEPA for the release and distribution of the agent in the United States. Like the invasive plants that are targeted, agents do not recognize property boundaries. The Forest Service has no control over the release of agents on adjacent weed populations. Agents are expected to spread onto National Forest system lands regardless of any action the Forest Service may take. More information is available in the R6 2005 FEIS. Biological control agents are a useful tool in the integrated weed management program, but are usually not completely effective in the control of invasive plants.

Table B-2 that follows, displays the invasive plant species proposed for biological control in Deschutes/Ochoco/CRNG Invasive Plant Treatment EIS, and the Agents to be used[1]. Use of these agents complies with Standard #14 which requires use of only APHIS and State-approved agents that do not have direct negative impacts on non-target organisms.

[1] Information from Langland (2006) and Coombs et. al. (2004). Langland, Dave. 2004. Personal communication. Oregon Dept. of Agriculture Weed Specialist. Coombs, Eric M., Janet K. Clark, Gary L. Piper, and Alfred F. Cofrancesco, Jr. 2004. Biological Control of Invasive Plant in the United States. Oregon State University Press, Corvallis, Oregon.

Table B-2. Invasive plant species proposed for biological control

Invasive Plant	Common Name Biocontrol Agent	Scientific Name Biocontrol Agent	Activity	Non-target Effects	Notes
Bull thistle *(Cirsium vulgare*	Bull thistle gall fly	*Urophora stylata*	Larvae feed on seed-producing tissue	None have been reported	60-90% of seed heads have been attacked in some areas, which reduced seed production by up to 60%
Canada thistle (*Cirsium arvense*)	Canada thistle stem weevil	*Ceutorhynchus litura*	Adults eat leaves and stem. Larvae eat stem and crown.	None have been reported. The host range of the beetle was found to be narrow, restricted to plants of the tribe *Cardueae*.	Favorable conditions include disturbed areas where Canada thistle is dense and where the plant is not stressed by grazing, dry conditions, flooding, mowing, or herbicides.
	Canada thistle stem gall fly	*Urophora cardui*	Forms galls which act like a metabolic sink.	None have been reported.	This fly does best in moist, disturbed areas with scattered Canada thistle plants. Semi-shaded areas seem to be slightly preferred over those in full sun. Fields subject to flooding, grazing, mowing, or chemical treatments are not conducive to fly survival.
Dalmatian & yellow toadflax *(Linaria dalmatica, L. vulgaris)*	Toadflax stem weevil	*Mecinus janthinus*	Larvae eat young shoots and stem tips.	None have been reported	Mining of stems causes premature wilting of shoots and suppresses flower formation, particularly when weevil density is high and there are multiple attacks. Drought stress improves effects.
	Toadflax moth	*Calophasia lunula*	Root-galling weevil	None have been reported	Agent was released in Central Oregon in the 1980's but failed to establish. When established, can defoliate whole stands of toadflax.
	Toadflax seed capsule weevil	*Gymnetron antirrhini*	Stem boring weevil	None have been reported	Substantial damage to shoots and flowers of yellow toadflax may occur. Weevils can reduce seed production up to 90%, however 25% may be typical
Diffuse knapweed & spotted knapweed	Lesser knapweed flower weevil	*Larinus minutus*	Larvae eat seeds. Adults eat foliage.	None have been reported	Weevil prefers hot, dry areas. Does not do well at higher elevations. Defoliation can be severe in sites with high weevil populations, resulting in the stunting and death of affected plants.
	Blunt knapweed flower weevil	*Larinus obtusus*	Larvae eat seeds.	None have been reported	Weevil prefers dry, open sites. Prefers spotted and meadow knapweeds. Populations grow slowly.

Invasive Plant	Common Name Biocontrol Agent	Scientific Name Biocontrol Agent	Activity	Non-target Effects	Notes
	Knapweed root weevil	*Cyphocleonus achates*	Larvae mine root cortex. Adults feed on leaves	None have been reported	This weevil prefers hot, dry, well-drained sites with loc, scattered vegetation in temperate areas. Seems to prefer smaller, younger plants.
	Banded gall fly	*Urophora affinis*	Larvae form galls on flower receptacle and seeds, causing nutrient sink.	None have been reported	Well distributed throughout knapweed infested range. Because deep mice feed heavily on fly larvae, the moth may contribute to an increase in deer mice numbers in high density knapweed areas.
	UV knapweed seed head fly	*Urophora quadrafasciata*	Larvae eat flower receptacle and seeds.	None have been reported	Less dominant than *U. affinis*, disperses more rapidly. See deer mice comments for *U. affinis*
Field bindweed (*Convulvusis arvensis)*	Bindweed gall mite	*Aceria malherbae*	Mites stunt plant and reduce flowering	None have been reported	Not for use along roadways or other highly disturbed areas. Move galls in the spring or early summer.
Leafy spurge *(Euphorbia esula)*	Brown dot leafy spurge flea beetle	*Aphthona cyparissiae*	Root/defoliating flea beetle	None have been reported	Success is dependant on location and soil type. May prefer warm, sunny, open sites with sandy soils and spurge above 50cm. Watch for re-sprouting after initial control
	Red-headed leafy spurge stem borer	*Oberea erythrocephala*	Root/stem boring beetle	None have been reported	Only attacks specific biotypes; some local biotypes have been reduced. Prefers mesic areas.
	Leafy spurge tip gall midge	*Spurgia esula*	Attacks growing tips; inhibits flowering and seeding	None have been reported	This gall midge prefers fairly dense stands of spurge. Tolerates some shade. Established midge populations may be attacked by parasites.
Mediterranean sage *(Salvia aethiopis)*	Mediterranean sage root weevil	*Phrydiuehus tau*	Larvae feed on roots; adults feed on foliage and flowers	None have been reported	Agent does best on south facing slopes and deeper soils. Larvae feeding on the roots can kill plants or prevent flowering.
Puncturevine *(Tribulus terrestris)*	Puncturevine seed weevil	*Microlarinus lareynii*	Larvae feed on seeds	*Tribulus cistoides* and some *Kallstroemia* spp. have been attacked without significant damage.	Prefers warm climates. Good levels of control have been seen when present with *Microlarinus lypriformis.* Abundance of weevil is reduced by cold winter climates.
	Puncturevine stem weevil	*Microlarinus lypriformis*	Larvae mines stems and root crown	*Tribulus cistoides* and some *Kallstroemia* spp. have been	Prefers warm climates. Good levels of control have been seen when present with *Microlarinus lypriformis.* Abundance of weevil is reduced by

Invasive Plant	Common Name Biocontrol Agent	Scientific Name Biocontrol Agent	Activity	Non-target Effects	Notes
				attacked without significant damage.	cold winter climates.
Russian knapweed *(Acroptilon repens)*	Russian knapweed gall nematode	*Subanguina picridis*	Galls form on stems, leaves and root crown	None have been reported	Best in areas that are moist during the winter or spring. Severely infested plants are often stunted and do not flower. Generally, impact has been poor in western North America.
Scotch broom *(Cytisus scoparius)*	Scotch broom seed weevil	*Exapion fuscirostre*	Larvae feed on seed, adults on flowers	None have been reported	Prefers meadows and hillsides with south exposure. Do not use in cold, damp or heavy shade. In OR, 40-60% of seedpods are attacked, with 85% seed reduction in attacked pods.
	Scotch broom bruchid	*Bruchidius villosus*	Larvae feed on seeds, adults on pollen	None have been reported, the beetle was tested on native lupines from the West Coast	Use in meadows and hillsides with southern exposures. Populations may take 4-5 years to build. Seed reduction in OR ranges from 10-25%. Do not use in cold, wet, shade or above 300M.
	Scotch broom twig miner	*Leucoptera spartifoliella*	Twig mining moth	None have been reported	Avoid very hot and dry sites, and elevations above 1000 M. Stems continue to flower and re-grow below the site of attack.
St. Johnswort (*Hypericum perforatum*)	St. Johnswort root borer	*Agrilus hyperici*	Larvae eat roots.	The beetle attacks *Hypericum concinnum* in California, but no long-term impacts have been reported.	*Hypericum concinnum* does not occur in our Project Area and is currently only known from California (http://plants.usda.gov/) In North America, is found mostly in mountain areas. Larvae are subject to fungal attack in damp sites.
	St. Johnswort moth	*Aplocera plagiata*	Larvae eat leaves and flowers.	No instances of nontarget plant feeding have been reported.	The effectiveness of this agent is quite variable. It appears to need warm dry areas with a summer season long enough to complete both generations. In favorable areas, this moth can be very effective; large populations of larvae can defoliate plants, thus inhibiting flower and seed formation.
	Klamathweed beetle	*Chrysolina hyperici*	Larvae and adult eat leaves and flowers.	No instances of nontarget feeding have been reported, may develop on several *Hypericum*	The beetle prefers more moist conditions than *Chrysolina*. *quadrigemina* (see below) and avoids shaded or barren, rocky locations. It tolerates cold winter weather better than *C. quadrigemina*.

Invasive Plant	Common Name Biocontrol Agent	Scientific Name Biocontrol Agent	Activity	Non-target Effects	Notes
				species attacked by *C. quadrigemina* (see below)	
	Klamath weed beetle	*Chrysolina quadrigemina*	Larvae and adult eat leaves and flowers.	Adults will feed and oviposit on *Hypericum calycinum*, an introduced ornamental, and on *H. concinnum*, a native species. No population-level impacts have been reported on the native species.	*Hypericum concinnum* does not occur in our Project Area and is currently only known from California (http://plants.usda.gov/). Hypericum calycinum does not occur in the Project Area and is typically in moister regions of Oregon & California. This agent is found in mountainous, open, sunny and warm areas. It apparently does not do well in shaded, barren, and excessively rocky locations. Success has been variable. At many locations where the insect is established, many of the St. Johnswort populations are still increasing in size and density, while at others there is little change.
	St. Johnswort gall midge	*Zeuxidiplosis giardi*	Larvae attack the leaf buds which results in the formation of galls that provide the larvae with a protective environment as well as nutrition.	The midge is capable of forming galls on *Hypericum concinnum*, but the damage to the plant is insignificant.	*Hypericum concinnum* does not occur in our Project Area and is currently only known from California (http://plants.usda.gov/). The midge seems to prefer damp locations with moderate to high relative humidity and high elevations. It also apparently does not like dry summers or continuously windy areas. It does not persist in areas heavily grazed by livestock.
Tansy ragwort *(Senecio jacobaea)*	Ragwort flea beetle	*Longitarsus jacobaeae*	Larvae mine roots. Adults eat leaves.	None have been reported	This flea beetle has been highly successful at controlling tansy ragwort. The Swiss biotype is needed in our area (does better in colder, higher climates).
Yellow starthistle (*Centaurea solstitialis)*	Yellow starthistle bud weevil	*Bangasternus orientalis*	Attacks flower head and stem below flower head	None have been reported	Weevil is widespread wherever starthistle is found. Populations of the weevil are declining due to displacement by other flower head agents.
	Yellow starthistle Peacock fly	*Chaetorellia australis*	Larvae feed on flower head	None have been reported	Prefers hot, dry sites. Agent can reduce starthistle populations as much as 80-80%.
	Yellow starthistle hairy weevil	*Eustenopus villosus*	Larvae feed on flower head	None have been reported	Widespread wherever starthistle is found. Excellent control capability, up to 100% of population. Both flower heads and buds attacked.

Invasive Plant	Common Name Biocontrol Agent	Scientific Name Biocontrol Agent	Activity	Non-target Effects	Notes
	Yellow starthistle flower weevil	*Larinus curtus*	Larvae feed on flower head	None have been reported	Larvae can reduce seed production up to 100%. Habitat requirements are unknown, appears to be common in eastern OR.
	Yellow starthistle gall fly	*Urophora sirunaseva*	Larvae feed on flower heads, galls displace seeds	None have been reported	Widespread throughout most of western U.S. wherever starthistle is found. Specific habitat requirements are unknown.

Table B-3. Herbicides considered for use[2]

Species	Common Name	Chlor-sulfuron (Telar)	Clopyralid (Transline)	Glyphosate (RoundUp, Rodeo)	Imazapic (Plateau)	Imazapyr (Arsenal; Habitat))	Metsulfuron methyl (Escort)	Pic-loram (Tordon)	Sethox-ydim (Poast)	Sulfomet-uron methyl (Oust)	Triclopyr (Garlon)	Notes
Acroptilon repens	Russian knapweed	3	2	4				1				Picloram 1st choice, but if sensitive non-target species (e.g., cottonwoods on CRNG) switch to Clopyralid.
Arctium minus	Lesser burdock	3					1	2				
Cardaria draba	Whitetop	1		3			2					
Cardaria pubescens	Hairy whitetop	1		3			2					
Carduus	Musk thistle	3	1				2					

[2] Oregon Department of Agriculture and Crook County provided numbered priorities

Species	Common Name	Chlor-sulfuron (Telar)	Clopyralid (Transline)	Glyphosate (RoundUp, Rodeo)	Imazapic (Plateau)	Imazapyr (Arsenal; Habitat))	Metsulfuron methyl (Escort)	Pic-loram (Tordon)	Sethox-ydim (Poast)	Sulfomet-uron methyl (Oust)	Triclopyr (Garlon)	Notes
nutans												
Centaurea biebersteinii	Spotted knapweed		1	3		4		2				
Centaurea debeauxii	Meadow knapweed		1	3		4		2				Suspected but not yet documented to occur.
Centaurea diffusa	Diffuse knapweed		1	3		4		2				
Centaurea solstitialis	Yellow star-thistle		1	3				2				Would not use triclopyr; resistance to picloram possible in Northwest.
Cirsium arvense	Canada thistle	3	1	4				2				
Convolvulus arvensis	Field bindweed			4	2	3		1				
Cynoglossum officinale	Houndstongue	2		4			1	3				
Cytisus scoparius	Scotch broom			3				2			1	
Dipsacus fullonum	Teasel	2	3 (see notes)				1				3 (see notes)	3rd choice is Redeem (clopyralid + Triclopyr).
Elytrigia repens var. repens	Quackgrass	2 (See notes)		1		4			3	2 (See notes)		Landmark (Telar + Oust).
Euphorbia esula	Leafy spurge			2	3			1				
Hypericum perforatum	St. Johnswort			3			1	2				

Species	Common Name	Chlor-sulfuron (Telar)	Clopyralid (Transline)	Glyphosate (RoundUp, Rodeo)	Imazapic (Plateau)	Imazapyr (Arsenal; Habitat))	Metsulfuron methyl (Escort)	Pic-loram (Tordon)	Sethox-ydim (Poast)	Sulfomet-uron methyl (Oust)	Triclopyr (Garlon)	Notes
Kochia scoparia	Kochia	1		3			2					
Lepidium latifolium	Perennial pepperweed	1		4		3	2					Suspected but not yet documented to occur.
Linaria dalmatica	Dalmatian toadflax	2			3			1				Telar + Picloram mix works very well on Dalmatian Toadflax.
Linaria vulgaris	Butter & eggs	2			3			1				
Onopordum acanthium	Scotch thistle	2	1				3					
Phalaris arundinacea	Reed canarygrass			1		2			3			Habitat formulation of Imazapyr may work well.
Phalaris arundinacea var. picta	Ribbongrass			1		2			3			
Potentilla recta	Sulphur cinquefoil			3				1			2	
Rubus discolor	Himalayan blackberry			2				3			1	
Salsola kali	Russian thistle	1		3			2					
Salvia aethiopis	Mediterranean sage	2					1	3				
Senecio jacobaea	Tansy ragwort	2	1					3				
Silybum marianum	Blessed milkthistle	2	1					3				

Species	Common Name	Chlor-sulfuron (Telar)	Clopyralid (Transline)	Glyphosate (RoundUp, Rodeo)	Imazapic (Plateau)	Imazapyr (Arsenal; Habitat))	Metsulfuron methyl (Escort)	Pic-loram (Tordon)	Sethox-ydim (Poast)	Sulfomet-uron methyl (Oust)	Triclopyr (Garlon)	Notes
Taeniatherum caput-medusae	Medusahead	2 (See notes)		4	3				5	1 2 (See Notes)		Landmark (oust/telar) would be 2nd choice.

Table B-4 that follows, displays adjuvants and drift reduction agents approved for use on the Deschutes & Ochoco NF and Crooked River National Grassland (Derived from R6 2005 FEIS; compliant with Standard 18 of the ROD).

Table B-4. Adjuvants and drift reduction agents approved for use

Compliance with Standard 18. (SERA 1997, Bakke 2003, Bakke 2007)

	Formulations	Ingredients of Adjuvants (aka Category))	Manufacturer	Washington State Approved for Aquatic Areas	Risk Assessment ID (comment)
	Entry™ II	**Ethoxylated fatty amines (Cationic) aka POEA**	Monsanto Company		
	First Choice® Exciter	**Fertilizer/Surfactant Mixtures**	Western Farm Service	YES	
	Foaminator™	**Defoamers**	Agrilliance, LLC		
	Freeway®	**Silicone-based wetter/spreaders**	Loveland Products		
	Hasten®	**Oils**	Wilbur-Ellis Company		
	Herbimax®	**Crop Oils and Crop Oil Concentrates**	Loveland Products		
	Hi-Light™ Blue	**Colorants and Dyes**	Becker-Underwood, Inc		Not durable. Lasts hours.
	Improved JLB Oil Plus	**Oils**	Brewer International		
	In-Place®	**Drift reduction agents**	Wilbur Ellis Company		Efficacy is unknown
	Intensify	**Fertilizer/Surfactant Mixtures**	West Link Ag	YES	
	InterLock®	**Drift reduction agents**	Agrisolutions	YES	Efficacy is unknown
	Kerosene, deodorized	**Crop Oils and Crop Oil Concentrates**	found in the triclopyr formulation Garlon 4		
	Kinetic™	**Silicone-based wetter/spreaders**	Helena Chemical Company	YES	

Co...pliance with Standard 18. (SERA 1997, Bakke 2003, Ba... 2007)

Formulations	Ingredients of Adjuvants (aka Category))	Manufacturer	Washington State Approved for Aquatic Areas	Risk Assessment ID (comment)
Latron AG-98 AG®	**Alkylphenol ethoxylate-based wetter/spreaders (non-ionic) a NPE**	Dow AgroSciences LLC		
Latron AG-98®	**Alkylphenol ethoxylate-based wetter/spreaders (non-ionic) aka NPE**	Dow AgroSciences LLC		
LI-700®	**Acidifiers**	Loveland Products	YES	
Liberate®	**Drift reduction agents**	Loveland Produnts	YES	Efficacy is unknown
Magnifyt	**Fertilizer/Surfactant Mixtures**	Monterey AgResources	YES	
MSO®	**Oils**	Loveland Products		
No Foam	**Defoamers**	Wilbur Ellis Company		
No Foam Dry	**Defoamers**	Wilbur Ellis Company		
No Foam® B	**Defoamers**	Creative Marketing and Research		
Phase™	**Vegetables Oils and Silicon Blends**	Loveland Products		
Pro-Spreader Activator	**Alkylphenol ethoxylate-based wetter/spreaders (non-ionic) aka NPE**	Target Specialty Products, Inc.		
R-11®	**Alkylphenol ethoxylate-based wetter/spreaders (non-ionic) aka NPE**	Wilbur-Ellis Company		
R-56®	**Sticker/Spreaders**	Wilbur-Ellis Co.		

Compliance with Standard 18. (SERA 1997, Bakke 2003, Bakke 2007)

	Formulations	Ingredients of Adjuvants (aka Category))	Manufacturer	Washington State Approved for Aquatic Areas	Risk Assessment ID (comment)
	Red-Top Mor-Act®	**Crop Oils and Crop Oil Concentrates**	Wilbur-Ellis Company		
	Roundup® has 15% POEA in this formulation	**Ethoxylated fatty amines (Cationic) aka POEA**			
	Silwet L-77®	**Silicone-based wetter/spreaders**	Loveland and Helena		
	Sinker	**Drift reduction agents**	Helena Chemical Company	YES	Efficacy is unknown
	Sylgard ® 309	**Silicone-based wetter/spreaders**	Wilbur-Ellis Company		
	Syl-tac™	**Vegetables Oils and Silicon Blends**	Brewer International		
	Tactic™	**Sticker/Spreaders**	Loveland Products	YES	
	The surfactant in Pathfinder™ II (a triclopyr formulation)	**Oils**	Dow AgroSciences		
	Tri-fol®	**Acidifiers**	Wilbur Ellis Company		
	X-77®	**Alkylphenol ethoxylate-based wetter/spreaders (non-ionic) aka NPE**	Loveland Industries		

APPENDIX C – Management Direction and Compliance with Forest Plan Standards

Current Management Direction Relating to Invasive Plant Treatment:

- Deschutes National Forest Land and Resource Management Plan (1990)
- Ochoco National Forest & Crooked River National Grassland Land and Resource Management Plan (1991)
- Ochoco National Forest & Crooked River National Grassland Integrated Noxious Weed Management EA (1995)
- Northwest Forest Plan (1994)

See also standards and guidelines amending the LRMPs from the 2005 R6 FEIS and ROD (Appendix G)

Table C-1. Current management direction for invasive plant treatments[3]

Forest	Scope	Standard And Guideline	Comment
CR Grassland	Forage and Livestock Use Grassland-wide	Control noxious weeds and invader plants to prevent threats to adjacent agricultural lands or to prevent unacceptable loss of range productivity. 4-75	This sentence removed by 1995 Weed EA Amendment
CR Grassland	Grassland Health MA-G4 Research Natural Area	Take no action to control insects, disease, ~~or noxious weeds~~ unless the outbreak drastically alters the natural ecological processes within the RNA. 4-85	"or noxious weeds" deleted by 1995 Weed EA Amendment
CR Grassland	Grassland Health Grassland-wide direction	Use Integrated Pest Management (IPM) strategies to manage pests within the constraints of laws and regulations, and meet Forest management objectives. IPM strategies include manual, mechanical, cultural, biological, chemical, prescribed fire, and regulatory means. Select strategy though the environmental analysis process, and in compliance with the 1988 Regional Vegetation Management Environmental Impact Statement. 4-85	Direction in 1988 Veg EIS vacated with 2005 R6 ROD
CR Grassland	Grassland Health Grassland-wide direction	Coordinate strategies with the Agricultural Pest Health Inspection Service (APHIS) when proposing major control projects.	The biological control that is proposed in the project involves only agents that have previously been released.
CR Grassland	Grassland Health Grassland-wide direction	Pesticide application, if used, will conform with EPA regulations, label restrictions, and the Regional Environmental Impact Statement on Chemical applications.	The action alternatives are consistent with EPA regulations and label restrictions. Direction in 1988 EIS vacated with 2005 R6 ROD

[3] *Prevention S&Gs are not included in this table.

Forest	Scope	Standard And Guideline	Comment
CR Grassland	Forestwide Direction	Monitor plant communities/associations to determine conditions and trends. Encourage recovery or prevent deterioration where activities may be leading to poor conditions; downward trends; the displacement of native plants or plant communities by unusually weedy, annual, or noxious vegetation; or where cover is untypically low for the particular plant associations.	Covered by adoption of R6 2005 ROD standards for rehabilitation/revegetation and monitoring framework.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Maintain a current inventory of all noxious weed infestations. Monitor annually to detect population and distribution changes, and reasons thereto.	This standard is outside the scope of a treatment project.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Meet requirements specified in the noxious weed program agreement between the Oregon Dept. of Agriculture and the Pacific Northwest Region, Forest Service.	The action alternatives meet the requirements of the specified agreement.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Meet requirements specified in the Final Environmental Impact Statement (FEIS) for Managing Competing and Unwanted Vegetation in the Pacific Northwest Region, and the accompanying Mediated Agreement.	This direction vacated with 2005 R6 ROD
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Provide for ongoing public participation and information, and other agency coordination during all noxious weed management activities. Coordinate with county officials and other to prevent and control noxious weeds. Identify species and infestations of greatest concern, and opportunities for joint prevention and control activities.	Public involvement has been provided for through the NEPA process (see Section 1.7 of DEIS). Extensive coordination has occurred with county officials.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Implement integrated noxious weed management, including manual, chemical, biological, cultural and mechanical methods, based on site-specific analysis. Maintain documentation of annual noxious weed treatments.	The action alternatives meet this standard.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Use chemical treatments only when other methods would be ineffective or impractical.	This standard replaced with amendment to be consistent with R6 2005 ROD standards for herbicide use. See Sections 2.3 and 3.15 of this DEIS.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Adhere to EPA regulations and herbicide label restrictions.	The action alternatives meet this standard.
Och/CRNG 1995 Weed EA	Grassland-wide Direction	Inform the public of planned herbicide use locations prior to initiating control projects. Record annually the quantity and kinds of herbicides used; document reduced reliance on herbicide use over time.	Public notification is provided for (see Section 2.4 and Appendix F.

Forest	Scope	Standard And Guideline	Comment
Ochoco	Forestwide Direction	Control noxious weeds and invader plants to prevent threats to adjacent agricultural lands or to prevent unacceptable loss of range productivity.	This sentence removed by 1995 Weed EA Amendment
Ochoco	Mgmt. Area 15 - Riparian	Use all methods to control insect and disease except chemical spraying.	Insect and disease standard is not applicable to invasive plant species.
Ochoco	North Fork Crooked River Wild and Scenic River Plan	None	N/A
Och/CRNG 1995 Weed EA	Forest-wide Direction	Districts will coordinate closely with the respective county weed board to ensure sharing of information regarding infestations, treatments, etc.	There has been extensive coordination with counties.
Och/CRNG 1995 Weed EA	Forest-wide Direction	Provide for ongoing public participation and information, and other agency coordination during all noxious weed management activities. Coordinate with county officials and others to prevent and control noxious weeds. Identify species and infestation of most concern, and opportunities for joint prevention and control activities.	Public involvement has been provided for through the NEPA process (see Section 1.7 of DEIS). Extensive coordination has occurred with the state and county.
Och/CRNG 1995 Weed EA	Forest-wide Direction	Implement integrated noxious weed treatments, including manual, chemical, biological, cultural, and mechanical methods, based on site-specific analysis. Maintain documentation of annual noxious weed treatments.	This is consistent with R6 2005 ROD. Action alternatives meet this standard.
Och/CRNG 1995 Weed EA	Forest-wide Direction	Use chemical treatments only when other methods have proven ineffective or impractical. Adhere to EPA regulations and herbicide label restrictions.	See Forest Plan Amendment Sections 2.3 and 3.15 of DEIS.
Och/CRNG 1995 Weed EA	Forest-wide Direction	Inform the public of planned herbicide use locations prior to initiating control projects.	PDFs include public notification. Also see Appendix F, Implementation Guide.
Och/CRNG 1995 Weed EA	Forest-wide Direction	Record annually the quantity of herbicides used; document reduced reliance on herbicide use over time.	Action alternatives meet this standard. See Annual Implementation Guide, Appendix F.
Deschutes	Forestwide Direction	Herbicides will be used in accordance with direction in the Region 6 Vegetative Management Environmental Impact Statement.	Direction in 1988 ROD vacated by 2005 ROD.
Deschutes	Forestwide Direction	Pesticides will be used following all applicable state and Federal laws, including the labeling instructions of the EPA.	Action alternatives meet this Standard.
Deschutes	Forestwide Direction	Pesticide use will be conducted in accordance with direction in the following Forest Service Manuals: 2150 (Pesticide-Use	Action alternatives meet this standard. See PDFs (Section 2.4 of DEIS) and Appendix F.

Forest	Scope	Standard And Guideline	Comment
		Management and Coordination), 2109.11(Pesticide Project Handbook), 2109.12(Pesticide Storage, Transportation, Spills, and Disposal Handbook); 2109.13(Pesticide Project Personnel Handbook); 6709.11(Health and Safety Code Handbook, Chapter 9).	Manual and handbook sections in project record.
Deschutes	Forestwide Direction	Activities such as noxious weed or predator control will be approved, as needed, to achieve desired future conditions in cooperation and coordination with the appropriate state and federal agencies.	Proposed action meets this Standard. See Section 4.1 of DEIS for consultation with other agencies.
Deschutes	Mgmt. Area 6 - Wilderness	Only native species will be used for site revegetation.	No invasive plant sites within Wilderness on the Deschutes.
Deschutes	Mgmt. Area 6 - Wilderness	Fertilizer may be used on a limited basis to stimulate initial growth.	No invasive plant sites within Wilderness on the Deschutes.
Deschutes	Mgmt. Area 15 - Old growth, Mgmt. Area 27 - Metolius Old Growth	Exotic plants will not be introduced. Vegetation management to enhance forage production or species composition for livestock consumption is not permitted.	The purpose of invasive species control is not to improve forage production or species composition for livestock. Action alternatives meet this standard.
Deschutes	Mgmt. Area 9 - Scenic Views, Management Area 21 - Metolius Black Buttes Scenic Area	Vegetation manipulation such as brush removal, reseeding and prescribed burning will be designed to meet visual objectives.	Action alternatives meet this standard.
Deschutes	Mgmt. Area 2 - Research Natural Areas, Mgmt. Area 24 - Metolius RNA	Action should be taken when the damage has the potential to modify ecological processes to the point that the area has little value for observation and research.	Action alternatives meet this standard. See Section 3.14 for information on RNAs.
Deschutes Newberry National Volcanic Monument Plan	Newberry National Volcanic Monument	M-33 Take action to eliminate or control existing populations of undesirable exotic plant species within the monument. Where feasible and effective, choose methods that mimic natural processes (such as prescribed fire). Other treatments that may be used where appropriate include mechanical and herbicide treatments. Establish priorities for treatment based on rate of spread, threats to native populations, etc. In some cases, the re-establishment of native species through natural regeneration methods, seeding or planting may be appropriate to reduce further encroachment by undesirable, exotic plants. The collection of certain plants by American Indian Tribes and/or individuals will be reviewed on a case-by-case basis.	Action alternatives meet this standard.

Forest	Scope	Standard And Guideline	Comment
Deschutes Metolius W&S River Plan	Metolius Wild and Scenic River	MTWQ-4: Applications of chemical agents in streams and riparian areas are restricted to actions such as tracing movement of flows, or detection and control of water pollution.	This standard not applicable to invasive plant control.
Deschutes Metolius W&S River Plan	Metolius Wild and Scenic River	MTWQ-5: Mixing and loading operations for any chemical or biological application will take place in an area where an accidental spill will not flow into natural surface water bodies. MTWQ-6: Suction hoses or pumps used for chemical or biological applications will not be used to draw water from natural surface water bodies.	These standards are in reference to retardant chemicals used in firefighting (Bonacker, personal communication 2006).
Deschutes	Metolius Wild and Scenic River	Weeds: Weed prevention and early detection efforts are emphasized. Herbicide application is selective, site-specific, and in accordance with an Integrated Weed Management Plan (scheduled to be developed for the Deschutes NF), and the Region 6 Mediated Agreement for Managing Unwanted Vegetation. Weed control is coordinated between agencies. Weed awareness is pursued through education.	Action alternatives meet this standard.
Deschutes	Metolius Wild and Scenic River	MTEV-11: Chemical herbicides are used only where biological or manual control is impractical or ineffective in preventing degradation of native plant habitat.	Action alternatives meet this standard.
Deschutes	Big Marsh Wild and Scenic River	Control spread of reed canary grass. Appropriate methods include fire, seeding, and willow staking. Use of a chemical treatment will be allowed as long as water quality is not affected.	Action alternatives meet this standard (see Section 3.6 for water quality information).
Deschutes	Little Deschutes Wild and Scenic River	None	N/A
Deschutes	Upper Deschutes Wild and Scenic River	V-7 Noxious weeds in riparian and upland vegetation types will be controlled using prevention, biological, mechanical, or chemical methods (consistent with Regional direction) where such activities will not adversely affect river values.	Action alternatives meet this standard (see Section 3.14).
NWFP	Deschutes - NWFP Area, Late Successional Reserves	Evaluate impacts of nonnative species (plant and animal) currently existing within reserves, and develop plans and recommendations for eliminating or controlling nonnative species that are inconsistent with Late-Successional Reserve objectives. These will include an analysis of the effects of implementing such programs to other species or habitats within Late-Successional	Action alternatives meet this standard. See Section 3.9 for effects to LSR habitats/species.

Forest	Scope	Standard And Guideline	Comment
		Reserves.	
NWFP	Deschutes-NWFP Area, Riparian Reserves	RA-3. Herbicides, insecticides, and other toxicants, and other chemicals shall be applied only in a manner that avoids impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.	Action alternatives meet this standard. See Sections 3.6 and 3.7
NWFP	Deschutes-NWFP Area, Matrix	Modify site treatment practices, particularly the use of fire and pesticides, and modify harvest methods to minimize soil and litter disturbance.	Action alternatives meet this standard. PDFs section 2.4 minimize adverse soil impacts.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	Prioritize infestations of invasive plants for treatment at the landscape, watershed or larger multiple forest/multiple owner scale.	See Section 2.3.4 for prioritization strategy, and Appendix F, Implementation Guide.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	Develop a long-term site strategy for restoring/revegetating invasive plant sites prior to treatment.	See Section 2.3.4 for restoration information and Appendix E, Revegetation Planning.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used when: 1) needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species), 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants, 3) native plant materials are not available, and 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation.	Prescriptions for proposed active restoration (Appendix A, Table A-3) meet this standard.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	Use only APHIS and State-approved biological control agents. Agents demonstrated to have direct negative impacts on non-target organisms would not be released.	Action alternatives meet this standard. See Section 2.3.4 and Appendix B, Table B-2.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	Application of any herbicides to treat invasive plants will be performed or directly supervised by a State or Federally licensed applicator. All treatment projects that involve the use of herbicides will develop and implement an herbicide transportation and handling safety plan.	Requirements to be included in contracts and agreements (See PDFs, Section 2.4).
2005 R6 ROD	Deschutes, Ochoco	Select from herbicide formulations containing one or more of the	Action alternatives meet this standard. See

Forest	Scope	Standard And Guideline	Comment
	and CRNG-wide	following 10 active ingredients: chlorsulfuron, clopyralid, glyphosate, imazapic, imazapyr, metsulfuron methyl, picloram, sethoxydim, sulfometuron methyl, and triclopyr. Mixtures of herbicide formulations containing 3 or less of these active ingredients may be applied where the sum of all individual Hazard Quotients for the relevant application scenarios is less than 1.0. 3 All herbicide application methods are allowed including wicking, wiping, injection, spot, broadcast and aerial, as permitted by the product label. Chlorsulfuron, metsulfuron methyl, and sulfometuron methyl will not be applied aerially. The use of triclopyr is limited to selective application techniques only (e.g., spot spraying, wiping, basal bark, cut stump, injection). Additional herbicides and herbicide mixtures may be added in the future at either the Forest Plan or project level through appropriate risk analysis and NEPA/ESA procedures.	Section 3.2 for herbicide information and Table A-1 for herbicides proposed in project area.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	Use only adjuvants (e.g. surfactants, dyes) and inert ingredients reviewed in Forest Service hazard and risk assessment documents such as SERA, 1997a, 1997b; Bakke, 2003.	Action alternatives meet this standard.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	To minimize or eliminate direct or indirect negative effects to non-target plants, terrestrial animals, water quality and aquatic biota (including amphibians) from the application of herbicide, use site-specific soil characteristics, proximity to surface water and local water table depth to determine herbicide formulation, size of buffers needed, if any, and application method and timing. Consider herbicides registered for aquatic use where herbicide is likely to be delivered to surface water.	See Section 2.4 for Project Design Features that will minimize or eliminate adverse effects, based on site-specific resource information.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	#20. Design invasive plant treatments to minimize or eliminate adverse effects to species and critical habitats proposed and/or listed under the Endangered Species Act. This may involve surveying for listed or proposed plants prior to implementing actions within un-surveyed habitat if the action has a reasonable potential to adversely affect the plant species. Use site-specific project design (e.g. application rate and method, timing, wind speed and direction, nozzle type and size, buffers, etc.) to mitigate the potential for adverse disturbance and/or contaminant exposure.	See Section 3.4 for sensitive plant information and 3.9 for wildlife information. Project Design Features in Section 2.4 were adopted to minimize or eliminate potential for adverse effects.

Forest	Scope	Standard And Guideline	Comment
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	#21. Provide a minimum buffer of 300 feet for aerial application of herbicides near developed campgrounds, recreation residences and private land (unless otherwise authorized by adjacent private landowners).	The Invasive Plant Treatment Project does not involve any aerial application of herbicides.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	#22. Prohibit aerial application of herbicides within legally designated municipal watersheds.	The Invasive Plant Treatment Project does not involve any aerial application of herbicides.
2005 R6 ROD	Deschutes, Ochoco and CRNG-wide	#23. Prior to implementation of herbicide treatment projects, National Forest system staff will ensure timely public notification. Treatment areas will be posted to inform the pubic and forest workers of herbicide application dates and herbicides used. If requested, individuals may be notified in advance of spray dates.	Notification is addressed in PDFs; also see Appendix F, Implementation Guide.

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APPENDIX D – Herbicide Information and Project Design Feature Crosswalk

Herbicide Information Summary and PDF Crosswalk

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Last updated October 12, 2010

Deschutes and Ochoco National Forest and Crooked River National Grassland PDF Information Incorporated by Beth Peer, Deschutes National Forest, Bend, Oregon

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The following information is designed to aid in the understanding of herbicides used for invasive plant control. Any attempt to summarize the complex information about herbicides is prone to over-simplification and errors. The information in these tables should be used as an introduction to the herbicides, but should not be the sole source of information used for analysis purposes. It is important to refer to the respective risk assessments prepared by Syracuse Environmental Research Associates (SERA), Inc. and peer-reviewed literature for effects analysis information.

These tables have five columns labeled herbicide characteristics, basic hazard identification, risk characterization, label restrictions and information, and Project Design Features (PDF). Herbicide characteristics are general pieces of information about the herbicide and its use, often taken from the Herbicide Handbook (Weed Science Society of America 2002) or the respective risk assessments (SERA, Inc). Qualitative statements (e.g. highly water soluble) are based on information in charts on water solubility and soil mobility found at the end of the document. These categories are not absolute, but have been gleaned from a variety of sources. These charts (water solubility and soil mobility) are a work in progress.

To better understand each herbicide, it is important to recognize the difference between the inherent risks from the chemical (i.e. hazard identification) from those risks associated with the intended use, which take into account application and exposure amounts (i.e. risk characterization). The hazard identification and risk characterization information is mostly taken from the respective risk assessments for each herbicide, prepared by SERA, Inc., as well as analysis results from the Region 6 Invasive Plant Program EIS (USFS 2005a). The R6 EIS already has conducted the analysis of effects from the hazard ID and risk characterization information. Standards added to the Deschutes and Ochoco Land and Resource Management Plans from the Invasive Plant ROD (USDA Forest Service 2005b) further reduce the potential risks listed in the risk characterization column. Project Design Features (PDF) (Section 2.4 of the DEIS) focus on reducing risks remaining after the application and exposure amounts are taken into consideration (i.e., risk characterization) along with compliance with label directions and new forest plan standards.

We have also included brief summaries of some label restrictions or information. Please note: the label restrictions column in these tables is not a comprehensive listing of all label requirements. The information is largely brief excerpts of some requirements from some formulations. Labels are also updated and revised periodically, so it is important to obtain and read the full label for complete information. Labels may be downloaded from the following website: www.cmds.net/manuf/default.asp.

This version of the table contains, for each herbicide, the priority target species for the Deschutes and Ochoco NFs and Crooked River NG. The herbicide became a first priority for the identified invasive plants based on efficacy of the herbicide on that species, as per recommendations from the local State

and County weed specialists. Environmental and seasonal variables, as well as infestations that contain several species, may require using a different herbicide in a given treatment area.

Herbicide grazing restrictions are summarized in the table on pages 35-36.

LOC used in the table=Level of Concern. The concentration in media or some other estimate of exposure above which there may be effects.

RfD = Reference dose. The RfD is a numerical estimate of a daily exposure to the human population, including sensitive subgroups such as children, that is not likely to cause harmful effects during a lifetime. RfDs are generally used for health effects that are thought to have a threshold or minimum dose for producing effects.

The use of product names is for illustrative purposes only and is not intended as a recommendation for use or an endorsement of these products by the USDA Forest Service.

Aminopyralid

Active Ingredient: Aminopyralid Trade Name(s): Milestone. Milestone VM

Mode of Action: Mimics Auxin Plant growth hormone Chemical family: Pyridine carboxylic acid

DES-OCH-CRNG target species: 1st choice: true knapweeds (not Russian), thistles, tansy ragwort, 2nd choice: Russian knapweed

Aminopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Advisories**	**Project Design Features**
Extremely SELECTIVE for MOST ALL broadleaves. Post emergent herbicide. Grasses are tolerant.		Selectivity reduces threat to non-broadleaf plants. Very hazardous to sensitive nontarget broadleaf species.	Avoid non-target contact with spray in treated areas. Small quantities of spray may injure susceptible broadleaf plants.	Drift management plan must be developed prior to implementation.
High water solubility. Runoff a concern in primarily clay soils depending on rainfall.	0.01 % of that applied may reach stream after first significant rainfall	Contamination threat to water resources and non-target species	Do not apply directly to water, to areas where water is present or to intertidal areas below the mean water mark. Do not contaminate water when disposing of equipment washwater or rinsate.	(17) precipitation (56, 57) aquatic buffers (52) equipment rinsing
Hydrolysis does not occur	Halftime in water ranges 127-447 days.		Do not contaminant water.	
In H20, degraded by sunlight	Degradation halftime of 0.6 days		May be applied up to water's edge	(17) precipitation (56, 57) aquatic buffers (52) equipment rinsing
Weakly adsorbed to soil, peculation, runoff and wind erosion are sources of nontarget effects.	Very high mobility in soil			
Degraded by soil microbes	Foliar half-life in the field ranges from 8-19 days. Soil halftime ranges 5-89	Relatively rapid breakdown reduces potential for run-		

Aminopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Advisories**	**Project Design Features**
	days	off or leaching		
	Low toxicity to soil organisms	Exposures far below level of concern		(12) application rates
Non-microbial degradation does not occur			Do not use hay or straw from treated areas for composting or mulching on susceptible plants	
Contains NO HCB's or chlorinated benzenes.			Resistance management guidelines should be followed	
Does not bioaccumulate or bioconcentrate	No evidence of reproductive risk, malformations, cancer, or mutagenicity. Not neurotoxic.	Exposures far below levels of concern. No HQ's >1.	Spot application: do NOT exceed 7 fl oz/ac per annual growing season.	(11) personal protective gear (12) application rates
Rapidly absorbed and excreted and is not substantially metabolized in mammals	Changes in gastrointestinal tract (cecal enlargement), weight loss, and incoordination in mammals.	Exposures far below levels of concern		(12) application rates
	Chronic doses cause weight loss, thicken stomach lining in mammals	Exposures far below levels of concern		(12) application rates
	Low toxicity to birds	Exposures far below levels of concern		(12) application rates
		Chronic risk to insect-eating birds or mammals unknown		(12) application rates
May be used as an alternative to picloram, 2,4-D, dicamba, monosodium	Slight skin and eye irritation		Avoid contact with skin and eyes or clothing. Avoid breathing spray mist.	(11) personal protective gear

Aminopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Advisories**	**Project Design Features**
methanearsonate (MSMA), and metsulfuron methyl.			Applicators and handlers must wear face shield, long-sleeved shirt and long pants, chemically resistant gloves, boots	
Potent herbicide. Requires small amounts of AI to be effective.	May damage susceptible non-target terrestrial plants	Adverse effects on some non-target plant species due to drift are likely under certain conditions		Drift management plan. (16) drift (66, 67) botanical buffers
	Low toxicity to birds and mammals	Exposures below levels of concern. Non HQ's > 1.	No grazing restriction	(12) application rates
	Low toxicity to fish or aquatic invertebrates	Exposures very far below levels of concern		(12) application rates (56, 57) aquatic buffers
	No chronic tests to fish, or eggs and fry studies available; no adverse effects plausible to fish.	Exposures very far below levels of concern		(12) application rates (56, 57) aquatic buffers
	Practically non-toxic to aquatic phase amphibians.	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers
	Aquatic plants and algae are not susceptible	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers
	Low toxicity to bees and earthworms	Exposures far below level of concern		(12) application rates

Chlorsulfuron

Active Ingredient: Chlorsulfuron Trade Name(s): Telar, Glean, Corsair

Mode of Action: Acetolactate synthesis inhibitor Chemical family: Sulfonylurea

DES-OCH-CRNG target species: 1st priority: perennial pepperweed, whitetop, kochia, Russian thistle 2nd priority: houndstongue, Dalmatian toadflax, butter 'n eggs, Scotch thistle, Mediterranean Sage, tansy ragwort, milk thistle

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Chlorsulfuron				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
SELECTIVE: controls some broadleaf weeds and grasses			Supplemental label for mix with clopyralid for control of yellow starthistle in Oregon	
Very high water solubility at pH 7; decreases to medium solubility at pH 5	Leaching, runoff	Rainfall post treatment: Off target movement and non-target effects.	Do not contaminate water	(17) precipitation
Moderate affinity for organic material, but adsorption to clay is low	High mobility in soils		Treatment of powdery, dry soil and light sandy soils when there is little likelihood of rainfall soon after treating may result in off target movement and possible damage to susceptible crops when soil particles are moved by wind or water.	(47) chlorsulfuron use on soils

Chlorsulfuron				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
In H20, degraded very slowly by sunlight	Half-live in water is 1 month	Very low application rates; therefore, little potential to enter ground water		(16) drift (54, 56, 57) aquatic buffers
Degradation by soil microbes is slow	Half-life in field avg 40 days (range 4-6 wks); shorter at lower pH			(66, 67) botanical buffers
	Low toxicity to soil microorganisms	Exposure far below level of concern		
In field, degraded primarily by hydrolysis, but rates are slow	Persistent		Residues may injure susceptible plants up to 4yrs after application in high pH soils	(66, 67) botanical buffers (71) sulfonylurea use near TES plants
Absorbed thru roots and foliage; active in soil as a pre-emergent			Do not apply thru irrigation system	
Resistant Biotypes may develop			Application should be based on IPM principles	
Maintains native perennial grasses				
Potent herbicide. Requires small amounts of AI to be effective.	May damage non-target plants and trees; Wind erosion concern	Adverse effects on some nontarget plants are plausible		no aerial application (12) application rate (64, 65) botanical buffers (69) sulfonylurea buffers
	Can cause body weight loss in mammals	Worker and public exposures below level of concern (LOC) except workers using ground broadcast applications, which is slightly above LOC at high application rate (0.14 lb/acre)	Do not apply in a way that will contact workers or other persons, either directly or through drift.	(12) application rate (15, 16) drift (11) personal protective gear

Chlorsulfuron				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	Mild eye and skin irritant	Mild irritation to skin and eyes from exposures to high levels from mishandling	Only protected handlers may be in the area during application.	(12) application rates (11) personal protective gear
	May alter insulin production, cholesterol levels, and triglycerides at high doses	Exposures far below levels of concern		(12) application rates
does not bioaccumulate or bioconcentrate	No evidence of reproductive risk, malformations, cancer, or mutagenicity			(12) application rates
	Can cause mild body weight loss in mammals and birds	Exposures well below levels of concern		
		No plausible risk to insectivorous species		
	Very low toxicity to fish, no effects to egg & fry	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers
	Very low toxicity to aquatic invertebrates	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers
	No data on effects to amphibians, fish used as a surrogate	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers (83) spotted frog buffers
	Aquatic plants are susceptible to chlorsulfuron, algae is less susceptible	Peak exposures could damage aquatic plants at typical and high application rates; algae may be damaged at high rates		(12) application rates (56, 57)aquatic buffers

Chlorsulfuron				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	Low toxicity to bees or beetles	Exposure below level of concern		

Clopyralid

Active Ingredient: Clopyralid Trade Name(s): Transline; Reclaim; Stinger Mode of Action: Plant growth regulator Chemical family: Not known

DES-OCH-CRNG target species: 1st choice: true knapweeds (not Russian), thistles, tansy ragwort, 2nd choice: Russian knapweed

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Clopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Extremely SELECTIVE for broadleaves. Post emergent herbicide		Selectivity reduces threat to non-target plants	Avoid non-target contact with spray in treated areas	(66, 67) botanical buffers
Targets: knapweeds and families Asteraceae, Fabaceae, Solanaceae. Canada thistle; Does NOT effect conifers, grasses are tolerant			Supplemental label for control on tree plantations and forest sites	
High water solubility	0.01 % of that applied may reach stream after first significant rainfall	Contamination threat to water resources and non-target species	Do not contaminate water. Do not apply directly to water or to areas where	(56, 57) aquatic buffers (27, 28) water intake buffer

Clopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
			surface water is present. Do not contaminate irrigation ditches.	(17) precipitation
Photo degradation and hydrolysis do not occur	8-40 day ½ life in water			
Weakly adsorbed to soil	Very high mobility in soil		Users are advised not to apply where soils have a rapid to very rapid permeability throughout the profile (such as loamy sand to sand) and the water table is shallow.	(56, 57) aquatic buffers (43) low aquatic risk herb. (45) high porosity soils
Degraded by soil microbes	Half-life in field avg 40 days (range 12-70 days)	Relatively rapid breakdown reduces potential for run-off or leaching		
	Low toxicity to soil organisms	Exposures far below level of concern		(12,13) application rate
Non-microbial degradation does not occur			Do not use hay or straw from treated areas for composting or mulching on susceptible plants	
Contaminated with hexachlorobenzene (HCB) (less than that in picloram)	HCB is a persistent carcinogen and it bioaccumulates	Exposure levels far below level of concern. Clopyralid does not present any substantial cancer risk.		(12) application rates
Does not bioaccumulate or bioconcentrate	No evidence of reproductive risk, malformations, cancer, or mutagenicity	Exposures far below levels of concern		(12) application rates
	High acute doses cause depression of central	Exposures far below levels of concern		(12) application rates

Clopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	nervous system in mammals			
	Chronic doses cause weight loss, thicken stomach lining in mammals	Exposures far below levels of concern		(12) application rates
	Low toxicity to birds	Exposures far below levels of concern		(12) application rates
		Chronic risk to insect-eating birds or mammals unknown		(12) application rates
	Slight skin and eye irritation		Avoid contact with skin and eyes or clothing. Avoid breathing spray mist. Applicators and handlers must wear long-sleeved shirt and long pants, waterproof gloves, shoes plus socks	(12) application rate (11) personal protective gear (26) public notification
Potent herbicide. Requires small amounts of AI to be effective.	May damage susceptible non-target terrestrial plants	Adverse effects on some non-target plant species due to drift are likely under certain conditions		(15, 16) drift (66, 67) botanical buffers (13) application method
	Low toxicity to birds and mammals	Exposures below levels of concern	No grazing restriction	(12) application rates
	low toxicity to fish or aquatic invertebrates	Exposures very far below levels of concern		(12) application rates (56, 57) aquatic buffers
	No chronic tests to fish, or eggs and fry studies available; use surrogate	Exposures very far below levels of concern		(12) application rates (56, 57) aquatic buffers
	No data on effects to amphibians, fish used as a	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers

Clopyralid				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	surrogate			(83) spotted frogs
	Aquatic plants and algae are not susceptible	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers
	Low toxicity to bees and earthworms	Exposures far below level of concern		(12) application rates

Glyphosate

Active Ingredient Glyphosate Trade Name(s): Roundup; Accord; Glypro, many others

Aquatic formulations: Rodeo; Aquamaster

Mode of Action: Inhibits 3 amino acids and protein synthesis Chemical family: None generally accepted

DES-OCH-CRNG target species: 1st choice: quackgrass, reed canarygrass, ribbongrass 2nd choice: leafy spurge, Himalayan blackberry

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Glyphosate				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Broad spectrum, NON selective	Will kill contacted desirable plants,	boom-spray drift may adversely affect non-target species	Keep people and pets off treated areas until spray solution has dried to prevent transfer of this product onto desirable vegetation.	(15, 16) drift (66, 67) botanical buffers (13) application method (11) personal protective gear (26) notification
Quickly absorbed by leaves		No risk to non-target plants		(66, 67) botanical buffers

Glyphosate				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
and rapidly moves thru plant; no root absorption		from runoff		
Aquatic Use formulations exist				(43) soils & aquatic label herbicides
Very high water solubility	Runoff, leaching potential		Rainfall within 6 hours may reduce effectiveness;	(17) precipitation
Strongly adsorbed to soil particles, especially clay	Low mobility in soil	Low likelihood of runoff due to strong adsorption to soil; soil-bound glyphosate not available to plants		
No photo degradation or hydrolysis				
Degraded by soil microbes	Avg half-life 25-47 days (range 3-130 days)			
	May cause transient population decrease or increase in some bacteria & fungi			
Does not bioaccumulate or bioconcentrate	No evidence of dose-related reproductive risk, malformations, cancer, or mutagenicity	All exposures for workers and public far below level of concern		(12) application rate (11) personal protective gear (26) notification
	May damage mucosal tissue, weight loss in mammals; mild liver toxicity	All exposures for workers and public far below level of concern	Applicators and other handlers must wear long-sleeved shirt and long pants, shoes plus socks, and protective eyewear.	(12) application rates (11) personal protective gear
	Mild to moderate irritant to skin and eyes.		Do not get in eyes or on clothing; Avoid breathing vapor or spray mist;	(12) application rates (15, 16) drift (11) personal protective gear
	Can cause diarrhea, weight loss in mammals; weight loss in birds at very high doses; some mortality to pregnant	Mortality to some large vegetation-eating mammals plausible at highest application rates only; some		(12) application rates

Glyphosate				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	rabbits observed	risk to insect-eating birds & mammals at high rate		
		Chronic risk to insect-eating birds at typical rate unknown; at highest rate, chronic risk to insect-eating birds and mammals unknown		(12) application rates
Surfactants (tallow amine or POEA) in non-aquatic use formulations very toxic to aquatic organisms	Low toxicity to fish; surfactant in some formulations much more toxic than glyphosate	Even aquatic formulation exceeds level of concern for endangered fish, with max risk assumptions; surfactant formulations may cause mortality at high application rate only		ROD standard (12) application method (43) aquatic labels/low aquatic risk (12, 44) surfactant buffer and application rate
	Low toxicity to aquatic invertebrates	Exposures below level of concern		(12) application rate (56, 57) aquatic buffers
	No malformations in amphibians; toxicity to amphibians is comparable to that of fish	Mortality plausible from surfactant formulations at high application rate; at typical rate, all exposures below level of concern		(12) application rates, NPE application rate (56, 57) aquatic buffers (83) spotted frog
	Surfactants may be highly toxic to aquatic organisms		Do not apply (surfactant formulations) directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment.	(44) surfactant buffers (12) surfactant application rates (52) equipment rinsing (56, 57) aquatic buffers
	Aquatic plants and algae are susceptible to glyphosate; but it does not control submerged plants	Exposures below levels of concern; some algae growth stimulated at low concentrations	No restriction on the use of treated water for irrigation, recreation, or domestic purposes. If emerged weeds cover entire water body, treatment of aquatic weeds may result in oxygen	(12) application rates (28) water intake buffer (56, 57). aquatic buffer

Glyphosate				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
			depletion.	
	Low or no toxicity to bees, beetles, spider mites, wasps, isopods, earthworms, or snails.	Highest application rate may pose risk to some individual bees, but not likely to populations		(13) application rates (56, 57) aquatic buffers

Imazapic

Active Ingredient: Imazapic Trade Name(s): Plateau

Mode of Action: acetolactate synthesis inhibitor Chemical family: Imidazolinone

DES-OCH-CRNG target species: 2nd choice: field bindweed 3rd choice: leafy spurge, Dalmatian toadflax, butter ‘n eggs, medusa head

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Imazapic				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Selective against some broadleaves & some grasses				(66, 67) botanical buffers
Uptake by roots & leaves; active in soil as pre-emergent	May damage non-target plants and trees	Drift or runoff may cause some damage to susceptible species	Do not treat inside of irrigation ditches; conduct small test areas to determine risk to desirable trees and plants	(15, 16) drift (66, 67) botanical buffers (62) botanical buffers/adaptive management
Very high water solubility	Leaching, runoff		Do not contaminate water	(28) water intake buffer

Imazapic				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
				(43) low risk formulations (56, 57) aquatic buffers
Adsorbs to OM in soil	Moderately mobile in soils, leachable in coarse soils			
Degraded by soil microbes	Half-life avg. 120d		Treatment of areas that were previously treated with Chlorsulfuron, metsulfuron methyl, sulfometuron or imazapyr may cause compound injury or death to desirable plants	(66, 67) botanical buffers (64) botanical buffers/adaptive management
No info on toxicity to soil microbes				
In H20, degraded by sunlight				
	Not irritating to skin, minimal irritation to eye	Mild eye irritation from mishandling; no exposure scenario exceeded RfD for workers or public except spill		(11) personal protective gear
Does not bioaccumulate or bioconcentrate	No adverse effects to mammal reproduction or development, not carcinogenic or mutagenic			
	Muscle, liver, & blood damage in dogs at high chronic doses	Exposures far below levels of concern		(12) application rates
	Low toxicity to birds	Exposures far below levels of concern		(12) application rates
		No plausible risk to insectivorous species		(12) application rates
	Low toxicity to fish, no effects to egg & fry	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers
	No data on effects to amphibians, fish used as a surrogate	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers (83) spotted frogs

Imazapic				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	Aquatic plants sensitive, algae is not	Potential risk to aquatic plants at highest application rate only, no risk to algae		(12) application rates (56, 57) aquatic buffers
	Low toxicity to bees	Exposure far below level of concern		(12) application rates

Imazapyr

Active Ingredient: Imazapyr Trade Name(s): Arsenal, Chopper, Stalker,

Aquatic Formulation: Habitat

Mode of Action: acetolactate synthesis inhibitor Chemical family: Imidazolinone

DES-OCH-CRNG target species: 2nd choice: reed canarygrass, ribbongrass 3rd choice: field bindweed, perennial pepperweed

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described. Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Imazapyr				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Non-selective				
Uptake by roots & leaves; active in soil as pre-emergent	May damage non-target plants; may be exuded into soil from roots of treated plants	Drift or runoff may cause some damage to susceptible species	Do not apply to irrigation ditches; prevent drift to desirable plants	(15, 16) drift (66, 67) botanical buffer
Very high water solubility			Do not contaminate water	(56, 57) aquatic buffer
Weakly bound to soil, but OM	Moderately mobile in soils			

Imazapyr				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
and lower pH increase adsorption to moderate levels				
In H2O, degrades by sunlight	Half-life in water 1-2 d		May be used in intermittent drainages, flood plains, and bogs when no water is present	(56, 57) aquatic buffer
Degrades by soil microbes	Half-life in soil 25-142 d; weed control for 3 mo-2yrs			
	Slight effect on soil microbes at high doses	Peak concentrations in soil well below level of concern		(12) application rates
	Mildly irritating to eyes and skin	Mild eye irritation from mishandling; no exposure scenario exceeded RfD for workers or public except spill		(11) personal protective equipment
Does not bioaccumulate or bioconcentrate	No adverse effects to mammal reproduction or development, not carcinogenic or mutagenic			
	No effects to birds or mammals even at high doses	Exposures all below level of concern		(12) application rates
		No plausible risk to insectivorous species		(12) application rates
	Low toxicity to North American fish	Exposures very far below levels of concern		(12) application rates
	No data on effects to amphibians, fish used as a surrogate	Exposures far below levels of concern		(12) application rates (56, 57) aquatic buffers (83) spotted frog
	Some aquatic plant species sensitive to imazapyr	Potential risk to aquatic plants at typical application rate, no risk to algae		(12) application rates (56, 57) aquatic buffers
	Low or no toxicity to bees	Exposure well below level of concern		(12) application rates

Metsulfuron methyl

Active Ingredient: Metsulfuron methyl Trade Name(s): Escort, Ally

Mode of Action acetolactate synthesis inhibitor Chemical Family: Sulfonylurea

DES-OCH-CRNG target species: 1st choice: houndstongue, St. Johnswort, lesser burdock, Med. Sage 2nd choice: whitetop, kochia, pepperweed, Russian thistle, musk thistle

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Metsulfuron methyl				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Selective for some broad-leaf and woody species; can damage conifers				(66, 67) botanical buffers
Resistant biotypes may develop			Manage herbicide resistance, use IPM	
Potent herbicide; uptake by roots & leaves	May damage non-target plants and trees; highly potent herbicide at low rates	Drift, runoff or wind erosion, may cause damage to susceptible species	This herbicide is injurious to plants at extremely low concentrations. Non-target plants may be adversely affected from drift and run-off. Do not use on irrigation ditches.	No aerial application (15, 16) drift (29) water intake buffer (66, 67) botanical buffer (54, 55) aquatic buffer
High water solubility	Runoff, leaching potential		Do not contaminate water; do not apply or rinse equipment near desirable plants;	(52) equipment rinsing (66, 67) botanical buffers (56, 57) aquatic buffers
Low adsorption to clay, OM increases adsorption; active in soil as pre-emergent	Very high mobility in soils		Treatment of powdery, dry soil or light sandy soil when there is little likelihood of rainfall soon after treating	(15) wind (17) precipitation

Metsulfuron methyl				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
			may result in off target movement and possible damage to susceptible crops when soil particles are moved by wind or water.	
No photo degradation				
Slow microbial degradation at high pH, fast at low pH	Typical half-life 30 d (range 1-6 wks)			
	Short-term toxicity to soil microbes			(43) aquatic label & low risk herb
Degrades by hydrolysis			May be used in intermittent drainages, flood plains, marshes, and bogs when no water is present	(56, 57) aquatic buffers (12) application rates
	May alter insulin production, cholesterol levels, and triglycerides at high doses	Exposures well below levels of concern even at highest application rates		(12) application rates (11) personal protective gear
	Irritates skin and eyes	Mild eye irritation from mishandling; all exposures below levels of concern for workers and public	Applicator and other handlers must wear long-sleeved shirt, long pants, shoes plus socks	(11) personal protective gear
Does not bioaccumulate or bioconcentrate	No adverse effects to mammal reproduction or development, not carcinogenic or mutagenic			
	Can cause body weight loss in mammals & birds	Exposures well below levels of concern even at highest application rates		(12) application rates
		No plausible risk to insectivorous species		(12) application rates
	Low toxicity to fish, no effects to egg & fry	Exposures very far below levels of concern		(12) application rates (56, 57) aquatic buffers
	No data on effects to	Exposures very far below		(12) application rates

Metsulfuron methyl				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	amphibians, fish used as a surrogate	levels of concern		(56, 57) aquatic buffers (83) spotted frogs
	Can damage aquatic plants in acute exposures	Potential risk to aquatic plants at typical application rate, no risk to algae		(56, 57) aquatic buffers (12) application rates
	Low or no toxicity to bees	Exposure well below level of concern		(12) application rates (56, 57) aquatic buffers

Picloram

Active Ingredient: Picloram Trade Name(s): Tordon 22K; Pathway

Mode of Action: Plant growth regulator Chemical family: Pyridcarboxylic acid or picolinic acid

DES-OCH-CRNG target species: 1st choice: Russian knapweed, field bindweed, leafy spurge, Dalmatian toadflax, butter ‘n eggs, sulphur cinquefoil 2nd choice: lesser burdock, true knapweeds, Canada thistle, Scotch broom, St. Johnswort

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Picloram				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Selective: rate and season dependant; foliar active, pre-emergent and soil active		Off-site drift or soil activity of picloram may cause damage to susceptible plant species	Minimize drift and runoff	(15, 17) drift (46) soils (picloram and sulfo met) one app per year
Target: composite, legume,				(66, 67) botanical buffers

Picloram				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
buckwheat, and parsley families. Less affected families: mustard, lily, figwort.				
High water solubility	Run-off, leaching potential;		Under some conditions, picloram may also have a high potential for runoff into surface water… Do not apply directly to water, to areas where surface water is present. Do no allow run-off or spray to contaminate wells, irrigation ditches or any body of water used for irrigation or domestic purposes.	(28) water intake buffer (56, 57) aquatic buffers (47) soils (picloram and sulfo met) (46) one app per year
In H2O, degrades in sunlight	Half-life in H20 is 2.6 days			
Weakly adsorbed to soils	Very high mobility in soils; leaching potential greatest in sandy soils with low OM	1-6% of application mobilized and reached drainage channels (monitoring results)	Picloram is known to leach through soil into ground water under certain conditions as a result of agricultural use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground water contamination.	(12) application rates (46) soils (picloram and sulfo met), and one application per year (47) do not use on shallow soils, scabs, or high clay content soils.
Degraded slowly in soil by microbes	Half-life avg. 90 days (range 20-300 d)		NTE 2 qts/ac/growing season as a broadcast application	(46) soils (picloram and sulfo met) (47) do not use on shallow soils, scabs or soils with high clay content
	Can inhibit microbial activity	Microbial activity inhibition likely at rates used by FS		(46) soils (picloram and sulfo met) (47) do not use on shallow soils, scabs or soils with high clay content

Picloram				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Contaminated with hexachlorobenzene HCB (more than clopyralid)	HCB is a persistent carcinogen and it bioaccumulates	Exposure levels below level of concern. Picloram does not present any substantial cancer risk.		(13) application rates
Does not bioaccumulate or bioconcentrate	No adverse effects to mammal reproduction or development, not carcinogenic or mutagenic			
	Weight loss and increased liver weight in mammals following long term exposure to high concentrations	No exposures for workers or public exceeded levels of concern except spill		(12) application rates (11) personal protective gear
	Moderate eye irritant, can cause skin sensitization	Eye irritation and skin sensitization can occur with mishandling	Applicator and other handlers must wear long-sleeved shirt, long pants, shoes plus socks	(12) application rates (11) personal protective gear
	Low in toxicity to mammals	Exposure to insect-eating mammals exceed acute levels of concern only at highest application rates		(12) application rates
	Almost nontoxic to birds	Exposures below levels of concern		(12) application rates
		Chronic risk to insect-eating birds or mammals unknown at typical and highest rates		(12) application rates
	Toxic to fish	Exposures exceed level of concern for listed fish at typical and highest application rate		(12) application rates (54, 55) aquatic buffers
	No data on effects to amphibians, fish used as a surrogate	Potential adverse effects to amphibians at typical and highest application rates		(12) application rates (56, 57) aquatic buffers (83) spotted frog
	Relatively nontoxic to bees	Exposures below level of concern even at highest		(12) application rates

Picloram				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
		application rates		

Sethoxydim

Active Ingredient: Sethoxydim Trade Name(s): POAST

Mode of Action: Inhibits acetyl co-enzyme (ACE) Chemical family: Cyclohexanedione or cyclohexenone

DES-OCH-CRNG target species: 3rd choice: quackgrass, reed canarygrass, ribbongrass

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Sethoxydim				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Selective for annual and perennial grasses			Low likelihood of impacting non-target plants from drift	(66, 67) botanical buffers (15, 16) drift
Soil activity prevents germination of grasses				
Absorbed rapidly by foliage and roots. Systemic				
Broadleaf and sedges are tolerant			Some herbicide resistance can develop	
Very high water solubility	Leaching, run-off potential		Do not contaminate water.	(56, 57) aquatic buffers
Medium mobility in soil				
Photodegrades	Photolysis is <4 hours in soil; <1 hr in water	Low soil persistence		

Sethoxydim				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Degraded by soil microbes	5-25 day ½ life (avg is 5 days)	Rapidly degraded		
	Causes skin and eye irritation	Skin or eye irritation from mishandling.	Applicators and other handlers must wear coveralls over short-sleeved shirt and short pants; chemical resistant gloves and footwear, plus socks; protective eyewear; etc.	(11) personal protective gear
Does not bioaccumulate or bioconcentrate	Not mutagenic or carcinogenic			(12) application rates
	Can cause liver and blood toxicity in chronic doses	All chronic exposures well below level of concern for workers and public		(12) application rates
	Decreased reproduction and maternal toxicity in high doses	All acute exposures below level of concern except for drinking water contaminated by accidental spill		(12) application rates
	Reproductive and neurological effects to small mammals at high doses	Exposures below levels of concern for mammals		(12) application rates
	Low toxicity to birds but reduced hatching for chronic exposures	Exposures below levels of concern except chronic dose for grass-eating bird at highest application rate		(12) application rates
		Chronic risk to insect-eating birds or mammals unknown at typical and highest rates		
	Highly toxic to fish due to petroleum inert	Exposure exceeds level of concern for federally listed fish at typical rate, and max exposure assumptions	This product is toxic to aquatic organisms. Do not apply directly to water or to areas where surface water is present.	(12) application rates (17) precipitation (56, 57) aquatic buffers
	No data on effects to amphibians, fish used as a surrogate	Plausible risk to amphibians		(12) application rates (56, 57) aquatic buffers

Sethoxydim				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
				salamander and mollusk
	Nontoxic to bees	Exposure below level of concern		(12) application rates

Sulfometuron methyl

Active Ingredient: Sulfometuron methyl Trade Name(s): Oust XP; DPX 5648

Mode of Action: acetolactate synthesis inhibitor Chemical family: Sulfonylurea

DES-OCH-CRNG target species: 1st choice: medusahead 2nd choice: medusahead & quackgrass (when combined with chlorsulfuron)

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Sulfometuron methyl				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Non-selective Preemergent and post emergent.			If a surfactant is used, contact with tree foliage may injure or kill trees.	(12) application rates (12) NPE application rate (66, 67) botanical buffers
Target: annual and perennial broadleaf weeds, some grasses and some woody tree species			Do not apply more than 8 oz/ac/yr	(12) application rates
Potent herbicide; uptake by roots & leaves	May damage non-target plants and trees; highly potent herbicide at low rates	Drift, runoff or wind erosion, may cause damage to susceptible species	Potential for drift is an issue. Use weather and droplet size criteria	Standard 16 in R6 2005 ROD (no aerial application)
Only medium solubility in water; difficult to create high	May leach or runoff into water	Low application rates and microbe degradation pose	Do not treat dry or frozen soils, unless rainfall is	(15) wind

Sulfometuron methyl				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
concentrations		little risk for water contamination	anticipated	(16) drift (17) precipitation (66, 67) botanical buffers
High mobility in soil			Treatment of powdery, dry soil and light sandy soils when there is little likelihood of rainfall soon after treating may result in off target movement and possible damage to susceptible crops when soil particles are moved by wind or water.	(12) application rates (47) soils (picloram and sulfo met) (46) one app per year
Degraded by microbes, light and hydrolysis	30 day ½ life in silt loam soils			
	Some growth inhibition to soil microbes in lab, but not demonstrated while in soil	Percolation could inhibit growth of microbes if lab results are relevant in the field		(47) soils (picloram and sulfo met) (46) one app per year
Does not bioaccumulate or bioconcentrate	Not mutagenic, carcinogenic			(12) application rates
	Reproductive and immune system effects to mammals at higher doses; very high doses cause neurotoxic effects	Exposures far below levels of concern		(12) application rates
	Irritating to skin and eyes at high doses	Mild irritation to skin and eyes from exposures to high levels from mishandling	Only protected handlers may be in the area during treatment	(12) application rates (11) personal protective gear (26) public notification
	Causes hemolytic anemia and weight loss in mammals	Exposures far below levels of concern		(12) application rates
	Slightly toxic to fish. Highly toxic to embryo hatch	Exposures very far below level of concern	Do not apply directly to water or where surface water is present	(12) application rates (56, 57) aquatic buffers
	Can cause malformations in amphibians	Exposures very far below level of concern		(12) application rates (56, 57) aquatic buffers

Sulfometuron methyl				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	Low toxicity to bee	Exposures well below level of concern		(12) application rates

Triclopyr

Active Ingredient: Triclopyr Trade Name(s): Garlon 4; Remedy; PathFinder;

Aquatic formulation: Garlon 3A

Mode of Action: Plant growth regulator Chemical family: Pyridinecarboxylic acid

DES-OCH-CRNG target species: 1st choice: Scotch broom, Himalayan blackberry 2nd choice sulphur cinquefoil

Project Design Features applicable to all herbicide characteristics and risks: Herbicides would be used in accordance with label restrictions, except where more restrictive measures are required as described; Herbicide application will only treat the minimum area necessary to meet site objectives; Herbicide use would comply with standards in the Pacific Northwest Regional Invasive Plant Program – Preventing and Managing Invasive Plants ROD (2005), including standards on herbicide selection, restrictions on broadcast use of some herbicides, tank mixing, licensed applicators, and use of adjuvants, surfactants, and other additives.

Triclopyr				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization* (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
Selective for broadleaf and woody plants				
Target: Woody and herbaceous plants, especially root- or stem-sprouting species				Restricted to selective application methods by forest plan standard (R6 2005 ROD), no broadcast spraying
Absorbed thru roots, foliage and green bark.	Non-target plant effects possible; some bryophytes and lichens sensitive to triclopyr		Do not apply through any type of irrigation system.	
Two forms: salt (acid)	Ester form more toxic and		Apply at cool temps with no	(15) wind

Triclopyr				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization* (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
(Garlon 3A) and ester (Garlon 4)	volatile		wind. Combustible.	
Salt formulation is highly soluble in water	Runoff, leaching		Do not contaminate water when cleaning equipment.	(52) equipment washing (28) water intake buffers (56, 57) aquatic buffers
Ester formulation has medium water solubility.	Less mobile			
Low adsorption to soils, varies with clay and OM content	Very high mobility in soils		The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.	(43) low risk herbicides; R6 standard – application method
Degraded by photolysis in soil and water	½ life 2-6 hours in water			
Degraded by microbes in soil	½ life avg 30days in soils; range 10-46 days			
	Inhibits growth of soil fungi and bacteria	Transient inhibition in the growth of some bacteria or fungi might be expected		(13) application method
	Can cause severe eye damage		Applicators and other handlers must wear long-sleeved shirt and long pants; shoes plus socks; protective eyewear; chemical resistant gloves.	(11) personal protective gear
Does not bioaccumulate or bioconcentrate	Ester has much higher lipophilic tendancy (Kow = 10, 233) than salt (Kow = 0.35)			
	Adverse effects to mammal reproduction or development only at doses that are maternally toxic		Except for lactating dairy animals, there are no grazing restrictions	(12) application rates
	Evidence for carcinogenicity			(12) application rates

Triclopyr				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization* (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
	is marginal (not convincing, but not entirely negative)			
	Effects to kidney are basis of risk to for acute and chronic exposures humans	At high application rates, chronic exposures to workers exceed level of concern; acute exposures do not exceed level of concern for workers. At high application rates, some acute and chronic exposures exceed level of concern for public. No exposures exceed level of concern at typical application rate.	Do not apply this product in a way that will contact workers or other persons, either directly or through drift.	(12) application rates drift (11) personal protective gear
	For wildlife, acute lethality only at very high doses, but effects to kidney and liver at lower doses	Acute exposures below level of concern at typical application rate, but exceed level of concern for grass and insect eating mammals		R6 standard – application method (12) application rates
	Primary effect from chronic doses is to the kidney	Using protective assumptions, chronic exposures exceed level of concern for grass-eating mammals. Risk from chronic exposure to contaminated insects unknown.		R6 standard – application method (12) application rates (11) personal protective equipment
	Formulations contain inerts that are neurotoxic (Garlon 3A = ethanol) (Garlon 4 = kerosene)	Exposures very far below level of concern; less toxic than triclopyr		(12) application rates (11) personal protective gear
	Ester more toxic to birds that salt form	Several scenarios exceed level of concern at typical and highest application rates for acute and chronic exposures		R6 standard – application method (12) application rates
	Salt/acid formulation low toxicity to fish; has aquatic use label	Exposures exceed level of concern for federally listed fish at typical rate, but not other fish even at highest application rate	(Garlon 3A) Permissible to treat flood plains, marshes, swamps, bogs etc. Permissible to treat non-	R6 standard –application method (12) application rates (56, 57) aquatic buffers

Triclopyr				
Herbicide Characteristics	**Basic Hazard Identification**	**Risk Characterization* (SERA Risk Assess.)**	**Label Restrictions & Information**	**Project Design Features**
			irrigation ditch banks. When making application to banks or shorelines of moving water sites, minimize overspray to open water.	(49) garlon4 buffer
	Ester formulation toxic to fish and aquatic invertebrates	Exposures exceed level of concern for federally listed fish at typical rate, but not other fish even at highest application rate	(Garlon 4) This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present… Do not contaminate water when disposing of equipment washwaters.	(49) garlon4 buffer (12) application rates (52) equip. rinsing (56, 57) aquatic buffers
	Metabolite TCP much more toxic to fish than the salt form, about the same toxicity as ester	At typical application rate, no TCP exposures exceed level of concern. At highest application rate, chronic exposure exceeds level of concern		(12) application rates (54, 55) aquatic buffers
	Ester form much more toxic to aquatic plants and algae than salt form	Only salt form exceeds level of concern for aquatic plants; algae not at risk from either form		(13) application method (12) application rates (56, 57) aquatic buffers
	Ester formulation much more toxic to amphibians than salt formulation	At typical application rate, risk to amphibians from either form is low. At highest rate, exposure to run-off of either form could adversely affect responsiveness of tadpoles.		(13) application rates (56, 57) aquatic buffers (83) spotted frog
	Practically non-toxic to bees	Exposure exceeds level of concern only for highest application rates		(12) application rates (56, 57) aquatic buffers

*Results of these risk characterizations are from scenarios where triclopyr is broadcast sprayed over a large area. A standard in each Forest Plan that was added by the Region 6 Invasive Plant Program ROD (USDA Forest Service 2005) prohibits this type of application. Triclopyr is restricted to selective application methods only. Therefore, in practice, it is not plausible to create the exposures causing concern during use of triclopyr for invasive plant control in Region 6.

Water Solubility Chart

Solubility Class	Water Solubility (ppm=mg/L)	Examples
Very High	3,000 – 1,000,000	chlorsulfuron, glyphosate, imazapic, imazapyr, picloram, sethoxydim,
High	300-3,000	clopyralid, metsulfuron methyl, 2,4-D
Medium	30-300	sulfometuron, triclopyr
Low	2-30	
Slight	0.5-2	
Immobile	<0.5	DDT (0.0012)

Adapted From Jay Davis, US Fish and Wildlife Service

Mobility in Soil KOC

Mobility Class	Koc in Soil	Examples
Very High	0-35	clopyralid, picloram, metsulfuron methyl, triclopyr salt
High	36-100	Sulfometuron methyl,chlrosufluron,
Medium	100-1,000	imazapic, imazapyr, sethoxydim, atrazine, triclopyr ester
Low	1,000-3,000	glyphosate
Slight	3,000-10,000	Trifluralin
Immobile	>10,000	chlorpyrifos, DDT

Adapted from Jay Davis, US Fish and Wildlife Service.
Mobility class categories by S. Bautista and are general breakdowns, not a definitive classification.

Livestock Use Restrictions by Herbicide

Livestock Use Restrictions by Herbicide*			
Herbicide	**Brand Name**	**Restriction**	**Remarks**
Chlorsulfuron	Telar, Glean, Corsair, Landmark (Oust + Telar)	None	
Clopyralid	Transline, Redeem (Clopyralid + Triclopyr)	Redeem: Do not graze treated areas until poisonous plants are dry and no longer palatable to livestock. Withdraw livestock from grazing treated grass at least 3 days prior to slaughter.	See label for cropland grazing restrictions post treatment in pastures. Redeem: Herbicide application may increase palatability of certain poisonous plants.
Glyphosate	RoundUp, Rodeo,	None	RoundUp:

Livestock Use Restrictions by Herbicide*			
Herbicide	**Brand Name**	**Restriction**	**Remarks**
	etc.		ingestion of this product or large amounts of freshly sprayed vegetation may cause temporary gastrointestinal irritation.
Imazapic	Plateau	Plateau: None. Plateau DG (dispersable granules): Do not use on areas to be grazed.	
Imazapyr	Arsenal, Chopper, Stalker	Arsenal: none. Chopper: none. Stalker: none.	
Metsulfuron methyl	(Escort)/Sulfonylurea	None.	
Picloram	Tordon	Tordon 101/22K/K: allow one week of grazing/feeding in non-exposure area before moving livestock onto broadleaf cropland. Tordon 22K: herbicide application may increase palatability of certain poisonous plants. Do not graze treated areas until poisonous plants are dry and no longer palatable to livestock. Meat grazing animals up to two weeks after treatment should be removed from treated areas 3 days prior to slaughter.	
Sethoxydim	Poast	None	
Sulfometuron methyl	(Oust)/Sulfonylurea, & Landmark (Oust + Telar)	None	
Triclopyr	(Garlon, Pathfinder, Remedy)/Synthetic auxin, Redeem (Clopyralid + Triclopyr)	Forestry Garlon 4, Garlon 4, & Remedy: 2 quarts per acre or less, no restriction. If less than 25% of the grazing area is treated, there is no restriction. Slaughter: remove animals from treated area 3 days prior to slaughter. Garlon 3A: none. Remove animals from treated area 3 days prior to slaughter. Pathfinder II & Remedy RTU: 2.5 gallons per acre or less, no restriction. If less than 25% of the grazing area is treated, there is no restriction. Slaughter: remove animals from treated area 3 days prior to slaughter. Redeem: Do not graze treated areas until poisonous plants are dry and no longer palatable to livestock. Withdraw livestock from grazing treated grass at least 3 days prior to slaughter.	

* This table is not meant to be an inclusive or up-to-date list; please refer to product labels for the most accurate and inclusive information

Summaries of Herbicide Characteristics that Influence Their Potential Effects on the Soil Resource

Picloram

Picloram has a typical half-life of 90 days. Field studies (Brooks et al., 1995; Nolte and Fulbright, 1997) have not noted substantial adverse effects from this herbicide on soil productivity and health under normal application rates (SERA, 2003-picloram). Although the application of Picloram at typical rates may change microbial metabolism on site in the short term, detectable effects to soil productivity that might be expected if soil microbial activity were substantially damaged have not been identified in the literature.

- Since picloram is toxic to microorganisms at low levels, toxic effects can last for some time after application.
- Long-term effects to soil microorganisms are unknown, but persistence in soils could affect soil microorganisms by decreasing nitrification (SERA, 2003-picloram).
- The persistence of picloram increases with soil concentration, thus increasing the likelihood that it becomes toxic to soil microorganisms in the short-term.
- Picloram applied at a typical application rate is likely to change microbial metabolism, though detectable effects to soil productivity are not expected.
- Substantial effects to soil productivity from the use of picloram over the last 40 years have not been noted (SERA, 2003d).
- Picloram has been studied on a number of soil invertebrates.
- Metabolites may increase toxicity for some soil microorganisms.
- Picloram has a typical half-life of 90 days.
- Picloram soil degradation rates vary in soil, depending on application rate and soil depth.
- Picloram is water soluble, poorly bound to soils that are low in clays or organics, has a high leaching potential, and is most toxic in acidic soil.
- Picloram should not be used on coarse-textured soils with a shallow water table, where groundwater contamination is most likely to occur (KSU, 2001; SERA, 2003d).
- Picloram percolation is highest in loam and sandy soils (SERA, 2003d; Herbicide Handbook, 2002). However, modeling results indicate picloram runoff (not percolation) is highest in clay soils.

Sulfometuron methyl

This herbicide is the primary choice for control of medusahead, which is located most extensively on the finer textured soils of the CRNG, with some populations also located on the Lookout Mountain, Paulina and Sisters Ranger Districts.

- The typical half-life for sulfometuron methyl varies from 10 to 100 days, depending on soil texture and organic matter content in the mineral soil profile.
- Microbial inhibition in the short term is likely to occur at typical application rates and could be substantial in some cases, as indicated by the negative impacts that a formulation of sulfometuron methyl had a on the abundance of microorganisms and decreased soil nitrogen content on a Christmas tree farm (Arthur and Wang, 1999).

- Residues of these herbicides in the soil may alter the composition of soil microorganisms over an extended period of time on coarser textured and lower organic matter content soils with higher pH levels. Mobility of this herbicide following application also increases under these same characteristics.
- There are no studies on the effects of sulfometuron methyl on soil invertebrates.
- Sulfometuron methyl degradation occurs most rapidly at lower pH soils where rates are dominated by hydrolysis.
- Sulfometuron methyl mobility is generally greater at higher soil pH and lower organic matter content.
- Modeling results indicate sulfometuron methyl runoff is highest in clay and loam soils with peaks after the first rainfall. Sulfometuron methyl percolation is highest in sandy soils. Monitoring results generally support modeling results (SERA, 2003e; Herbicide Handbook, 2002).
- Sulfometuron methyl applied to vegetation at typical application rates would probably be accompanied by secondary changes to vegetation that affect the soil microbial community more certainly than direct toxic action of sulfometuron methyl on soil microorganisms (SERA, 2003e).

Metsulfuron methyl

Metsulfuron methyl and chlorsulfuron are also members of the Sulfonylurea chemical type, although they exhibit less toxic effects on soil microorganisms than sulfometuron methyl.

The half-life of metsulfuron methyl is approximately 30 days and the herbicide has a short-term toxicity to soil microorganisms identified on the label. This herbicide is the primary choice for treating houndstongue. Studies on the effects of metsulfuron methyl on soil biota are limited to *Pseudomonas* species, though there are a few studies of insects that live in soil. The lowest observed effect concentration is 5 mg/kg, based on the Psuedomonas study. At recommended use rates, no effects are expected for insects.

- Effects to soil microorganisms appear to be transient (SERA, 2003c).
- Metsulfuron methyl degrades in soil, with a variable half-life up to 120 days.
- Half-life is decreased by the presence of organic matter though microbial degradation of metsulfuron methyl is slow.
- Non-microbial hydrolysis is slow at high pH but rapid at lower pH.
- Adsorption to soil particles, which affects the runoff potential of metsulfuron methyl, increased with increased pH and organic matter.
- Metsulfuron methyl has low adsorption to clay.
- Modeling results indicate that off-site movement due to runoff could be significant in clay soils.
- Metsulfuron methyl percolates in sandy soils (SERA, 2003c; Herbicide Handbook, 2002).

Chlorsulfuron

The half-life of chlorsulfuron is approximately 40 days but has a very low toxicity to soil microbes identified on the label. This herbicide is the primary choice for perennial pepperweed and white top. Studies on the effects of chlorsulfuron on soil biota include lab and field studies on nematodes, fungi, populations of actinomycetes, bacteria, and soil microorganisms.

- No effects of chlorsulfuron were found for soil biota at recommended application rates, with the exception of transient decreases in soil nitrification (SERA, 2003a).

- The ‘no observable effects concentration’ for soil is 10 mg/kg, based on cellulose and protein degradation.
- Chlorsulfuron degrades in aerobic soil.
- Non-microbial hydrolysis plays an important role in chlorsulfuron breakdown, and hydrolysis rates increase as pH increases.
- Adsorption to soil particles, which affects the runoff potential of chlorsulfuron, is strongly related to the amount of organic material in the soil.
- Chlorsulfuron adsorption to clay is low.
- Chlorsulfuron is moderately mobile at high pH.
- Leaching is reduced when pH is less than six.
- Modeling results indicate that runoff would be negligible in relatively arid environments as well as sandy or loam soils.
- In clay soils, off-site loss could be substantial (up to about 55 percent of the applied amount) in regions with annual rainfall rates of 15 to 250 inches (SERA, 2003a; Herbicide Handbook, 2002).

Triclopyr

Triclopyr has been identified as capable of inhibiting soil fungi and bacteria, but research suggests that it is not persistent at levels high enough following recommended application rates to negatively affect soil productivity. Relationships between observed maximal residues and threshold concentrations for toxicity to soil biota suggest that sustained deleterious effects on soil organisms or functional processes are unlikely to result from normal operational use of either triclopyr or glyphosate herbicides (Thompson, et al. 2000).

The five commercial formulations of triclopyr contain one of two forms of triclopyr, BEE (butoxyethyl ester) or TEA (triethylamine). Triclopyr BEE is much more toxic to aquatic organisms than triclopyr TEA. A breakdown product, TCP (3,5,6-trichloro-2-pyridinol), is more toxic than either form of triclopyr. Site-specific cumulative effects analysis buffer determinations need to consider the form of triclopyr used and the proximity of any aquatic triclopyr applications, as well as toxicity to aquatic organisms (SERA, 2003f).

- R6 ROD Standard #16 restricts triclopyr to selective applications, which would reduce direct effects to ectomychorrhizal fungi.
- Triclopyr has not been studied on soil invertebrates. Triclopyr does have direct toxicity to ectomychorrhizal fungi.
- Soil fungi growth was inhibited at concentrations 2 to 5 times higher than concentrations expected from USDA Forest Service application rates.
- Triclopyr has an average half-life in soil of 46 days, while TCP has an average half-life in soil of 70 days. Warmer temperatures decrease the time to degrade triclopyr.
- Soil adsorption is increased as organic material increases and decreased as pH increases. Triclopyr is weakly adsorbed to soil, though adsorption varies with organic matter and clay content. Both light and microbes degrade triclopyr (SERA, 2003f; Herbicide Handbook, 2002).

Glyphosate

Glyphosate is a non-selective, non-residual, systemic, post emergence herbicide used for the control of a great variety of annual, biennial, and perennial grasses, sedges, broad-leaved weeds, and woody shrubs. It is very effective on deep-rooted perennial species.

- Glyphosate dissipates rapidly from the water column as a result of adsorption and possibly biodegradation. The half-life in water is a few days. Sediment is the primary sink for glyphosate. After spraying, glyphosate levels in sediment rise and then decline to low levels in a few months.
- Modeling results indicate glyphosate runoff is highest in loam soils with peaks after the first rainfall (SERA, 2003b; Herbicide Handbook, 2002).
- Studies suggest glyphosate does not adversely affect soil organisms.
- Glyphosate is readily metabolized by soil microorganisms and some species can use glyphosate as a sole source of carbon (SERA, 2003b).
- Numerous soil bacteria, fungi, invertebrates, and other microorganisms have been studied for effects of glyphosate application.
- It is degraded by microbial action in both soil and water.
- Sylvia and Jarstfer (1997) found that after 3 years, pine trees in plots with grassy invasive plants had 75 percent fewer mycorrhizal root tips than plots that had been treated 3 times per year with a mixture of glyphosate and metsulfuron methyl to remove invasive plants.
- Glyphosate degrades in soil, with an estimated half-life of 30 days.
- Glyphosate is highly soluble, but adsorbs rapidly and binds tightly to soil.
- Glyphosate has low leaching potential because it binds so tightly to soil.

Clopyralid

Clopyralid is a selective herbicide used for the control of broadleaf weeds, especially thistles and clovers. It is the only effective herbicide for the control of creeping thistle, Cirsium arvense, a noxious, perennial weed. Clopyralid is in the pyridine family of herbicides, which also includes picloram, triclopyr, and several less common herbicides. It is particularly active on members of the Asteraceae and Fabaceae families but does not affect grasses.

Clopyralid is a synthetic plant growth hormone and has some structural similarities to naturally occurring hormones called auxins. Clopyralid is similar in structure and mode of action to the herbicide picloram. It disrupts plant growth by binding to molecules that are normally used as receptors for the natural growth hormones. Because clopyralid is more persistent in plant tissue than auxins, the binding causes abnormal growth leading to plant death in a few days or weeks, depending on the species.

- Studies of clopyralid effects on soil invertebrates have been conducted, including field studies on the effects to microorganisms. Clopyralid is in the same chemical family as triclopyr and is identified as having a low toxicity to soil microorganisms.
- Soil concentrations from USDA Forest Service applications are expected to be 1,000 less than concentrations that would cause toxic effects. Therefore, no effects to soil invertebrates or microorganisms are expected from use of clopyralid (SERA, 1999a).
- Clopyralid is degraded by soil microbes, with an estimated half-life of 14 to 29 days, meaning that one-half of the amount applied remains in the soils after 14 to 29 days, one-fourth of the applied amount remains after 28 to 58 days, one –eight after 42 to 87 days, and so on.
- Increased soil moisture decreases degradation time.
- Clopyralid is weakly adsorbed and has moderate leaching potential.
- Modeling results indicate clopyralid runoff is highest in clay soils with peaks after rainfall events.
- Clopyralid percolation is highest in sandy loam soils (SERA, 1999a; Herbicide Handbook, 2002).

Imazapic

Imazapic is a relatively new herbicide, and there are no studies on the effects of imazapic on either soil invertebrates or soil microorganisms. This herbicide is a member of the Imidazolinones chemical family and appears to have low toxicity to soil microbes.

- If imazapic was extremely toxic to soil microorganisms, it is reasonable to assume that secondary signs of injury to microbial populations would have been reported (SERA, 2001a).
- Imazapic degrades in soil, with a half-life of about 113 days.
- Half-life is decreased by the presence of microflora.
- Imazapic is primarily degraded by microbes and it does not degrade appreciably under anaerobic conditions.
- Imazapic is weakly adsorbed in high soil pH, but adsorption increases with lower pH (acidic soils) and increasing clay and organic matter content.
- Field studies indicate that imazapic remains in the top 12 to 18 inches of soil and do not indicate any potential for imazapic to move with surface water.
- Modeling results indicate imazapic runoff is highest in clay and loam soils with peaks after the first rainfall. Imazapic percolation is highest in sandy soils (SERA, 2001a; Herbicide Handbook, 2002).

Imazapyr

Imazapyr is a non-selective herbicide used for the control of a broad range of weeds including terrestrial annual and perennial grasses and broadleaved herbs, woody species, and riparian and emergent aquatic species. It controls plant growth by preventing the synthesis of branched-chain amino acids. Because imazapyr is a weak acid herbicide, environmental pH will determine its chemical structure, which in turn determines its environmental persistence and mobility. Below pH 5 the adsorption capacity of imazapyr increases and limits its movement in soil. Above pH 5, greater concentrations of imazapyr become negatively charged, fail to bind tightly with soils, and remain available (for plant uptake and/or microbial breakdown). In soils imazapyr is degraded primarily by microbial metabolism.

There are no studies on the effects of imazapyr on soil invertebrates, and incomplete information on the effects on soil microorganisms.

- Imazapyr can persist in soil for over a year. Persistence studies suggest that imazapyr residues damage plants at concentrations that are not detectable by laboratory analysis.
- Imazapyr moves readily in soil. It has contaminated surface and ground water following aerial and ground forestry applications.
- Small amounts of imazapyr (as little as 1/50 of a typical application rate) can damage crop plants.
- Imazapyr exposure also has the potential to seriously impact rare plant species. The U.S. Fish and Wildlife Service has identified 100 counties in 24 states east of the Mississippi River where endangered species may be jeopardized by use of imazapyr.
- Over a half-dozen weedy plant species have developed resistance to imazapyr.
- This herbicide is a member of the Imidazolinones chemical family and appears to have low toxicity to soil microbes.

- One study indicates cellulose decomposition, a function of soil microorganisms, can be decreased by soil concentrations higher than concentrations expected from USDA Forest Service applications.
- There is no basis for asserting adverse effects to soil microorganisms (SERA, 1999b).
- Imazapyr degrades in soil, with a half-life of 25 to 180 days.
- Degradation rates are highly dependent on microbial action.
- Anaerobic conditions slow degradation.
- Adsorption increases with time as soil dries and is reversible.
- Field studies indicate that imazapic remains in the top 20 inches of soil and do not indicate any potential for imazapic to move with surface water.
- In forest field studies, imazapyr did not run off and there was no evidence of lateral movement.
- Modeling results indicate imazapyr runoff is highest in clay and loam soils with peaks after the first rainfall.
- Imazapyr percolation is highest in sandy soils (SERA, 1999b; Herbicide Handbook, 2002).

Sethoxydim

Selective post-emergence herbicide used to control annual and perennial grass weeds among broad-leaved plants.

- Sethoxydim is a member of the cylohexanone chemical family and has been researched to be very low in toxicity to soil microbes (Roslycky, 1986).
- Sethoxydim has not been studied on soil invertebrates.
- Assays of soil microorganisms noted transient shifts in species composition at soil concentration levels far exceeding concentrations expected from USDA Forest Service application.
- No adverse effects to soil organisms are expected (SERA, 2001c).
- Sethoxydim is degraded by soil microbes, with an estimated half-life of 1 to 60 days. Adsorption of sethoxydim varies with organic material content of the soil.
- Modeling results indicate sethoxydim runoff is highest in clay and loam soils with peaks after the first rainfall (SERA, 2001c; Herbicide Handbook, 2002).

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APPENDIX E – Revegetation Planning and Implementation, and Excerpts from the 2003 "Draft Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest"

Revegetation Planning and Implementation

In order to conserve and enhance the biodiversity and sustainability of wildland ecosystems, numerous authorities and policies are in place to promote the use of native species in restoration and revegetation (R6 2005 FEIS). Regional direction for the use of native plants was issued in 1994 with the Pacific Northwest Revegetation Policy. It set a long-term goal for using native plant species as much as possible.

The Deschutes and Ochoco National Forests and Crooked River National Grassland have been actively collecting and propagating native seeds and plants for various projects; however, we currently have enough native seed to be able to meet all of our short-term needs (3-5 years). However, we still must prioritize where to use our limited quantities of native seeds and the available seed must be ecologically appropriate for the sites where it will be used. A list of sites to be actively revegetated is included in Appendix A. These are sites that are currently within Project Area Units (PAU), and do not include those that may need revegetation under the early detection/rapid response (EDRR) process. At some sites (e.g., PAUs 12-05, 15-22, and 15-32), we will collect and/or propagate plants of adjacent native species and replant those in the treated areas. Though our goal is to use native plant species whenever possible, some introduced species will continue to play an important role in site restoration. Introduced ("cultivar") species may be used on Paulina District or Crooked River National Grassland (e.g., PAU 72-15) in areas where the sites are highly degraded, the invasive plant species is very aggressive (e.g., medusahead and houndstongue), and the native plant community is absent or greatly reduced. On degraded invasive plant sites where desirable plant species are absent or in low abundance, revegetation with competitive grasses and forbs may be necessary to direct and accelerate plant community recovery, and achieve site-management objectives in a reasonable timeframe (Erickson et al. 2005).

Available information and expertise will be used to develop revegetation plans for the above-listed sites. One source of information will be the "Draft Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest" (Erickson et al. 2003) included below. These guidelines provide strategies and considerations for site assessment, selection of plant materials, site preparation, planting techniques, and use of mulches and fertilizers. Revegetation prescriptions will vary depending on site type (e.g., riparian or upland), erosion potential, and land use designation (e.g., special management area, such as wilderness, Research Natural Areas, and Special Interest Areas).

Revegetation will involve site preparation, such as raking to prepare a seed bed to promote seed germination, planting of seeds and/or propagules (depending on the species, this is done either in early spring or late fall to take advantage of available moisture), mulching, vigilant treatment of invasive plants as they germinate from the existing seedbank, and monitoring the results. In some cases, a follow-up seeding/planting may need to be done.

United States
Department
Agriculture

Forest Service

**Pacific
Northwest
Region**

2003

Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest

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Introduction

This document provides methods and guidance for revegetation of invasive weed sites and other disturbed areas on National Forests and Grasslands in the Pacific Northwest (Region 6). Steps are outlined for assessing existing and potential site conditions, and for developing long-term revegetation strategies that are effective, affordable, and consistent with the ecological context and land management objectives of the site and surrounding landscape. The need for this document was driven by relatively new policies and programs that promote the use of native plant materials in revegetation projects. Historically, resource managers in the western United States have relied on introduced species (e.g., smooth brome, orchardgrass, timothy, crested wheatgrass) that have been selectively bred for characteristics that, at least in the short-term, made them logical choices for revegetation projects. Although some introduced species will continue to play an important role in site restoration, it has become increasingly clear that the widespread and excessive use of highly competitive and persistent non-native species has had adverse impacts on the diversity and health of our native forest, rangeland, and aquatic ecosystems (Detwyler 1971; Covington and Moore 1994; Kaufmann *et al*. 1994; Kay 1994; Mills *et al*. 1994; Brown 1995, Lesica and DeLuca 1996; Bartos and Campbell 1998; Schoennagel and Waller 1999; Brown and Rice 2000) As a consequence, new direction for revegetation projects strives for a balance between rapid establishment of high levels of competitive plant cover, and broader, more long-term objectives aimed at restoring inherent ecosystem properties (e.g., genetic and species diversity, vegetation structure) and processes (e.g., disturbance regimes, succession patterns, hydrologic regimes, and nutrient cycles).

Revegetation with carefully selected plant materials is a critical component of integrated weed management strategies. Commonly used control tactics, such as manual or chemical treatments, may eliminate or suppress invasive species in the short term, but the resulting gaps and bare soil create open niches that are susceptible to further invasion by the same or other undesirable plant species (Westman 1990; Jacobs *et al.* 1999; D'Antonio and Meyerson 2002). On degraded weed sites where reproducing individuals of desirable species are absent or in low abundance, revegetation with well-adapted and competitive grasses, forbs, and legumes can be used to direct and accelerate plant community recovery, and achieve site management objectives in a reasonable timeframe (Hobbs and Mooney 1993; Sheley *et al*. 1996, Brown and Amacher 1998). This document incorporates a landscape ecology approach to revegetation that first considers and prioritizes individual projects in the context of watershed scales. More fine-scale elements of a successful revegetation design are also addressed, including evaluation of existing and potential site conditions, identification of realistic site goals, and development and implementation of appropriate action strategies. Because the science and practice of restoration is rapidly evolving, and the potential and most effective usage of many native species has not been fully explored, an experimental approach to revegetation is advocated. Sections and references on monitoring principles and techniques are therefore included to provide tools for resource specialists to evaluate the efficacy of alternative revegetation treatments, and gain insights into how methods may be refined to better achieve desired outcomes (i.e., adaptive management).

The recommendations in this document follow National and Regional Forest Service authorities and policy guidelines, and are intended to provide a conceptual framework from which site-specific revegetation prescriptions can be developed. A number of sections, including the Decision Matrix and Site Prescriptions, were initially developed by resource specialists on the Siuslaw National Forest (Region 6), and refined and augmented by multi-Forest revegetation teams in Region 2 in cooperation with the National Park Service (http://fsweb.arnfpng.r2.fs.fed.us/). Detailed treatment descriptions and management scenarios are beyond the scope of this document, and specialists including District and Forest botanists, silviculturists, geneticists, ecologists, soil scientists, and range conservationists should be consulted as necessary to refine revegetation prescriptions and identify the most appropriate plant materials (species and seed sources) and revegetation methods for a particular site. Restoration of disturbed sites should be approached as a multi-disciplinary effort, and

will be most successful when local knowledge and expertise are fully utilized and integrated into comprehensive revegetation strategies.

Revegetation in a Landscape Context

Revegetation programs and strategies should be developed using a landscape ecology approach that considers individual projects in the context of watershed scales. Thus, revegetation of invasive weed sites should fit into broader ecological strategies that address other major restoration issues of a given watershed, including departures from historical vegetative conditions, at-risk aquatic/wildlife/plant species, hydrology, uncharacteristic wildfire risks, etc. Projects can then designed and prioritized so that they contribute to the overall goals for the particular watershed or landscape planning area. In addition, efforts should be taken to ensure that revegetation projects are fully integrated with the suite of other ongoing resource management projects, both spatially and temporally. One obvious example is that weed control operations must be tightly linked and coordinated with post-removal revegetation plans. A landscape ecology approach to revegetation also requires a thorough understanding of the underlying problems contributing to the need for revegetation, and how they interact with other processes within the watershed. This may be accomplished through assessments of the larger landscape area and its connection to the problem site. A key question is whether the site problem is unique, or symptomatic of other problems within the watershed that need to be addressed at a larger scale. Finally, in an era where the extent and intensity of management is declining and more aligned with natural processes, revegetation projects must be compatible with the dominant disturbance processes of the site and surrounding area (e.g., wildfire cycles, herbivory).

Some of the major issues to consider during the development of landscape-scale revegetation strategies for invasive weed sites include:

(the following section is not complete)

1. <u>The current extent and patterns of spread of invasive species</u>: Design projects to cut off or slow the spread paths and corridors using spatial strategies similar to those of wildfire management. Interrupt dominant vectors to minimize the degree and rate of propagule spread. Identify recurring points of invasion (e.g., roads/trails); revegetate the sites with highly competitive species. Tier revegetation to control prioritization scheme. Because funding for invasive spp. management efforts is typically limited, it is essential to prioritize revegetation of sites occupied by species and populations that are most important to control. Prioritization should be based on impacts of invader species, site characteristics, and potential for success.

2. <u>Grazing and hydrologic issues in riparian systems</u>: Revegetation species should be chosen based on consideration of site and landscape level aquatic strategies and goals. Utilize the Rosgen or other hydrologic classification schemes to determine succession on the stream and physical site characteristics to help select species for revegetation that will be compatible with the dominant hydrologic disturbance processes. Design projects with hydrologic disturbance in mind. Ungulate herbivory can be the dominate disturbance process (e.g., in the Blue Mountains) and must be factored into design and cost of revegetation.

3. <u>Historical range of variability (HRV) and degree of departure:</u> Quantify historical range and variability of landscape pattern dynamics to assess current landscape conditions and define limits of acceptable change. Design appropriate landscape vegetation treatments consistent with overarching ecosystem management goals. In upland settings, consider implications of fire regime (e.g., low intensity, frequent return interval versus infrequent high intensity). In high intensity fire areas, for

example, revegetation efforts may emphasize use of species that disperse and spread rapidly, have high seed production, and are tolerant of fire.

Site Assessment

Following the development of larger scale landscape strategies, site assessment is the next critical phase in the design of a successful revegetation project. There are 3 primary steps in determining whether a given site requires active revegetation. These include:

- Evaluation of site history and existing conditions
- Defining land management and site goals
- Determining the need for action

Site History and Existing Conditions:

The evaluation of existing site conditions involves first determining what resources or values are at risk from degradation of the site. Example of site risks to be considered include: (1) erosion and soil loss potential, (2) the likelihood of invasion or re-invasion by undesirable plant species, (3) loss of cultural, visual, or social values, and (4) potential effects on threatened, endangered, or sensitive (TES) species, and their forage and habitat.

Site dominated by invasive weed species may have an increased risk of surface run-off and soil erosion due to the loss of vegetative cover and native plants that have inherent soil stabilizing growth habits (e.g., extensive fibrous root systems). Risk of erosion will be higher on steep slopes (>40-50%) and sites with crusted, shallow, compacted, or highly erodible soils. Erosion can have negative effects on “downstream” ecosystem processes and species through sediment transport and deposition. On site, loss of the soil surface layer may strongly affect the degree and speed of revegetation due to depletion of organic matter, water holding capacity, and critical nutrient reserves.

Risk of noxious weed invasion or re-invasion on a site is largely dependent on the abundance of undesirable species in the seed bank, the size and proximity of surrounding weed populations, the ease of seed movement to the site, and the growth and spread characteristics of any adjacent weed species (D’Antonio and Meyerson 2002). For example, a population of an aggressive knapweed less than a quarter mile down a well-traveled road renders a site highly susceptible to invasion. In contrast, a site surrounded by several miles of dense forest that separates it from a population of a rhizomatous weed species such as white top is at fairly low risk of invasion. Loss of native vegetative cover may negatively impact the availability and abundance of culturally important medicinal or food species. Artifacts present in the soil also may be at risk of being disturbed or transported by soil erosion accompanying the loss of vegetative cover. Aesthetics and recreational quality are diminished by patches of bare soil, as well as by unattractive invasive plants that have sharp spines or thorns. Wildlife species have co-evolved with native plant species and are highly dependent on them for food, or cover, or both. Of special concern are TES species that may be directly or indirectly affected by degraded vegetative conditions resulting from weed invasions. For example, listed fish species may be adversely affected by altered seasonal water flows or by increased sediment loads in streams due to erosion of disturbed weed sites. Propagules from weed sites in close proximity to special management areas of high social or ecological value can disperse and become established in the pristine habitats that often harbor TES plant species. Finally, revegetation of invasive weed sites with aggressive non-native cover species may unintentionally introduce equally invasive, though not officially designated as noxious, plants into the vicinity of TES plant populations resulting in excessive competition with rare native species that are already in decline or at risk of extirpation.

In additional to risk assessment, it is also important to determine the causes of site degradation. Broad categories include soil disturbance, loss of native species, and loss of whole plant communities

whose structure normally regulates the processes of nutrient cycling and water retention. Within these broad categories, the agents contributing to disturbance and their relationship to ecosystem degradation should be identified and evaluated in terms of their continued presence and ongoing effects. For instance, if road construction has disturbed soils in the past, is the road still maintained (bladed annually, subject to ditch cleaning, sprayed annually to control existing weed infestations), or has it been closed or even obliterated? Or, if native plants have been lost due to heavy grazing pressure by domestic or wild ungulates, do those animals still have access to the area? Revegetation, especially with native species, is difficult to impossible in the face of continuing disturbance. Passive restoration (the removal of the disturbing agent so that unassisted site recovery can take place) will be the simplest and most cost-effective step towards revegetation of some sites, and is requisite to the success of active revegetation methods.

Desired Future Condition:

Defining revegetation goals, or desired future condition, for a given site is a crucial step in site assessment. In many cases, the recovery of natural ecosystem processes and pre-disturbance conditions, or some close approximation, will be assumed as the preferred state. This suggests a plant community that is structurally diverse, fully functioning in all ecosystem processes, and consisting of locally adapted native species. A knowledgeable botanist or a plant ecologist should be consulted at this stage to help in identifying realistic goals for site revegetation. In some cases, such as in the presence of ongoing degradation or large-scale infestations, complete recovery to pre-disturbance conditions may not be an appropriate objective. Revegetation goals must also be realistic, both in the sense that they may actually be achieved, and that they are affordable. Some common and overarching goals for revegetation of National Forests and Grasslands include:

- Contribute to the restoration of ecosystem structure and function.
- Minimize or contain surface erosion, particularly if the project or downstream area is susceptible to impacts of erosion and/or sedimentation.
- Maintain or re-establish nutrient cycling as quickly as possible through establishment of desirable vegetative cover for nutrient uptake, and placement of woody debris or mulch for nutrient input.
- Avoid or minimize stream or riparian area sedimentation
- Exclude noxious weeds and undesirable non-native species by revegetating sites with local native species or non-persistent cover crops that will not be overly competitive with native vegetation in the target area.
- Give special consideration to sites of high ecological or social value, and areas containing TES species or habitat. Revegetation with local native species (local ecotypes) is a high priority within intact and pristine ecosystems, core conservation areas, and their buffers and connecting corridors.

Need For Action:

Determining the need for action on a specific site requires consideration of the potential for natural recovery. For example, is there adequate moisture available to support natural regeneration, sprouting, and establishment of native vegetation within a reasonable period of time? The degree of disturbance, as indicated by the proportion of the existing plant cover that consists of desirable native species, will also affect revegetation outcome. Ten to twenty percent native cover is considered a minimum required to facilitate natural recovery of a site (James 1992, Sheley *et al*. 1996, Goodwin and Sheley 2003). The diversity, abundance, and viability of plant propagules of desirable species in the seed bank or within the immediate vicinity are additional important determinants in natural recruitment and

recovery. A novel method for quantifying site disturbance and the potential for natural recovery based on the plant cover of individual species, and their longevity and native/non-native status is described in McArthur *et al*. (1995). The formula[4] could easily be modified to incorporate information on additional life history traits such as root morphology (e.g,. rhizomatous vs. non-rhizomatous) and seral status. Sites dominated by propagule pools of early seral (pioneering) native species are predicted to have the greatest likelihood of natural colonization and recovery, while those reliant on late seral species for regeneration or dominated by undesirable rhizomatous species will generally be less successful.

The size of the invasion and the length of time that weeds have been present may strongly influence revegetation strategies and the need for active manipulations. Very small sites are the most easily re-colonized by the extant seed bank and by plant propagules dispersed from surrounding sources. Depending on the ecological setting, it is reasonable to allow revegetation to occur on its own on sites less than about 0.25 acres, or to possibly assist natural recovery through the redistribution of seed from surrounding plants by hand. The longer the site has been occupied by invasive plants, the greater the potential for the seed bank to become dominated by undesirable species, and for chemical or physical changes in soil conditions (e.g., shifts in nitrogen pools and pH) and associated microbial communities that may adversely affect species replacement dynamics and natural site recovery (Evans *et al*. 2001; Svejcar and Sheley 2001; D'Antonio and Meyerson 2002).

Other soil conditions influencing outcome include the degree of substrate disturbance (loss or mixing of soil horizons) and seedbed physical characteristics, including the extent of crusting and compaction. As fertility and water holding capacity are lost with the A and B soil horizons it becomes increasingly difficult to establish vegetation. Regardless of the method of regeneration, cultural amendments and manipulations may be required on highly degraded sites to help decrease the competitive advantage of exotic species, and improve the number and condition of regeneration sites available for germination and root extension of desired species. Examples include topsoil replacement, incorporation of organic matter, mulching, seedbed disking and imprinting to aid water infiltration and soil aeration, liming to adjust pH, and nutrient enhancements/manipulations. An experimental technique of great promise in *Bromus tectorum* dominated communities is the application of sucrose to reduce plant-available nitrogen and create a soil environment more conducive to the establishment of native perennial vegetation (McLendon and Redente 1992; Young *et al*. 1999; Paschke *et al*. 2000).

Selection of Plant Materials

Regional Priorities and Guidelines:

When site assessment indicates a need for active revegetation, the next critical step is to determine the species and seed sources that will establish and perform well on the site without impeding natural community recovery and succession, or compromising the diversity, genetic integrity, and long-term viability of resident wild populations. The potential risks and impacts of revegetation treatments are greatest for seeding and planting projects that involve large acreages, or that occur in or near management areas of high social or ecological value. In 1994, Region 6 formulated revegetation policy that set general guidelines and priorities for plant material usage in disturbed areas on national forests and grasslands, including sites occupied by invasive exotic plants (see Appendix B). Regional priorities, as well as definitions and rational, are as follows:

Priority 1 - Local Native: Plant materials of native species that originate from genetically local sources. Benefits of use include high adaptation to spatial and temporal extremes, and low input

[4] Disturbance value = Sum[Cover*(Longevity-Origin Scores)]/Number of Species. Longevity: 1=annual, 2=biennial, 3=biennial to perennial, 4=perennial. Origin: 1=native to local area, 2=exotic to the area, but native to North America, 3=exotic to North America.

requirements (e.g., supplemental water, fertilizer). Local native plant materials are recommended for projects of all sizes (Fig. 1, adapted from Lesica and Allendorf 1999), especially in and around pristine or relatively intact habitats and ecosystems such as designated or proposed wilderness, roadless areas, wild and scenic river corridors, Research Natural Areas (RNAs), Special Interest Areas (SIAs), riparian areas, wetlands, cultural use areas, TES species habitat and connecting corridors, etc. For severe and large-scale disturbances, a mixture of genotypes or seed sources from ecologically different populations has been suggested as a strategy for maximizing genetic variation and enhancing the likelihood of plant establishment and persistence in stressful environments (Fig. 1, adapted from Lesica and Allendorf 1999).

The ecological and geographic boundaries that define a local population are determined primarily by the heterogeneity of the climate and habitat, the genetic structuring of the populations, the extent of local adaptation, and the consequences of mixing distant gene pools (Fenstar and Dudash 1994; Knapp and Rice 1994; Linhart 1995; Montalvo *et al*. 1997; Lesica and Allendorf 1999; Hufford and Mazer 2003).

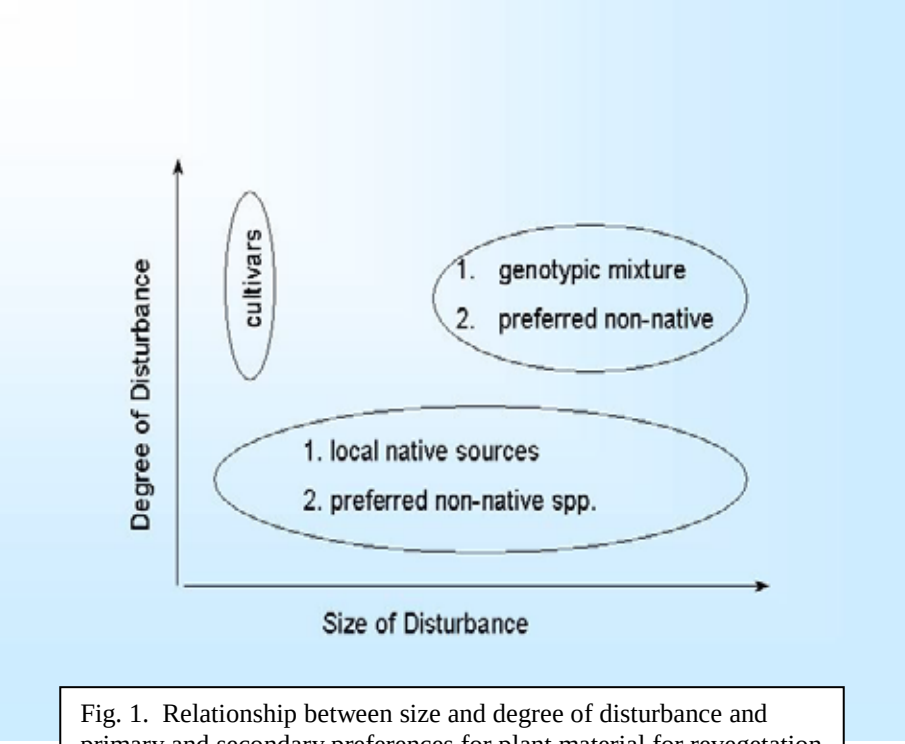

Fig. 1. Relationship between size and degree of disturbance and primary and secondary preferences for plant material for revegetation on National Forests and Grasslands in Region 6. (Adapted from Lesica and Allendorf 1999).

Although seed zones and transfer guidelines have been developed for most Pacific Northwest conifer species (USDA 1973; Randall and Berrang 2002), such information is generally lacking for other native plant species. As a consequence, elevational restrictions along with existing spatial frameworks such as EPA ecoregions, 5th field watersheds, and conifer seed zones are frequently used to guide seed movement in native shrubs, grasses, and forbs (Erickson *et al.*, submitted). In the absence of supporting genetic data, the spatial scale of seed mixing and movement in the Pacific Northwest should be limited to geographic areas on the order of Level III ecoregions (Fig. 2; Omernik 1987, 1995), with additional restrictions based on elevation, cold hardiness, and local precipitation patterns. Area geneticists should be consulted for guidance in determining the most appropriate genetic sources of plant material for a particular restoration site.

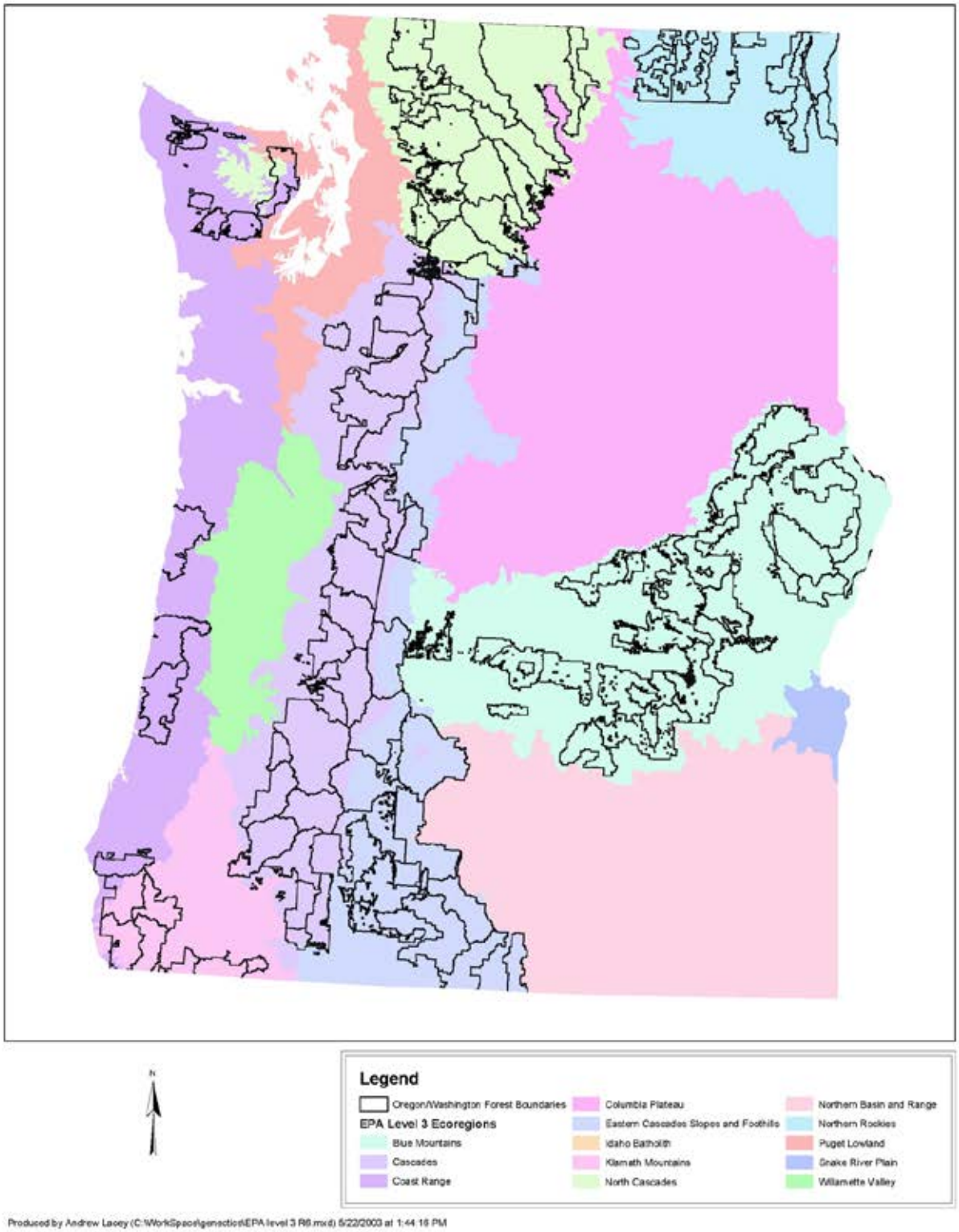

Figure 2. Relationship between Level III ecoregions (in color) and R6 National Forest boundaries (outlined in black).

Use of local sources of native seed requires carefully coordinated and integrated programs to ensure adequate quantities of suitable seed are available at critical times for project work. A new 5-year Regional contract for native grass and forb seed production (53-04R3-03-14, http://www.fs.fed.us/r6/uma/native/) will help facilitate this process at reasonable cost. Table C-1 (Appendix C) contains seed yield and cost figures for native grass and forb species included in the contract. Table C-2 (Appendix C) describes ecological attributes and suggested seeding rates for a broad array of native species that have successfully been used in revegetation projects in the Pacific Northwest.

Priority 2 - Preferred Non-Native: The volume of seed needed for large-scale restoration may at times preclude the use of local native seed, particularly for unplanned events such as wildfires, or other disturbances where it is critical to quickly establish vegetation in order to protect basic resources values and prevent weed invasions. In these instances, a second choice would be sterile hybrids or annuals/biennial/perennial introduced plant species that are non-persistent and non-invasive (Fig.1, adapted from Lesica and Allendorf 1999). Preferred non-native species are those that will not aggressively compete with the naturally occurring native plant community, will not invade plant communities outside the project area, persist in the ecosystem over the long term, or exchange genetic material with local native plant species. Appendix D includes recommendations for non-native species that may be seeded as temporary ground cover for both erosion control and as noxious weed competitors until native species can become established and occupy the site. The list includes sterile hybrids, such as REGREEN and annuals such as white oats (*Avena sativa*) and winter wheat (*Triticum aestivum*). A more complete list of perennial non-natives that are suitably non-persistent may be developed on Districts/Forests by examining past revegetation efforts where the seeded species are known. Exotic species that have not already been introduced into the area, or that have been found to be aggressive and/or persistent, should be avoided. Table E-1 (Appendix E) provides a listing of non-native species that, although commonly used in the past, are generally no longer recommended due to their highly aggressive nature that has resulted in widespread loss or displacement of native species and plant communities in western wildlands. These include Kentucky bluegrass (*Poa pratensis*); smooth brome (*Bromus inermis*); crested wheatgrass (*Agropyron cristatum)*; orchard grass (*Dactylis glomerata*); yellow and white sweetclover (*Melilotus officinale* and *M. albus*); alsike clover (*Trifolium hybridum*) and alfalfa (*Medicago sativa* to name a few. As a last resort, some of these "species-to-avoid" may play a limited role in revegetation of small, highly degraded sites where there is poor potential for native plant community recovery, or in settings where there is little risk of spread beyond the original site of introduction (e.g., seeding around buildings on administrative sites).

Priority 3 - Non-local Native: This category includes native species that do not occur naturally in the local ecosystem, or native plant material that does not originate from genetically local sources. These types of plant materials, including most commercial cultivars (Table E-2, Appendix E), are generally not preferable for wildland use due to concerns over adaptability, genetic diversity level, and the potential for genetic contamination or "swamping" of local native gene pools, including those of TES plants (Millar and Libby 1989; Knapp and Rice 1994; Linhart 1995; Montalvo *et al*. 1997; Lesica and Allendorf 1999; Hufford and Mazer 2003). Because commercial cultivars are typically selected for agronomic traits such as high fecundity, vegetative vigor, and competitive ability, their use may also adversely impact resident natural populations through direct competition and displacement. Moreover, cultivars of native species (and introduced look-alikes such as sheep fescue, *Festuca ovina*) can be very difficult to distinguish from native germplasm, which could severely complicate efforts to collect and propagate local material and waste valuable economic resources. Because of these concerns, cultivars are recommended for use only on small, highly disturbed sites (Fig. 1, adapted from Lesica and Allendorf 1999) that are not in close proximity to areas of high social or ecological value such as designated or proposed wilderness areas; Research Natural Areas (RNAs); Special

Interest Areas (SIAs), TES species habitat or corridors, and riparian/wetland areas. Where cultivars have been used, it is important to document and map their locations so these areas can be avoided during seed harvesting activities.

Designing Seed Mixes

The design of an effective seed mixes incorporates a number of factors, including land-use objectives and site characteristics such as existing and potential vegetation, weed density and biomass, precipitation/temperature regimes, soil characteristics, and shade conditions. In addition, short-term objectives of quick establishment of competitive plant cover must be balanced with more long-term goals of restoring fully functioning and self-sustaining plant communities that will be resilient to further disturbances (i.e., will not degrade to pre-treatment, weed-dominated conditions). This may be achieved by devising seed mixes containing compatible species that (1) maximally occupy available niches (enhance functional diversity), and (2) possess physiological and growth characteristics that facilitate their establishment, competitiveness, and tolerance of stress.

Researchers have found that sites with high functional group diversity, especially with respect to native forbs, are more competitive and resistant to weed invasion and establishment because site resources are fully utilized (Carpinelli 2000; Symstad 2000; Pokomy 2002). Although the full spectrum and diversity of the desired plant community rarely will be achieved during revegetation, niche occupation and resources use can be enhanced by combining key species that vary in their seasonal growth pattern, seral status, reproductive mechanisms, and growth form and root morphology (e.g., fibrous-rooted grasses and forbs with deep taproots) (Panetta and Groves 1990; Jacobs *et al*. 1999; Goodwin and Sheley 2003). Example of native cool-season grasses (grow in the early spring/summer and utilize soil resources in the upper soil profile) that can be competitive against invasive weeds include blue wildrye (*Elymus glaucus*), squirreltail (*Elymus elymoides*), mountain brome (*Bromus carinatus*), thickspike wheatgrass (*Elymus lanceolatus*), slender wheatgrass (*Elymus trachycaulus*), bluestem or western wheatgrass (*Pascopyrum smithii*), and prairie junegrass (Koelaria macrantha), Sandberg bluegrass (*Poa secunda*) (Borman et al. 1991; Brown and Amacher 1999; Goodwin and Sheley 2003). Idaho fescue (*Festuca idahoensis*), a cool-season bunchgrass, can also be a strongly competitive once mature stands are established. Competitive native forbs and legumes include blue flax, (*Linum lewisii*), common yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), fireflower (*Epilobium angustifolium*) and various lupine (*Lupinus*) and vetch (*Vicia*) spp.

Native grass-like species, such as sedges, spikerushes, rushes, and bulrushes, may be useful in revegetating riparian and wetland areas. Under these conditions, containerized seedlings often show better survival and establishment than seeding. Deep-rooted shrubs may also be seeded or planted to more fully utilize resources from the lower soil profile, especially late in the growing season. Shrub vegetation can facilitate the establishment of understory species by increasing water availability and reducing understory temperatures and evapotranspiraation. Over the long term, perennial shrubs will also enhance soil fertility and structure and increase nutrient cycling (West 1989).

A more complete list of native species suitable for revegetation activities should be developed on Districts/Forests by knowledgeable plant resource specialists (i.e., range specialists, botanists, ecologists, etc.) through examination of target sites and nearby undisturbed reference areas. There's a broad array of competitive native species that may be useful in revegetation; however, research efforts have not fully explored their potential or the conditions under which they would be most effective. In general, characteristics that make a species well-suited for revegetation include broad ecological amplitude, rapid germination and early seedling growth, and aggressive root systems. Such species are often early seral natural colonizers of disturbed sites. Late seral species often have lower growth rates than colonizers, but still can be an important component of a seed mix because they tend to be

highly competitive and often have high root/shoot ratios (Brown and Amacher 1999). Combining native and non-native species in seeding or planting mixes, however, is generally not recommended due to incompatible growth and life history strategies. An exception would involve the mixing of one or two long-lived perennial native species with a non-native temporary cover crop type species (e.g., from the list in Table D-1, Appendix D) that will rapidly colonize and occupy the site until the slower perennial species become established.

Seed Labeling and Testing

The genetic origin of all native seed used in restoration should be known; purchased seed should be certified as to source identity. Purchased seed, both native and non-native, must have documented and recent (<1 year old) germination, purity, and "All State's Noxious Weed" test results. The more recent the test, the more likely it is to reflect the true condition of the seed . Testing should be conducted by a National Association of Official Seed Certification Analysis (AOSCA) approved seed testing laboratory (Table C-2, Appendix C). Copies of seed test results should be retained in associated project files.

Purity testing verifies the proportion of pure seed contained in the seed lot and identifies contaminants, including other crop seed, weed seed, and inert matter (e.g, stems, chaff, small stones). Graminoid seed with more than 10-15 percent inert matter will be difficult to apply through a rotary seeder or rangeland drill. Germination tests provide information on how well the pure seed portion of the seed lot will perform under favorable field conditions. The percentage of pure live seed (PLS), calculated as the percent purity multiplied by the percent germination, is commonly used as a standardized indicator of seed quality. See Table C-2, Appendix C, for suggested minimum acceptable germination and purity standards for grass and forb seed.

Many native species produce seeds that are dormant and won't germinate without afterripening (time) or special germination enhancement treatments (stratification, scarification, gibberellic acid, etc.). In these cases, seed viability may be estimated using other procedures. Most widely used is the fast and inexpensive tetrazolium (TZ) test, which involves a biochemical staining technique with tetrazolium chloride that visibly stains live, germinable seed (Young and Young 1986).

Seed test results should verify that the seed lot contain no "Prohibited" noxious weed seed, and that seed meets or exceed standards for "Restricted" or "Other Weed Seed" content according to Oregon and/or Washington State standards for Certified Seed (Table C-2, Appendix C). Because each state has different lists of prohibited and restricted noxious weeds, request that the seed be tested with an "All-States Noxious Weed Exam". The name and number of seeds per pound of weed and other crop seed will be listed on the seed label. Be on the alert for aggressive nonnatives that, although not prohibited or restricted by the State, may still pose a threat to native plant communities.

<u>Determining Seeding Rates</u>

Seeding rates for grasses and forbs can vary greatly depending on site condition, species, and methods of application. Recommended seeding rates for pure grass seed mixtures are generally in the range of 20-50 viable seeds per square foot (Goodwin and Sheley 2003); pure forb and shrub mixes will be lower (you wouldn't want 10 Elderberry shrubs in every square foot for example). Higher rates are often recommended for severely disturbed sites to compensate for high seedling morality due to limiting environmental factors and competition. Goodwin and Sheley (2003), for example, suggest a seeding rate of 80 PLS/ft^2 for perennial grasses in severely burned areas, and doubling or tripling rates when seeding to prevent weed invasions, or if broadcast seeding or hydroseeding. Brown and Amacher (1999) recommend 250-350 PLS seeds per ft^2 on severe disturbances. Increasing the seeding rate, however, will never make up for poor seedbed preparation, poor seeding methods, or improper timing of seeding.

Seeding rates are calculated using the following information:

1) total number of seeds per pound
2) percentage of each pound that is pure, live seed (PLS)
3) number of acres to be treated
4) target PLS /ft^2 after considering site conditions and seeding method

Example calculations for a single species seed mix: seed 1 acre with blue wildrye which has 131,000 seeds per pound and is 83% PLS to get a result of 20 PLS /ft^2:

(1 acre) x (43,560 ft^2/acre) x (20 PLS/ft^2) = 871,200 PLS
(131,000 seeds/lb) x (0.83) = 108,730 PLS/lb.
871,200 ¸ 108,730 = 8.01 lb.

Example calculations for a multi-species seed mixture: seed 1 acre with 4 species at different rates (to equalize competition) to obtain a coverage of 40 PLS/ft.^{2}:

Species	Seeds per pound	PLS	Target Coverage (PLS/ft2)
Blue wildrye	131,000	0.83	10
Mountain brome	81,500	0.86	10
Prairie junegrass a	2,300,000	0.80	10
Sandberg's bluegrass	925,000	0.80	10
		Total Coverage:	**40 PLS/ft2**

[a] Bluebunch wheatgrass may be substituted on drier sites. Idaho fescue would be a good addition to this mix if available.

Blue wildrye: (1 acres) x (43,560 ft^2/acre) x (10 PLS/ft^2) = 435,600 PLS
(131,000 seeds/lb) x (0.83) = 108,730 PLS/lb.
435,600 ¸ 108,730 = **4.01 lb/acre**.

Mountain brome: (1 acre) x (43,560 ft^2/acre) x (10 PLS/ft^2) = 435,600 PLS
(81,500 seeds/lb) x (0.86) = 70,090 PLS/lb.
435,600 ¸ 70,090 = **6.21 lb/acre**.

Prairie junegrass: (1 acre) x (43,560 ft^2/acre) x (10 PLS/ft^2) = 435,600 PLS
(2,300,000 seeds/lb) x (0.80) = 1,840,000 PLS/lb.
435,600 ¸ 1,840,000 = **0.24 lb/acre**.

Sandberg's bluegrass: (1 acre) x (43,560 ft^2/acre) x (10 PLS/ft^2) = 435,600 PLS
(925,000 seeds/lb) x (0.80) = 740,000 PLS/lb**.**
435,600 ¸ 740,000 = **0.59 lb/acre**.

Total Mix = 11.05 lb/acre

How to use PLS: If the plan calls for a certain amount of pounds of PLS seed per acre, how much bulk seed is needed? To calculate the corresponding bulk amount, divide the PLS percentage into the number of pounds recommended. Example: You want to plant 5 PLS pounds of Idaho Fescue per acre. The analysis label indicates 85% purity and the germination is 79%. .85 x .79 = .67 PLS. Divide .67 into 5 lbs/acre = 7.5 lbs of BULK seed/acre.

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Internet Resources
Weed Related Websites

Weed ID Sites	
CropNet – Weeds	http://www.crop-net.com/weeds.htm
American Cyanamid Weed Guide	http://www.cyanamid.com/tools/weedguide/index.shtml
UC Pest Management Guidelines - Weed Photo Gallery	http://www.ipm.ucdavis.edu/PMG/r785700999.html
FMC Weed ID	http://ag.fmc.com/ag/weedbug
Idaho Noxious weeds	http://www.oneplan.state.id.us/pest/nw00.htm
University of Illinois Weed ID	http://web.aces.uiuc.edu/weedid.htm
Iowa State Weed ID	http://www.weeds.iastate.edu/weed-id/weedid.htm
Noxious Weeds of Kansas	http://www.ink.org/public/kda/phealth/phprot/weeds.html
Common Weed Seedlings of Michigan	http://www.msu.edu/msue/iac/e1363.htm
Oregon State Weed ID site	http://www.css.orst.edu/weeds/id.html
University of New England Weed ID	http://www.une.edu.au/agronomy/weeds/photo_library/ph_lib.html
Rutgers Coop Extension - Weeds of New Jersey	http://www.rce.rutgers.edu/weeds/index.html
Virginia Tech Weed Identification Guide	http://www.ppws.vt.edu/weedindex.htm
WSSA Photo herbarium	http://ext.agn.uiuc.edu/wssa/subpages/weed/herbarium0.html
Wyoming Noxious Weed Site	http://www.uwyo.edu/plants/weeds/id
Weed Control	
ARS Exotic and Invasive Weeds Unit	http://wric.ucdavis.edu/exotic.html
NC Aquatic Weeds (East)	http://www.cropsci.ncsu.edu/aquaticweeds
Yellow Star thistle	http://soils.ag.uidaho.edu/yst
Weeds of No-till Cropping Systems	http://www.btny.purdue.edu/Extension/Weeds/NoTillD/NoTillWeed1.html
North Carolina Cotton Weed Control	http://ipmwww.ncsu.edu/Production_Guides/Cotton/chptr10.html
New York Forage Crops Weed Control	http://wwwscas.cit.cornell.edu/forage/recommends/recindex.html
Weeds of Minnesota Wheat	http://www.smallgrains.org/techweed.htm
Agricultural Companies	
Aventis	http://www2.aventis.com
BASF	http://www.basf.com
Bayer	http://www.agro.bayer.com/
Dow AgroSciences	http://www.dowagrosciences.com
DuPont	http://www.dupont.com
FMC Home Page	http://www.fmc.com
Monsanto	http://www.monsanto.com
Novartis	http://www.novartis.com/agri/index.html

Rohm and Haas Home Page	http://www.rohmhass.com
Zeneca Main page	http://www.zeneca.com
Herbicide Company Geneology	http://www.css.orst.edu/herbgnl/tree.html
Educational Resources	
American Society for the Advancement of Science	http://www.aaas.org
1998 Weed Science Compendium	http://www.agsci.kvl.dk/weedsci/teaching/weedbk98.htm
BLM environmental Education	http://www.blm.gov/education/fire_and_weeds.html
K-8 Weed Projects	http://www.sped.ukans.edu/~unitest/explorer-db/html/835851687-81ED7D4C.html
National Science Foundation	http://www.nsf.gov
Miscellaneous	
Council for Agricultural Science and Technology	http://www.cast.science.org
The Environmental Weeds Home Page (Austrailia)	http://weeds.merriweb.com.au
Sustainable Agriculture Network	http://www.sare.org/san
University of New England, Australia	http://www.une.edu.au/agronomy/weeds
WeedJobs (Jobs in Weed Science)	http://www.NRCan.gc.ca/~bcampbel
University Weed Science Sites	
Auburn University	http://www.ag.auburn.edu/dept/ay
University of California, Davis	http://veghome.ucdavis.edu/weedsci/WWW/Welcome.html
Colorado State University	http://www.colostate.edu/Depts/IPM/nipm/agwee.html
University of Georgia Weed Science	http://mars.cropsoil.uga.edu/fac_weed.htm
University of Illonois, Urbana-Champaign	http://w3.aces.uiuc.edu/CropSci/weed-lab
Iowa State Weed Science	http://extension.agron.iastate.edu/extweeds/Default.htm
University of Maryland Weed Science	http://www.agnr.umd.edu/users/weed
University of Missouri-Colunbia Weed Science	http://www.psu.missouri.edu/agronx/weeds
University of Nebraska Weed Science	http://ianrwww.unl.edu/ianr/agronomy/ws.htm
New Mexico State University Weed Science	http://taipan.nmsu.edu/weeds/
North Dakota State University	http://ncweeds@ndsuext.nodak.edu/extnews/weedpro/
Oregon State University	http://www.css.orst.edu/weeds/
Rutgers University	http://www.rce.rutgers.edu/weeddocuments/index.htm
Southern Illinois University	http://www.siu.edu/~weeds/

Texas A&M	http://aggie-horticulture.tamu.edu/plantanswers/turf/publications/weed2.html
Virginia Tech Weed Science	http://www.ppws.vt.edu/
University of Wyoming	http://www.uwyo.edu/plants/weeds/
U.S. Government Weed Related Sites	
BLM Weed Site	http://www-a.blm.gov/weeds/
BLM Weed Hall of Shame	http://www.blm.gov/education/weeds/hall_of_shame.html
Federal Interagency Committee FICMNEW	http://bluegoose.arw.r9.fws.gov/FICMNEWFiles/FICMNEWHomePage.html
National Agricultural Pests Information System	http://www.agnic.nal.usda.gov/agdb/napis.html
National Biological Control Institute	http://www.aphis.usda.gov/nbci/
National Park IPM of Weeds	http://www.colostate.edu/Depts/IPM/natparks/natpark.html
USDA ARS Southern Weed Science	http://msa.ars.usda.gov/la/srrc
USDA ARS Weed Science Laboritory (Beltsville, MD)	http://www.barc.usda.gov/psi/wsl/wsl.htm
Weed Science Societies and Organizations	
American Crop Protection Association	http://www.acpa.org
Colorado Weed Management Assoc	http://www.fortnet.org/CWMA
European Weed Research Society	http://www.ewrs.ac.uk
Herbicide Resistance Action Committee	http://www.PlantProtection.org/HRAC
International Weed Science Society	http://www.css.orst.edu/weeds/iwss
International Weed Science Congress	http://www.sercomtel.com.br/ice/plantas
North American Weed Management Association	http://www.nawma.org
North Central Weed Science Society	http://www.ncwss.iastate.edu
Northeastern Weed Science Society	http://www.ppws.vt.edu/newss.htm
Southern Weed Science Society	http://www.weedscience.msstate.edu/swss
Weed Science Society of America	http://ext.agn.uiuc.edu/wssa
Weed Science Society of Victoria, Australia	http://home.vicnet.net.au/~weedsoc
Western Society of Weed Science	http://www.wsweedscience.org
Individual State Weed Sites	
Arizona Rangeland Weeds	http://ag.arizona.edu/OALS/agnic/weeds/home.html
Colorado's 10 Most Wanted	http://www.ag.state.co.us/commish/press/1999/weedweek.html

Weeds	
Control of Invasive Exotic Plants in the Great Plains	http://www.npsc/nbs.gov/resources/literatr/exotic/exotic.htm
Kansas Noxious Weeds	http://www.ink.org/public/kda/phealth/phprot/weeds.html
Michigan	http://mel.lib.mi.us/science/weeds.html
North Dakota Weed Information	http://www.ext.nodak.edu/extpubs/weeds.htm
Wyoming Weed and Pest Council	http://www.wyoweed.org/

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APPENDIX F – Project Implementation and Monitoring

Invasive Plant Treatment Implementation and Monitoring Guide Deschutes and Ochoco National Forests, Crooked River National Grassland

Changes between DSEIS and FSEIS:

- Examples of implementation scenarios have been added to demonstrate the process that would be used to determine a final prescription for site treatment, including site characterization and application of PDFs.
- The addition of GLEAMS model runs for the two treatment scenarios.
- Updated information based on the Terms and Condition Requirements from the National Marine Fisheries Service and US Fish and Wildlife Service Biological Opinions.

Annual Implementation Guidelines

The following outlines the process that will be used to ensure that the selected alternative is properly implemented. It applies to invasive plant sites known and identified for treatment in the EIS as well as new sites found during inventory, where an early detection/rapid response strategy (EDRR) will be used. Annually, an invasive plant assessment review team will be assembled to identify sites for potential treatment and follow the steps below to ensure consistent and effective treatment is applied, appropriate Project Design Features are implemented, and necessary monitoring and reporting are completed.

Implementation planning includes annual treatment of both known sites and newly discovered sites.

1. **Convene interdisciplinary team (IDT) to review the annual program.**
   a. Team members and a team leader will be assigned by the Forest Supervisors.
   b. Appropriate botanists, fish and/or wildlife biologists will be part of this team when proposed project sites are near listed species or their habitats.
   c. The PNW Research Station's RNA coordinator will be part of this team when proposed project sites are within or adjacent to RNAs.

2. **Characterize invasive plant infestations to be treated. This includes:**
   a. Characterize infestation (density, type and no. of species, extent, etc.). See Exhibit 1 for an example of an inventory form.
   b. For detections outside of PAUs, ensure that there are no unique features or treatment needs beyond the scope of the selected alternative. Ensure that no conditions exist that were not considered in the FSEIS.[5]
   c. Add or refine target species information to database (NRIS).
   d. Identify site objective, short and long term desired condition (see the Site Priority and Objectives section below).
   e. Identify conditions at the site to be treated (affected environment, resources at risk). List any resources of concern and determine if additional surveys are needed.

[5] Conditions at the site outside the parameters of the FSEIS analysis may trigger additional NEPA requirements.

Coordinate with resource specialists to get additional information or new information about specific locations.

Pre-implementation documentation: Maps and descriptions, finding that no extraordinary site conditions exist.

3. Develop site-specific prescriptions and plans

3A. Sites included in the FSEIS

a. Prioritize treatment areas according to Standard #11 of the 2005 R6 FEIS. Priority should be based on where to treat first, and by what method, based on budgets, effectiveness, and important areas and species outlined in Tables 1 and 2.

b. Treatment within RNAs will be designed to have the least effect on ecological processes, and the RNA Coordinator will be involved in all treatment decisions.

c. Review current TES lists and identify pre-treatment survey needs (e.g. sensitive plants, survey and manage species, etc.).

d. Apply appropriate PDFs from FSEIS section 2.4. Consider:

   i. Size of infestation, treatment history and response to past treatments
   ii. Proximity to sensitive species or habitats
   iii. Proximity to streams, lakes, or wetlands
   iv. Soil conditions (e.g. texture, shallow water table, excessively well-drained)
   v. Depth to groundwater
   vi. Domestic water intakes or position in municipal watershed
   vii. Recreation or special forest product uses.
   viii. Mineral material source (in use or planned for use)

e. Consider effectiveness of treatments once PDFs are applied.

f. Review Forest Plan standards or other environmental criteria for treatment site location.

g. Ensure no effect for heritage resources. Complete project review/exemption form (Exhibit 5).

h. Prepare a restoration plan for those sites identified in Appendix A, Table A-3 for active restoration. Refer to Appendix E for general guidelines for restoration methods. Ensure acceptable plant and mulch materials are available before implementation. (R6 Standard #12)

i. For treatments that may affect listed species, provide treatment implementation information to the National Marine Fisheries Service by May 1of each year, and to the US Fish and Wildlife Service Level 1 team by April 1 of each year (refer to the BOs for specific data required, USFWS 2011, USDC 2012).

j. Confirm that all required permits are obtained before implementation begins (e.g. National Pollutant Discharge Elimination System permit for herbicide application into water, or an adjacent hydrologic conveyance into water at the time of herbicide application).

k. Complete Form FS2100-2 (Exhibit 3), Pesticide Use Proposal. This form lists treatment objectives, specific herbicide(s) that would be used, the rate and method of application, and PDFs that apply. Pesticide Use Proposals can be grouped by site type and herbicide being applied.

l. Apply annual **herbicide cap for riparian areas**: Treatments above bankfull, but still within the aquatic influence zone, would be restricted to 10 acres per year per 1.5 miles of stream, within any 6th field watershed. Treatments below bankfull would be restricted to 1.0 acres per year within any 6th field subwatershed. The Forest Activity Tracking System (FACTS) database will be used to track herbicide application within 6th field watersheds. Invasive Plant Coordinators on the districts will be required to track where treatment occurs along streams to account for applications below bankfull.

m. Apply annual combined treatment cap: **Treatments of all kinds shall not exceed 16,000 acres per year** during the expected 15 years that the Record of Decision will be in effect. This cap allows an approximately 10 percent addition to the proposed quantity of treatment of known sites. Defining this acreage "cap" allows the analysis in the EIS to proceed within well-defined parameters. It also provides the public with useful information about the potential extent of proposed treatments, including those implemented through EDRR. Realistically, it is expected that actual treatment would be substantially less than 16,000 acres, considering budget and what has been treated in recent years. All herbicide treatments are recorded in the FACTS database, which tracks the acres, amount of herbicide and location of herbicide application.

3B. EDRR Sites (sites outside PAUs)

a. Using an interdisciplinary team, determine whether the preferred treatment method and proposed prescription are within the scope of those analyzed in the FSEIS[6].

b. If, after an interdisciplinary review and consideration of new information within the context of the overall project, the responsible official determines that a correction, supplement, or revision to this EIS is not necessary, implementation would continue.

c. For new sites (not inventoried and listed in this FSEIS) use Integrated Weed Management principles to identify preferred treatment method(s). Use Appendix B of the FSEIS (Common Control Measures with notations specific to the Deschutes, Ochoco, and CRNG) and other sources as a reference. These methods are intended to be refined through monitoring and adaptive management.

    i. This step will involve the consideration of whether or not herbicides are required for treatment effectiveness and/or whether or not the use of herbicides increases cost-effectiveness of treatments. The team will also consider the availability of volunteers to reduce the cost of manual treatments. The decision to use herbicides must consider the ability to comply with R6 Standards #15 – 23 as well as all of the project design features listed in Section 2.4 of the FSEIS. The appropriate prescription will consider all site conditions identified during step #2 above.

d. Treatments occurring under an EDRR scenario planned after April 1will have the Project Consistency Evaluation Forms submitted to the Level 1 team by November 1 of each year.

e. Continue with all steps outlined in 3A above.

[6] If preferred methods have effects that are outside the scope of those analyzed in the EIS, additional NEPA would be required. If prescribed treatment would not be effective once PDFs are applied, further NEPA would also be required to authorize the effective treatment. An analysis according to Section 18 of the 1909.15 Forest Service NEPA Handbook would be warranted if the treatment prescription was not similar to any analyzed in this EIS, or there were circumstances not considered in this EIS.

Pre-implementation documentation: Detailed prescriptions that include appropriate PDFs, finding that treatment methods are within the scope of the EIS, finding of no effect on heritage resources, restoration/revegetation plans, completed Pesticide Use Proposal (Exhibit 2 - FS2100-2), and information sent to the regulatory agencies as required in 3.A.i. above.

4. Coordination and Notification

- Coordinate with adjacent landowners and partners if appropriate.
- The PNW Research Station will be notified in writing of any treatments proposed within or adjacent to RNAs.
- If the IDT identifies EDRR opportunities that "may affect" federally ESA-listed species, the Level 1 team will be notified prior to project implementation. Project Consistency Evaluation Forms (see Exhibit 6) for treatment of Project Area Units (PAU) and EDRR areas that "may affect" federally ESA-listed species will be completed as outlined in 3.A.i. and 3.B.d. above.
- For treatments that fall below the ordinary high water mark (bankfull), and that cannot meet the In-Water Work Time Periods, consult with the Oregon Department of Fish and Wildlife. In-Water Work Time Periods vary by species and location, specific periods can be found at http://www.dfw.state.or.us/lands/inwater.
- Prioritize sites to be treated on each Forest following the criteria listed below in Table 1. Coordinate with road managers to ensure needed mineral material sources are considered in prioritization. (R6 Standard #11)
- Document a public notification plan based on the treatment areas (e.g. if they involve places where people gather or areas of special use forest product collection). See Exhibit 3 for an example of a newspaper notification. (R6 Standard #23).
- Before using herbicides in any Project Area Unit that has cultural (traditional) use plants either previously mapped or subsequently identified in the unit, notify tribal government leader, culture and heritage committee or person, and natural resources lead for relevant tribal organizations (Confederated Tribes of the Warm Springs Reservation, Burns Paiute Tribes, and the Klamath Tribes) with information about location, time of application, application methods, and herbicides used. Contact should be a combination of written notice and subsequent phone or email confirmation or discussion. A partial list of plants can be found in the FSEIS Section 3.12.

Pre-implementation documentation: notes of meetings; contact logs for phone calls to landowners and others, copies of notification.

Site Priority and Objectives

Invasive plant sites are prioritized for treatment (Table F-1) based on the level of risk associated with the species and the type of site. Though all invasive plant sites are important to treat, the sheer number and distribution of sites results in the need to prioritize and focus our treatments. Prioritization will be a step in the annual implementation planning process and is not included as a NEPA decision.

High priority sites include areas that have the potential to more rapidly spread seeds and propagules of invasive plant species, such as quarries, roads, and high use recreation sites, as well as current treatment sites. High priority sites are also determined by high priority species (see Table F-2) that have potential to spread quickly and change plant species composition to the extent that resources, such as sensitive plant populations, wildlife and livestock forage are at risk.

Medium priority sites include larger infestations with the goal to control or contain these sites to prevent further introduction and spread and environmental degradation. Some sites may be controlled over time given enough years of treatment. Other sites are so large and widespread that a more reasonable goal is to contain these sites by focusing treatment on the outside boundaries of the infestation to prevent further spread. Medium priority sites can contain high priority species, such as the knapweeds and houndstongue.

Low priority sites are either those infestations that are extremely difficult to eradicate or control, such as large, well-established infestations of reed canarygrass along lakeshore edges, or are low priority because the invasive plant species is less aggressive and there is less potential for significant ecological impacts (e.g., bull thistle).

Table F-1. Treatment prioritization strategy used annually to implement invasive plant treatments on the Deschutes and Ochoco National Forests and Crooked River National Grassland.

Priority	Description
High	Eradication, control or containment of aggressive new species with potential for significant ecological impact. New infestations in high priority areas not yet infested. Infested active gravel, fill, sand stockpiles, quarry, and borrow material sites. Active restoration sites where invasive plant control is essential for successful restoration. Sites that threaten or jeopardize Threatened, Endangered, and Sensitive plant and animal habitat. Sites we have already been treating and need to continue this commitment. Areas of high traffic (e.g., roads, high use recreation sites, trailheads, horse camps, fire camps, parking lots, etc.). Unique plant habitats (e.g., wetlands, fens, bogs, botanical areas, Research Natural Areas).
Medium	Containment of existing large infestations of priority species with focus on boundaries of infestation. This is to prevent the spread of the invasive plant beyond the perimeter of patches or infestation areas mapped from current inventories. Control of existing large infestations with a high potential for significant reduction and at least 15% of native plant component. Focus first on: 1) sites with the highest native plant cover available to colonize the site as the invasive plants are reduced; and 2) outside edges of population to prevent/contain further spread Road systems that have less traffic but still function as seed dispersal vectors.
Low	Suppression of existing large infestations when eradication/control or containment is not possible. Tolerate. Accept the continued presence of established infestations and the probable spread to ecological limits for certain species. Try to exclude new infestations through prevention practices.

Table F-2 lists the highest priority species for treatment on each District and the Grassland. Some species are a priority because they are established on the District and rapidly expanding and invading into native plant and wildlife habitats, while other species are a priority because they are new invaders and need to be controlled before they become established and control becomes more difficult, expensive, and time consuming. Though the species listed in TableF- 2 are currently the highest priority for treatment, this list can change any time that a new invasive plant species is discovered.

Table F-2. Top five priority invasive plant species for each district of the Deschutes and Ochoco National Forests and Crooked River National Grassland (as of September 2010).

Forest/Grassland	District	1st	2nd	3rd	4th	5th
Deschutes NF	Bend/Ft. Rock	Orange hawkweed	Medusahead	Spotted knapweed	Dalmatian toadflax	Canada thistle
	Crescent	Orange hawkweed	Leafy spurge	Houndstongue	Spotted knapweed	Canada thistle
	Sisters	Diffuse knapweed	Spotted knapweed	Ribbongrass	St. Johnswort	Scotch broom
Ochoco NF	Lookout Mt.	Medusahead	Yellow star-thistle	Scotch thistle	Houndstongue	Spotted knapweed
	Paulina	Medusahead	Houndstongue	Spotted knapweed	Yellow starthistle	Scotch thistle
Crooked River National Grassland		Jointed goatgrass	Medusahead*	Russian knapweed	Scotch thistle	Whitetop

*Medusahead is scattered throughout the Grassland; this is a high priority species only on high priority sites such as protecting the RNA, private land, and other values at risk.

Target species within each project area unit are assigned a treatment strategy. These strategies vary depending on the potential negative impacts of a given invasive species and the value or sensitivity of the treatment site (or adjacent lands) (USFS 2005a, page 3-78). The Treatment Effectiveness section of Chapter 3 and Appendix A provide further information on the site-specific conditions within the project area units.

The following objectives are identified for the approximately 1,892 known invasive plant sites on the Forests and Grassland and will be applied to new sites through the EDRR process:

- Eradication Attempt to totally eliminate an invasive plant species from a USDA Forest Service unit, recognizing that this may not actually be achieved in the short term since re-establishment/re-invasion may take place initially.
- Control Reduce the infestation over time; some level of infestation may be acceptable.
- Suppression: Prevent seed production throughout the target patch and reduce the area coverage. Prevent the invasive species from dominating the vegetation of the area; low levels may be acceptable.
- ContainmentPrevent the spread of the weed beyond the perimeter of patches or infestation areas mapped from current inventories.
- Tolerate: Accept the continued presence of established infestations and the probable spread to ecological limits for certain species. Try to exclude new infestations through prevention practices. This is for species where other levels of effort have not been successful.

Treatment Prescription Examples

To illustrate how decisions are made for treatment of invasive plant sites and how Project Design Features (PDFs) would be implemented and tracked, example prescriptions were prepared for two of the most complex treatment areas in the project, Rimrock Springs (PAU 75-20) and the Metolius River (PAU 15-32). These sites were selected as a representation of the small percentage of sites that are high-value areas with recreational use, a wide diversity of flora and fauna present including TES species, and are directly adjacent to perennial water. Prescriptions (Figures F-1 and F-2 that follow) for Alternative 2 show how the PDFs result in decisions that are made at the site-specific level. For example, Appendix A of the FSEIS shows that for PAU 75-20 the four choices of herbicide to control

Russian knapweed in order of preference are clopyralid, picloram, chlorsulfuron, and glyphosate. Since some areas of Russian knapweed at the Rimrock Springs site are directly adjacent to water, PDF # 43 and Table 15 in the FSEIS require the use of an aquatic formulation of herbicide. As shown in Figure 1 below, the resulting prescription calls for Rodeo, an aquatic form of glyphosate, the 4th most effective herbicide. Table 15 further refines the application method to wiping foliage within 15 feet of water. For treatment further than 15 feet the prescription changes to spot spraying clopyralid.

In addition to demonstrating how PDFs will be tracked and incorporated into the site prescription, the GLEAMS model was used to show the estimated results of the prescription implementation for the two treatment scenarios, Rimrock Springs and Metolius River. The GLEAMS model was used in this situation to test assumptions made about PDF effectiveness on these two complex sites to see if the results are indeed within the assumptions. Although the model can be used to test conditions and prescriptions on a site-specific level, this will not be done as a matter of course for all treatment sites, because as seen in the results below, the two complex site examples are well within the effects analyzed in this FSEIS.

In addition to demonstrating how PDFs would be tracked and incorporated into the site prescription, the GLEAMS model was run specifically for the Rimrock Springs and Metolius River sites. The site-specific modeling results show that proposed herbicide application at the Rimrock Springs and Metolius River (under Alternative 2) would not result in herbicide delivery over a level concern, as analyzed in the FSEIS. No further site-specific modeling is warranted at the site scale because treatments, using all layers of caution, would not exceed results in the FSEIS, as shown in the GLEAMS model results shown below.

INVASIVE PLANT IMPLEMENTATION WORKSHEET - OCHOCO / DESCHUTES NFs Example #1

I. Site Characterization

Site number and name: Rimrock Springs PAU #: 75-20

EDRR Site? Y (N) Size of infestation: 5 Ac.

Species: Russian Knapweed % Cover: 1% - 90% Ave=10

Site Type: stream/reservoir Management Area: Rimrock Spr. Wildlife Area

Treatment History: Limited amount of hand pulling

Distance to Stream, Spring, Wetland, Meadow, Wellhead, or other water: 0 feet

Stream Class: 2 Is the site in a Municipal Watershed? Y (N)

6th Field HUC: Rimrock 1707030602 02

Soil Type: Sandy loam - extremely compacted on dam + old road

Distance to TES / MIS species: 2800 Feet to redband trout

species cont'd: Columbia spotted frog present in reservoir

Distance to other wildlife (neotrops, landbirds): N. harrier - 200' Great horned owl - 300'

Survey done for TES plants? Y (N)

Cultural use plants present? (Y) N Willows, cattails

Public use evident? (Y) N Type of use: Wildlife viewing

Adjacent land ownership: None Distance:

II. Objective

Site Strategy: Control Russian knapweed

Priority and reason: High - spread may affect trout habitat in Willow Canyon

Restoration needs: Dam area will require revegetation using native species. Elsewhere density is low, no re-veg required

III. Prescription

Treatment Method: Wick glyphosate adjacent to water (15' width) Spot spray rest with clopyralid

Herbicide formulation: Rodeo / Transline Rate: 48 oz per Ac / 1.5 oz per Ac

Surfactant: Syltac Rate: 16 oz per 100 gal.

Buffer size needed based on herbicide, method and information from Site Characterization: 15' wipe adj to water Reason for buffer: Perennial water

Project Consistancy Evaluation Form completed for ESA-listed species? Y (N/A)

Name of biologist consulted:

Notification needed (Internal and external): Notify Tribe, post area in advance

Pg. 1 of 2

Figure F-1 part 1

IV. Implementation

Name of individual that will apply herbicide: Dave Langland / Floyd Faye

Proposed dates of application: Avoid 6/15 to 9/15

Mixing requirements / restrictions: Mix 300' from site

Weather restrictions: No rain within 24 hours

Specific PDFs for implementation: #25 - do not stand in water during application #63 - conduct TES plant survey prior to implementation; #83 - talk to biologist prior to implementation; #94 - limit no. of people + no machinery noise Mar. 1 - Sept 1 to avoid disturbance to raptors.

Name of Specialist for on-site coordination: Jim David = frogs / A. Roberts = birds

Public notification measures taken: (To be documented at application)

V. Monitoring

Region 6 Monitoring Framework regarding projects subject to Section 7 consultation under ESA required for this project (high risk projects)? Y (N)

If "Yes", Name of individual responsible for monitoring: _____

Date planned: _____

Protocol: _____

Implementation monitoring (To be determined)

On-site compliance monitoring done by: _____ Date: _____

Results: _____

Effectiveness monitoring (To be determined)

Name: _____ Date: _____

Efficacy of treatment (FACTS database): _____

PDF effectiveness: _____

Changes needed ? _____

Attach map of site

Pg. 2 of 2

Figure F-1 part 2

The GLEAMS pesticide transport model uses site-specific parameters to predict the surface and subsurface movement of pesticides following forest application as a function of time, in both soils and receiving water bodies. GLEAMS (Groundwater Loading Effects of Agricultural Systems) permit a user-friendly input of site-specific characteristics ranging from soil type, vegetative cover, hydrological parameters, rainfall data and others into the model. While the GLEAMS modeling contained in the SERA risk assessments fulfills the objective of accomplishing a general assessment of the risks associated with use of the 10 herbicides considered in the Proposed Action in a nationwide context, it is also recognized that considerable variation exists in different National Forests across the nation. Some environmental parameters have the potential to significantly influence herbicide stream concentrations. Examples include site slope, timing of rainfall, more complex and varied soil structure, ground cover, temperature, and size and shape of application site. The GLEAMS model contains input variables for all of these parameters. In addition, stream flows vary widely, and may be less than or considerably greater than the 1.8 cfs used in the SERA Risk Assessments. The analysis contained below assesses local conditions for the two treatment scenarios for a “worst-case” assessment.

The model output includes, for example, a time-dependent estimate of the amount of pesticide coming off the treated field and contaminating immediately adjacent land (OffSite01), and the amount coming off the treated field and contaminating immediately adjacent water (WatBD01). There is no buffer modeled or assumed, despite any actual buffer that may exist on the site.

The results of the run for the adjacent land are expressed in lbs/acre, as in an application rate of the pesticide. Results for the water body, either stream or pond, are expressed in mg/L. Concentrations in the soil of the treated field are in mg/kg of soil.

GLEAMS Model for Rimrock Springs – Glyphosate use on the dam

Glyphosate (loam/Std) at 1.5 lbs/ac; treated field = 0.60 ac; total field = 1.0 ac (top of dam, overland flow not directed onto the dam); field width = 15 feet; portion to foliage = 95%, soil = 5% (dense infestation), depth of incorporation = 0 cm(wick/wipe); slope = 30% (dam faces).

Application – applied 1/year, every year, from 2010 to 2015, starting June 15.

Site – “mixed pine hardwood”, “fair grass”, surface type = road, surface condition = dirt, moderate runoff potential; Mitchell, OR weather station data, 62 weather year sets.

Soil – Depth of root zone = 65 inches, cover factor = 0.15 (1.0 = bare ground);

Fine sandy loam 0-3”, silty clay loam 3-65” (to account for compaction); type of clay= mixed

Non-target field = 1.0 ac, 100% loss to field

Water body = 8.2 ac total, initial depth = 2.7 m, min= 1.8m, max=3.0m, sediment depth = 45.7 cm (18”); Consider water balance, fractional drift to water = 0.05

Table F-3. Summary of results of simulations: Rimrock-Glyphosate on the dam output

Receptor	Parameter	Median (Empirical Limits) (mg/kg soil, mg/l water)	p-value
Site01	Soil Conc. ('12' in.)	0.179 mg/kg (0.1792 - 0.1793)	p=0.025
Site01	Soil Conc. ('60' in.)	0.0359 mg/kg (0.0358 - 0.0359)	p=0.025
Site01	Soil Penetration (in.)	8.64 in. (8.6364 - 14.2727)	p=0.025
WatBd01	Peak Conc.	0.0 mg/L (0.0 - 0.0)	p=0.025
WatBd01	365-Day TWA	0.0 mg/L (0.0 - 0.0)	p=0.025
OffSite01	App rate (lb/acre)	0.0029 lbs/ac (0.0005 - 0.0224)	p=0.025

The units are in ppm for soil (mg/kg) and water (mg/L) concentrations.
The units for application rate are lb/acre. The units for soil penetration are in inches.
P value is two-tailed, so p=0.025 means the empirical limits represent the 95% confidence interval.

Results indicate that no detectable amounts of glyphosate could move into adjacent water. Off-site application rate is well-below the application rate that could damage non-target vegetation. Glyphosate may percolate a little in the soil profile due to the sandy soils, but soil concentrations are quite low. No effect to humans, fish, birds, amphibians, or non-target plants is likely from these concentrations.

GLEAMS Model for Rimrock Springs – Clopyralid use on the dam

Clopyralid (loam/Std) at 0.49 lbs/ac; treated field = 0.39 ac; total field = 0.39 ac (top of dam, overland flow not directed onto the dam); field width = 20 feet; portion to foliage = 95%, soil = 5% (dense infestation), depth of incorporation = 1 cm; slope = 10% (slope on top of dam = 0%, but assuming some edges overlap top of slopes on dam faces).

Application – applied 1/year, every year, from 2010 to 2015, starting June 15.

Site – “mixed pine hardwood”, “fair grass”, surface type = road, surface condition = dirt, moderate runoff potential; Mitchell, OR weather station data, 62 weather year sets.

Soil – Depth of root zone = 65 inches, over factor = 0.15 (1.0 = bare ground);

Fine sandy loam 0-3”, silty clay loam 3-65” (to account for compaction); type of clay= mixed

Non-target field = 1.0 ac, 100% loss to field

Water body = 8.2 ac total, initial depth = 2.7 m, min= 1.8m, max=3.0m

Consider water balance, fractional drift to water = 0.05

Table F-4. Summary of results of simulation: Rimrock - Clopyralid use on the dam output

Receptor	Parameter	Median (Empirical Limits) (mg/kg soil, mg/l water)	p-value
Site01	Soil Conc. ('12' in.)	0.0819 mg/kg (0.0819 - 0.085)	p=0.025
Site01	Soil Conc. ('60' in.)	0.0164 mg/kg (0.0164 - 0.0177)	p=0.025
Site01	Soil Penetration (in.)	53 in. (48.0909 - 65.0)	p=0.025
WatBd01	Peak Conc.	0.0016 mg/L (0.0016 - 0.0016)	p=0.025
WatBd01	365-Day TWA	0.0005 mg/L (0.0005 - 0.0005)	p=0.025
OffSite01	App rate (lb/acre)	0.0245 lbs/ac (0.0245 - 0.0247)	p=0.025

The units are in ppm for soil (mg/kg) and water (mg/L) concentrations.
The units for application rate are lb/acre. The units for soil penetration are in inches.
P value is two-tailed, so p=0.025 means the empirical limits represent the 95% confidence interval.

Modeled soil and water concentrations are extremely low and no effect to any non-target organisms would occur. The water concentrations are many orders of magnitude below any toxic value for humans, fish, amphibians, mammals or birds (e.g. the RfD for humans is 0.75 mg/kg, the NOEC for fish and amphibians is 5 mg/L, for mammals 75 mg/kg, birds 670 mg/kg). Off-site application rate could damage highly susceptible plant species (certain crops) but is unlikely to occur on the dam site.

GLEAMS Model for Rimrock – Clopyralid use in Upland and Downstream areas

Clopyralid (loam/Std) at 0.49 lbs/ac; treated field = 3.75 ac; total field = 5.2 ac; field width = 250 feet; portion to foliage = 95%, soil = 5%, depth of incorporation = 1 cm; slope = 2%.

Application – applied 1/year, every year, from 2010 to 2015, starting June 15.

Site – “mixed pine hardwood”, “fair grass”, surface type = road, surface condition = dirt, moderate runoff potential; Mitchell, OR weather station data, 62 weather year sets.

Soil – Depth of root zone = 65 inches, cover factor = 0.3 (1.0 = bare ground);

Fine sandy loam 0-3”, sandy loam 3-44”, loamy sand 44-65” type of clay= mixed

Non-target field = 1.7 ac, 100% loss to field

Water body = 3 ac total, initial depth = 2.7 m, min= 1.8m, max=3.0m, sediment depth = 45.7 cm (18”); Consider water balance, fractional drift to water = 0.05

Table F-5. Summary of results of simulations: Rimrock-Clopyralid in the upland output

Receptor	Parameter	Median (Empirical Limits) (mg/kg soil, mg/l water)	p-value
Site01	Soil Conc. ('12' in.)	0.0819 mg/kg (0.0819 - 0.0824)	p=0.025
Site01	Soil Conc. ('60' in.)	0.0164 mg/kg (0.0164 - 0.0167)	p=0.025
Site01	Soil Penetration (in.)	65.0 in. (65.0 - 65.0)	p=0.025
WatBd01	Peak Conc.	0.0016 mg/L (0.0016 - 0.0016)	p=0.025
WatBd01	365-Day TWA	0.0005 mg/L (0.0005 - 0.0005)	p=0.025
OffSite01	App rate (lb/acre)	0.0245 lbs/ac (0.0245 - 0.0246)	p=0.025

The units are in ppm for soil (mg/kg) and water (mg/L) concentrations.
The units for application rate are lb/acre. The units for soil penetration are in inches.
P value is two-tailed, so p=0.025 means the empirical limits represent the 95% confidence interval.

As expected for clopyralid on sandier soils, percolation is modeled to occur down to the depth of the rooting zone (65 inches) entered into the model. Model assumes that the 3-acre downstream pond area is immediately adjacent to the treatment area. In the field, treatments are more scattered, with the majority of the treated acres (3.6 ac) 80 feet or more from surface water. A small amount of treated area (0.15 acre) is immediately adjacent to surface water. Concentrations in water are many orders of magnitude below that which is toxic to humans, fish, amphibian, mammals, or birds (e.g. the RfD for humans is 0.75 mg/kg, the NOEC for fish and amphibians is 5 mg/L, for mammals 75 mg/kg, birds 670 mg/kg). Off-site application rate could damage highly susceptible plants, but the downward percolation in the sandy soil reduces the amount and likelihood of lateral movement or runoff.

INVASIVE PLANT IMPLEMENTATION WORKSHEET - OCHOCO / DESCHUTES NFs Example #2

I. Site Characterization

Site number and name #221 Metolius River PAU # 15-32

EDRR Site? Y (N) Size of infestation: 10 acres (0.9 Ac infested)

Species: Ribbongrass % Cover: <10%

Site Type: Stream Management Area: M28 Metolius Wild + Scenic

Treatment History None

Distance to (Stream) Spring, Wetland, Meadow, Wellhead, or other water: 0 feet

Stream Class: Perennial Is the site in a Municipal Watershed? Y (N)

6th Field HUC: 170703010905 Headwaters Metolius

Soil Type: Loamy sand; coarse sand below 13"

Distance to TES or MIS species: 0 ft. Species: Bull trout, redband trout, see attached worksheet

Distance to other wildlife (neotrops, landbirds) See attached worksheet

Survey done for TES plants ? (Y) N

Cultural use plants present? (Y) N

Public use evident? (Y) N Type of use: Campgrounds, trail, summer homes

Adjacent land ownership: Private Distance: 0 ft. (up to Pvt boundary on north end)

II. Objective

Site Strategy: Control ribbongrass

Priority and reason: High - high recreation use; unique plant habitat

Restoration needs: Revegetate treated areas using native species - sedges are preferred

III. Prescription

Treatment Method: Wipe glyphosate on leaf surfaces

Herbicide formulation: Rodeo Rate: 48 oz/AC

Surfactant: Syltac Rate: 32 oz/100 gal

Buffer size needed based on herbicide, method and information from Site Characterization: 15' Wipe Reason for buffer: Perennial river

Project Consistancy Evaluation Form completed for ESA-listed species? Y (N/A)

Name of biologist consulted: —

Notification needed (internal and external): Not a high risk project

Pg 1 of 3

Figure F-2 part 1

IV. Implementation

Name of individual that will apply herbicide: Dave Langland / Floyd Paye / Steve Davis

Proposed dates of application: July 1 – Aug 15 (PDF 42)

Mixing requirements / restrictions: Typical rate or less; 300' from site

Weather restrictions: No rain within 24 hrs of application

Specific PDFs for implementation: See attached worksheet for wildlife/fish species near PAU. All homeowners in Tracts E, F, H, I, O must be coordinated with; locate wells & springboxes in advance – no herbicide w/in 100' of wells, 200' of spring boxes. Consult with Tribes for cultural use plants. Post this high-use area in accordance with PDF 26

Name of Specialist for on-site coordination: See attached Worksheet

Public notification measures taken: (To be documented at application)

V. Monitoring

Region 6 Monitoring Framework regarding projects subject to Section 7 consultation under ESA required for this project (high risk projects)? Y (N)

If "Yes", Name of individual responsible for monitoring: _____

Date planned: _____

Protocol: _____

Implementation monitoring (To be done at time of implementation)

On-site compliance monitoring done by: _____ Date: _____

Results: _____

Effectiveness monitoring (To be done after implementation)

Name: _____ Date: _____

Efficacy of treatment (FACTS database): _____

PDF effectiveness: _____

Changes needed ? _____

Attach map of site

Pg 2 of 3

Figure F-2 part 2

INVASIVE PLANT IMPLEMENTATION WORKSHEET – OCHOCO / DESCHUTES NFs

PETS / MIS Species

Species	Designation	Biologist Contact	PDFs	Comments
Bull trout	T	Nate Dachtler	42, 50, 52, 53, 54	In-water work from 5/15-8/15. Use typical rate or less
Chinook	EFH	"	"	"
Redband trout	S	"	"	"
Oregon spotted frog	S	"	N/A	Metolius is not frog habitat
Tall agoseris	S	Maret Pajutee	64	Botanist will flag TES plants + work with applicators
Peck's penstemon	S	"	"	"
Spotted Owl	T	Monty Gregg	77	Nests are more than 2 miles from site
Bald eagle	S	"	78, 79	Nests are more than 1/2 mile. Do not create noise above ambient level.
Crater Lake Tightcoil Snail	S	"	42, 50, 52, 53, 54	In-water work from 5/15-8/15. Use typical rate or less
Osprey	MIS	"	94	April 1-Aug 31 no noise above ambient Coord. with Biologist
Great blue heron	MIS	"	94	Sightings only, no nests or rookery.
Lewis' Woodpecker	MIS/BCC	"	89	Sightings only - PAU is not common habitat No NPE proposed
White headed Woodpecker	MIS/BCC	"	—	Nests in vicinity of PAU. Ambient noise levels only.
Olive sided flycatcher	Landbird	"	89	No NPE proposed

Pg. 3 of 3

Figure F-2 part 3

Metolius River – Ribbongrass GLEAMS-Driver Runs

This model uses site-specific parameters to estimate the concentration of pesticide percolating through the soil on the treated field, estimates the amount of pesticide coming off the treated field and contaminating immediately adjacent land (OffSite01), and the amount coming off the treated field and contaminating immediately adjacent water (WatBD01). There is no buffer modeled or assumed, despite any actual buffer that may exist on the site. This provides a first cut "worst case" contamination scenario.

The results of the run for the adjacent land are expressed in lbs/acre, as in an application rate of the pesticide. Results for the water body, either stream or pond, are expressed in mg/L. Concentrations in the soil of the treated field are in mg/kg of soil.

Table F-6. GLEAMS-Driver Input Parameters[7]

Weather station	CAMP SHERMAN INTERP OR	Yrs weather data	250
Type of site	Mixed pine-hardwood forest	No. weather yr sets	50
Surface cover	dense grass	Repetitions per set	1
Surface type	meadow	Herbicide	glyphosate/loam std
Runoff potential	low	Date	15-Sep
Treated Field	1 acre	Application method	surface (spray)
Total Field area	10 acres	Starting year	2008
field width	30 feet	Ending year	2010
slope	0.1	Application rate	2 lbs/acre
Nontarget field	10 acres	Proportion app to foliage	0.8
Prop. Loss to nontarget field	1	Proportion app to soil	0.2
Total depth root zone	20 inches	waterbody type	stream
Soil layers	sandy loam 0-3 in	width	2 meters
	loamy sand 3-13 in	for 1.8 cfs	flow velocity = 6584 m/day
	coarse sand 13-20 in		flow rate = 4,403,836 l/day
Type of clay	mixed	for 0.5 cfs	flow velocity = 6584 m/day
			flow rate = 1,223,287 l/day
		Fractional drift to water	0.2
		Cover factor	0.05 (1.0=bare ground)

From Onlineconversion.com, flow rate values

1.8 cfs = 4,403,836 l/day 0.5 cfs = 1,223,287 l/day

Local field conditions:

Slow velocity in alcove = 0.25 ft/sec = 0.0762 m/sec = 6584 m/day Used to calculate average concentration over 1-day's length of stream

[7] Access database: Camp Sherman Metolius River OR

Table F-7. Summary of results of simulations: Metolius alcove 0.5 cfs output

Receptor	Parameter	Median (Empirical Limits) (mg/kg soil, mg/l water)	p-value
Site01	Soil Conc. ('12' in.)	0.2746 (0.274 - 0.2747)	p = 0.025
Site01	Soil Conc. ('60' in.)	0.0 (0.0 - 0.0)	p = 0.025
Site01	Soil Penetration (in.)	11.0 (11.0 - 15.5)	p = 0.025
WatBd01	Peak Conc.	0.0 (0.0 - 0.0003)	p = 0.025
WatBd01	365-Day TWA	0.0 (0.0 - 0.0)	p = 0.025
OffSite01	App rate (lb/acre)	1.2 (1.2 - 1.2063)	p = 0.025

Results are the median value with the range (low and high estimates) in parentheses.
The units are in ppm for soil (mg/kg) and water (mg/L) concentrations.
The units for application rate are lb/acre. The units for soil penetration are in inches.

Notice that there are 250 yrs of simulated local weather data used, which improves the statistical p-value significantly. This run also uses much more permeable and a more shallow soil profile. Peak concentrations in water are still extremely low. The high off-site application rate is due to the very high drift assumed in the run to produce a “worst-case” for water contamination. In reality, drift would be essentially zero due to the wicking/wiping application proposed. Peak concentrations in water are orders of magnitude below the value for effects to humans, salmon olefaction and other effect to fish, birds, mammals, or amphibians.

Metolius Stream margin 1.8 cfs

Table F-8. Summary of results of simulations: Metolius stream margin 1.8 cfs output

Receptor	Parameter	Median (Empirical Limits) (mg/kg soil, mg/l water)	p-value
Site01	Soil Conc. ('12' in.)	0.275 (0.274 – 0.275)	p=0.025
Site01	Soil Conc. ('60' in.)	0 (0 – 0)	p=0.025
Site01	Soil Penetration (in.)	13.0 (13.0 – 16.5)	p=0.025
WatBd01	Peak Conc.	3.85E-06 (3.85E-06 - 5.16E-05	p=0.025
WatBd01	365-Day TWA	1.05E-08 (1.05E-08 - 1.52E-07	p=0.025
OffSite01	App rate (lb/acre)	1.20 (1.20 - 1.20)	p=0.025

Results are the median value with the range (low and high estimates) in parentheses.
The units are in ppm for soil (mg/kg) and water (mg/L) concentrations.
The units for application rate are lb/acre. The units for soil penetration are in inches.

Large weather data set results in good p-values. Scientific notation is used in the table due to the large number of decimal places. For example, 3.85E-06 is the scientific notation for 0.00000385. Soil concentration at 60 inches is zero because the maximum rooting depth in the model was set at 20 inches, and the herbicide only penetrated to a maximum depth of 16.5 inches. The high off-site application rate is due to the very high drift assumed in the run to produce a “worst-case” for water contamination. In reality, drift would be essentially zero due to the wicking/wiping application proposed. Peak and chronic concentrations in water are several orders of magnitude below levels of concern for effects to humans, salmon olefaction, or other effects to fish, bird, mammals, or amphibians.

Post Implementation Reporting Guidelines

As part of the ESA consultation process, certain reporting is required:

1. US Fish and Wildlife Service:
    a. Complete Project Consistency Evaluation Forms (Figure 6) for treatments that may affect listed species or critical habitat. This may include broadcast spraying along road ditches within RHCAs, emergent vegetation treatments, treatments within the aquatic influence zone, Northern spotted owl areas, etc (see PDFs and the Biological Opinions).
    b. Project Consistency Evaluation Forms for treatments are to be submitted by January 31 of each year. Information shall include:
        i. Timing: Actual project start and end dates
        ii. Deschutes/Ochoco NF contact information: Project lead name
        iii. Post-project assessment: Report the results of monitoring efforts completed under the Regional Monitoring Framework. Send reports to the USFWS Bend Field Office, 63095 Deschutes Market Road, Bend, OR 97701.
2. National Marine Fisheries Service:
    a. A list of herbicide applications conducted over the reporting period, including information requested in 3(c) above.
    b. The results of the previous years' monitoring program.
    c. The annual report shall be sent to: National Marine Fisheries Service, Oregon State Habitat Office, Attn: 2009/03048 1201 NE Lloyd Blvd., Suite 1100, Portland, OR 97232
    d. Comply with the requirements of the USFS Region 6 invasive plant monitoring plan. The Forests should conduct a data review of the pesticides that are proposed for use, or may be used, on the Forests each year. The review should include: Any new scientific data regarding non-target fish species effects or environmental fate, including peer-reviewed studies and other forms of scientific evidence that may be relevant to Pacific salmon and steelhead.
    e. Any changes to EPA-approved pesticide labels (ESA-related and other).
    f. Any new legal findings relevant to the use of pesticides.

Level 1 team members may schedule post-implementation field trips to monitor effectiveness.

Monitoring

Two types of monitoring would be conducted to assure compliance: implementation monitoring and effectiveness monitoring. Implementation monitoring determines whether treatments were carried out according to the implementation plan, prescriptions, and PDFs. These strategies were designed to respond to the issues and lessen the effects to the associated resource.

Implementation Monitoring

Implementation monitoring of invasive plant treatments is a two-step process. Each infestation is given a priority as required by the 2005 R6 FEIS. Deciding what and where treatments should occur first is a crucial step to implementing the invasive plant program. This is the basis for building the implementation plan to effectively and economically meet land management goals. From the prioritized list, prescriptions are determined using field visits and inventory forms (Exhibit 1). The prescription is developed using associated PDFs and resource requirements, and is documented using the Prescription form (Exhibit 2). This allows many safeguards to be in place before control measures begin. For example, treatment caps are in place to protect water and aquatic species. To comply with

the cap and track the acres of herbicide application within a 6th-field watershed each year, the prioritized list of infestations and prescription estimates the acreage in advance. Spray reports are required from Contractors on a monthly basis, allowing comparison to estimated and actual acreage. Adjustments would then be made to stay within the cap.

The second step of implementation monitoring is reviewing the treatments on the ground to determine whether PDFs and prescriptions were followed. This often occurs concurrently with inspections of work in progress. Forest Service personnel regularly work with Contractors, volunteers and youth crews to ensure compliance with objectives and project design. Figure 1 displays a form used for tracking each herbicide application. Certain PDFs require monitoring, including weather before and during application (#15, #17), Survey and Manage and sensitive species (# 64, #65), and wildlife (#85, #86). In addition, a minimum of 50% of all treatment areas are monitored each year, allowing adaptive measures to be taken quickly if implementation monitoring shows non-compliance or the need to modify control techniques.

Effectiveness Monitoring

Effectiveness monitoring is used to determine if objectives and desired conditions in the Forest LRMPs, 2005 R6 Preventing and Managing Invasive Plants ROD, and this Invasive Plant Treatments EIS are being achieved in a timely manner. Effectiveness of treatment and effectiveness of project design features will be monitored.

Discussions of past monitoring results of the invasive treatments allowed by the 1998 EAs can be found in Chapter 3 in the Treatment Effectiveness and Native Vegetation Sections of this document. This monitoring provided the framework for assumptions made about treatment effectiveness, and will also help prioritize future long-term monitoring.

A monitoring framework is provided by the R6 2005 ROD, to help Forests determine if actions are taking place as described in the EIS, and if progress towards the desired future condition is occurring, including passive/active restoration success. Effectiveness monitoring for individual treatments is critical to fine tuning prescriptions to local conditions. Treatment areas will likely be monitored several times because multiple treatments are generally necessary to control invasive plants and restore desired vegetation. Forest Service policy requires annual reporting of treatment effectiveness in the database “FACTS.” FACTS protocols require at least 50% of all treatment areas to be visited and treatment effectiveness and efficacy reported.

The effectiveness monitoring strategy would be prioritized based on the issues, and on determining the effectiveness of PDFs, particularly long-term changes to both upland and riparian native plant communities. Treatments within Research Natural Areas would be included in the strategy, focusing on changes in plant communities, such as species composition and abundance. The PNW RNA Coordinator will determine which infestations will be monitored, and the protocol to be used. In addition, effectiveness monitoring would explore the effects to aquatic species habitat and non-target vegetation. Frequency and extent of this monitoring would depend on yearly funding, with the top priority issues and treatment sites being accomplished first.

A protocol for monitoring effectiveness of measures intended to protect federally listed species was developed by the Forest Service, Pacific Northwest Region (USFS 2011d), and reviewed by the US Fish and Wildlife Service and National Marine Fisheries Service, among others. This strategy will be used to monitor high priority treatments (such as broadcast spraying) within habitat of our listed species such as steelhead trout on the two Forests, and bull trout on the Crooked River National Grassland. Specific details for the strategy can be found in the Inventory and Monitoring Framework

for Listed Species, Appendix M from the R6 2005 Invasive Plant Final EIS. Specifics on implementation/compliance monitoring and effectiveness monitoring protocol can be found in the "Invasive Plant Monitoring Plan" (USDA 2011).

Exhibit 1: Invasive Plant Inventory Form

Ochoco National Forest and Crooked River NG Invasive Species Inventory Field Form
Adapted from NRIS Invasive Plant Data Recording Protocols (** designates required fields)*

General Information

*Site ID: 06070~~50~~ 0225	*Date: 08/25/2009 (MM/DD/YYYY)	New Site? (Re-visit?) (circle one)
*Examiner (Last, First, MI)	Mafera, Debra	
*Region: 06 Forest: 07	*District: 05	*State: OR
*County: Jefferson	*Ownership: USFS	

Location

Site Location/Project Name: Rimrock Springs	
*Legal Description T. 12 R. 14 Sec., 27 ¼ SW *Willamette Meridian*	
UTM's easting _____ northing _____ *Zone 10 NAD 27*	
Latitude/Longitude: 44°29'46.127 121°2'41.905	
* 6th-Field HUC: 17070306020Z Rimrock Sp	* Slope 0-30 %

Data Elements

Note: if plant code is not in the NRCS-PLANTS database, enter NO-XWALK in the plant code

(see back of form) *Species Code Russian Knapweed	*Species Category: (Plant) Pathogen Vertebrate Invertebrate
Total Area (gross ac) 5 AC	Fractions of an acre: 1 acre = 209'x 209'= 43,560 sq. ft. 0.1 acre = 66'x 66' = 4,358 sq. ft. 0.01 acre = 20.1'x 20.1' = 436 sq. ft. 0.001 acre = 6.1 x 6.6' = 43.6 sq. ft.
* % Infested 100 (% of Total Area occupied by the target species)	

Distribution (Circle one)
CL Clumpy SE Scattered Even (SP Scattered Patchy) LI Linear

Cover refers to the collective canopy area of this weed species at this site, and is described by using the Ten Point Cover Class Code (NRMCOV). Either a Cover Class or Cover % is required

Canopy Cover Code ____ (average)

T = 0-1.0%	2 = 15.1-25.0%	4 = 35.1-45%	6 = 55.1-65.0%	8 = 75.1-85.0%	A = 91.1-99.0%
0 = 1.1-5.0%	3 = 25.1-35.0%	5 = 45.1-55%	7 = 65.1-75.0%	9 = 85.1-95.0%	X = 99.1-100%
1 = 5.1-15.0%					

*Soil Texture (circle one): clay clay loam loam sand silt silt loam (sandy loam)
Soil / Site Comments: Compacted on dam

Landform (circle one or more): road, ridgetop, creek, swale, (seep/spring), (bench), slope, flat, talus

*Horizontal Distance to Water: 0 *Feet* Vertical distance to Water: 0 *Feet*

Species Count 1000's (Plants) Stems

Phenology (circle all that apply): (seedlings) / rosettes / 1st year plants bolted / (mature plants) / previous yr seedheads

Proposed Treatment: Herbicide

Revised 3/26/2009

Plant Codes

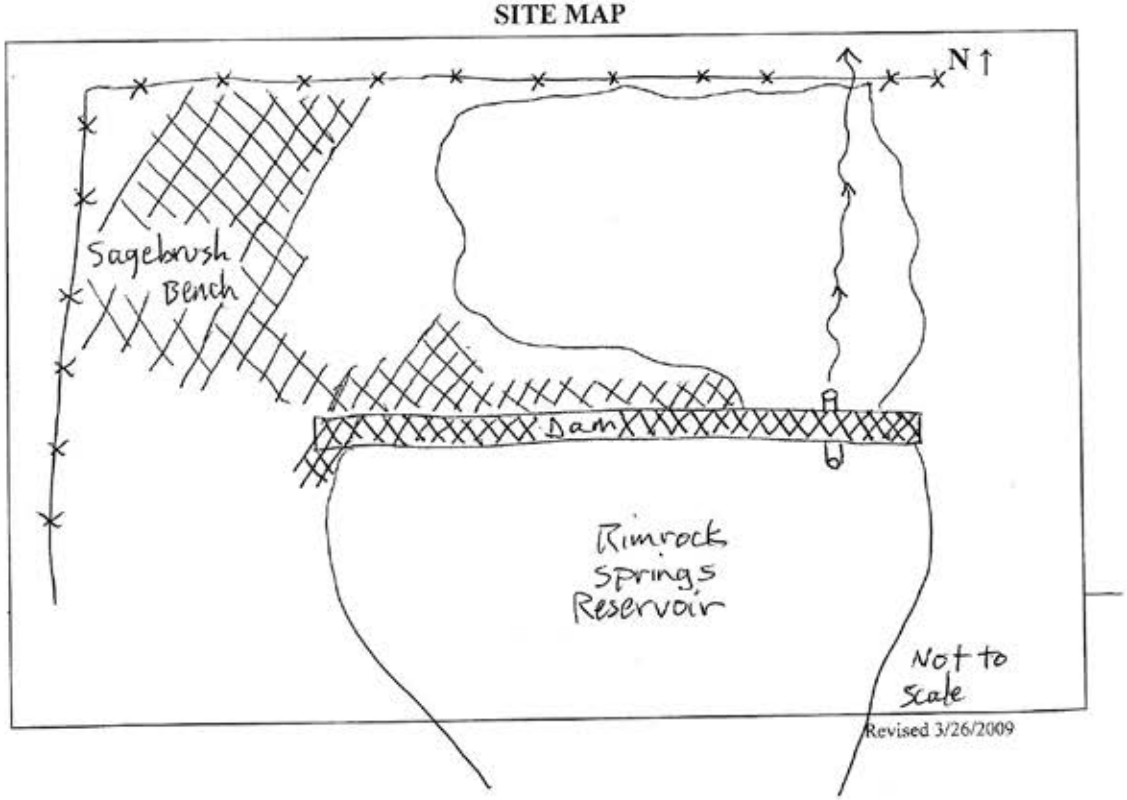
Bull Thistle= CIVU	Morning Glory= COAR4	Spotted Knapweed= CEBI2
Canada Thistle= CIAR4	Musk Thistle= CANU4	St. Johnswort= HYPE
Common Mullein= VETH	Oxeye Daisy = LEVU	Sulfur Cinquefoil= PORE5
Dalmation Toadflax= LIDAD	Perennial Pepperweed= LELA2	Tansy Ragwort= SEJA
Diffuse Knapweed= CED13	Poison Hemlock= COMA2	Teasel= DIFU2
Houndstongue= CYOF	Puncture Vine= TRTE	Yellow Starthistle= CESO3
Leafy Spurge= EUES	Russian Knapweed= ACRE3	Yellow Toadflax= LIVU2
Mediterranean Sage= SAAE	Scotch Broom= CYSC4	Whitetop= CADR
Medusahead Rye= TACA8	Scotch Thistle= ONAC	

Treatment _____ (H-Herbicide B-Biological N-None M-Manual ME-Mechanical)
Date _____

Date Monitored _____ **Monitoring Efficacy (%)** _____ **Comments**_____

Site Comments and Directions: Dam faces are covered with ACRE3, 70-95% cover. Area north of dam has a moderate infestation with 20-25% cover of plants. The bench area has an evenly scattered distribution of approx 1% cover. Slope of area is flat except for dam faces @ ~30%. Knapweed is directly adjacent to water on the south side of the dam.

SITE MAP



Revised 3/26/2009

Exhibit 2: FS2100-2, Pesticide Use Proposal Form

PESTICIDE - USE PROPOSAL (Reference FSM 2150)	DEPARTMENT/AGENCY		CONTACT/PHONE NO.
	REGION	FOREST	DATE SUBMITTED

1) OBJECTIVE a) Project No. b) Specific Target Pest c) Purpose	 _____ _____
2) PESTICIDE a) Common Name b) Formulation c) % AI,AE,or lb / Gal. d) Registration No.	 _____ _____ _____
3) a) Form Applied b) Use Strength (%) or Dilution Rate c) Diluent	 _____ _____ _____
4) Lbs. AI Per Acre or Other Rate	_____
5) APPLICATION a) Method b) Equipment	 _____ _____
6) a) Acres or Other Unit to be Treated b) Number of Applications c) Number of Sites d) Specific Desc. Sites	_____ _____ _____ _____
7) a) Month(s) of Year b) States	_____ _____
8) SENSITIVE AREAS a) Areas to be Avoided b) Areas to be Treated with Caution	 _____ _____
9) REMARKS a) Precautions to be Taken b) Use of Trained / Certified Personnel c) State and Local Coordination d) Other Pesticides Being Applied to Same Site e) Monitoring f) Other	 _____ _____ _____ _____ _____ _____

Approval (Signatures of Approving Official)	**Date (mm/dd/yy):**

Instructions for completing Form FS-2100-2, Pesticide Use Proposal

Heading - Provide requested information.

OBJECTIVE (Block 1)

a) Project Number - Assign in accordance with field IPMWG procedures.

b) Specific Target Pest - Identify the target pest by common and scientific name. Identify life cycle stage for animals or stage of growth for plants (e.g. emergent or pre-emergent, seedling, sapling, etc.)

c) Purpose - State exact purpose of pesticide use.

PESTICIDE (Block 2)

a) Common name of active ingredient(s) as indicated on the pesticide label. When a combination of pesticides are to be used on a single pest, use the word "AND" in listing the pesticide names. When alternate materials are proposed, use the word "OR" in listing the names.

b) Indicate product formulation (i.e., amine, ester, emulsifiable concentrate, granules, solution, etc.).

c) Percentage active ingredient, acid equivalent, or pounds per gallon (as indicated on the pesticide label).

d) List the EPA registration number from the pesticide label.

PESTICIDE - continued (Block 3)

a) Form Applied - e.g., dust, granule, emulsion, bait, solution, gas, etc.

b) Use strength or Dilution Rate - List the quantity of concentrate mixed with the quantity of diluent or indicate the percentage strength of the formulation.

c) Diluent - Identify the pesticide carrier, i.e., water, oil, talc, kerosene, etc.

PESTICIDE - continued - (Block 4)

Pounds of Active Ingredient Per Acre or Other Rate - State pounds of active ingredient per acre to be applied, unless some other unit is indicated. If reporting in acreage is not appropriate, indicate units used. Indoor applications of residual sprays may be expressed as percent of actual ingredient in the prepared spray in gallons per M (1,000) square feet. Point of runoff, which may appear on a label is generally considered to be 1 gallon per 1,ooo square feet on most indoor surfaces. If dusts are used instead of sprays, express as ounces or pounds of prepared dust per M (1,000) square feet. Treatment of trees is listed by number of trees or if application is by hydraulic sprayer, is expressed as pounds or quarts of concentrate per 100 gallons of diluent - oil or water, whichever is used. If the pesticide for trees or brush is applied by air or mist blower, express as pounds of active ingredient per acre. Fumigants or inside aerosols are expressed as pounds of the fumigant or aerosol per M (1,000) cubic feet. Rodent baits should be listed as ounces or pounds of the prepared bait per bait station. Treatments in water may be expressed in parts per million (ppm) by weight or volume - specify. In spot applications, the rate of application is expressed in pounds or gallons per 1,000 square feet indoors or pounds per acre of active ingredient outdoors applied to the spot area treated.

APPLICATION - (Block 5)

Indicate as specifically as possible the method (i.e., aerial, ground, etc.) of application and the type of equipment such as helicopter, hand compression sprayer, mist-dust blower, hydraulic sprayer, injector, etc.

APPLICATION - (Block 6)

a) Acres or Other Unit to be Treated. State in terms of acres, unless otherwise indicated. Some projects may require repeat applications. Report only the units to be treated for the first application.

b) Number of Applications - For projects that require repeat applications to the same area, indicate their estimated number and their timing.

c) Number of Sites - If the reported figures are a consolidation from several locations, indicate the number of locations.

d) Specific Descriptions of Sites - Indicate the type of area and pertinent portion of the area to be treated; such as ditchbank, rangeland, powerline right-of-way, tree nursery, etc. Specify if pesticide is to be applied in or around water and whether it will be applied directly to water or to the shore. Where applicable, indicate the slope of the treated area. For aquatic use, indicate water quality (hardness and pH) if available or applicable.

APPLICATION (Block 7)

a) Month(s) of Year - State month(s) of year.

b) State(s) - Indicate State and other designation that identifies the area geographically.

SENSITIVE AREAS (Block 8)

a) Areas to be Avoided - Identify sensitive areas to be avoided. Indicate if the area is subject to inadvertent treatment as a result of drift. Describe fully in "remarks" (Block 9) what protective measures are to be taken.

b) Areas to be Treated with Caution - Identify sensitive areas to be treated with special precautions to avoid contamination.

REMARKS (Block 9)

Use this line for information which will be helpful to the field IPMWG in evaluating the project.

a) Precautions to be Taken - Describe specific precautions be taken to protect sensitive areas; for example, no application within 100 feet of streams.

b) Use of Trained / Certified Personnel - Provide information on the status of training and/or certification of personnel doing the actual work and of those supervising. Has project been reviewed by a field biologist, agronomist, entomologist, or other appropriate subject matter specialist?

c) State and Local Coordination - Indicate coordination on the project at a State or local level.

d) Other Pesticides Being Applied to Same Site - Indicate what other pesticides are being or will be applied on the same site within the year.

e) Monitoring - Describe any monitoring of the operation be to conducted. Indicate effectiveness of prior projects and mention undesirable side effects observed.

f) Other - Indicate if the project is to be accomplished by contract.

Environmental analyses (EA's and/or EIS's) may be referred for additional information

Exhibit 3. Example of a Public Notice of Herbicide Use for Publication in Newspaper

PUBLIC NOTICE

Deschutes National Forest Integrated Weed Management Program

An integrated weed management program which includes the use of herbicides, hand pulling, and biological controls will be implemented on the Deschutes National Forest from June 1 to September 30, 2007. The locations and acreages of sites to be treated with herbicides are listed below:

Bend-Ft. Rock Ranger District: (Roads and legal locations listed)

Crescent Ranger District: (Roads and legal locations listed)

Sisters Ranger District: (Roads and legal locations listed)

All restrictions and regulations regarding the use of herbicides will be followed as stated in the Region 6 Invasive Plant Treatments FEIS and the Environmental Impact Statement for the Invasive Plant Treatments on the Deschutes and Ochoco National Forests and Crooked River National Grassland.

Herbicides will be applied directly to target weeds. Application dates are weather dependent. High use recreation areas and other areas of human use will be posted prior to spraying.

Persons who are known to be or suspect that they are hypersensitive to herbicides may contact the Forest Service to determine the appropriate risk management measures.

Questions regarding specific project areas, timing and treatment may be obtained by calling Debra Mafera at (541) 416-6588, or Dave Langland at Oregon Department of Agriculture, (541) 548-2241.

Exhibit 4: Inspection and Inventory Form for Mineral Material Sources

Ochoco NF / Deschutes NF / Crooked River NG

Mineral Material Source Weed Inspection Form NRIS Site # _____

Pit Name: _____ Pit Cleared: Y N Conditional ___

Location: _____Forest: _____

Public: ___ Private: ____ District: _____

Owner/Operator Name, Address, Tel. #:

_____

_____

_____

Weeds Present: Y N Species: _____

Population Size/Density/# of plants: _____

General weed location (narrative): (map on back)

_____

_____

_____

Project Name: _____

Type of Project: _____

Risk Assessment: H M L

Risk Narrative / Explanation: _____

Recommendations
(Conditions/Mitigations):_____

_____

Exhibit 5: Project Review for Heritage Resources under the Terms of the 2004 Programmatic Agreement among the USFS R6, ACHP, and SHPO, June 2004.

Forest:

Ranger District: County:

Undertaking/Project Name
USGS Quads:

By signing this document, the Forest Specialist certifies that for this project the Forest complies with Section 106 of the National Historic Preservation Act, under the terms of the 2004 Programmatic Agreement (PA) for the State of Oregon. This form shall be kept on file as supporting documentation

Stipulation III (A) 1 Undertaking meets the criteria listed in Appendix A of the PA

Date:

Inspection, monitoring, or other identification will be submitted to the Forest Specialist

Stipulation III(A)2 Undertaking meets the criteria listed in Appendix B of the PA.

Date:

Inspection, monitoring, or other identification will be submitted to the Forest Specialist

Stipulation III(A)3 Undertaking meets the criteria listed in Appendix C (Exempt/Non-undertaking

Stipulation III (B)1 Undertaking meets the criteria in the PA for a No Historic Properties Affected determinatio

Stipulation III(B)2 Undertaking meets the criteria in the PA for a Historic Properties Avoided determination.

Stipulation III(B)3 The Forest has notified interested Tribes and persons, as appropriate, of the findings and made the findings available to the publ

Stipulation III(B)5Date:

No Adverse Effect (No Historic Properties Affected). The Forest finds that there are historic properties but the undertaking will have no effect on them as defined by 36 CFR 800.16(i). SHPO review period (30-day) required.

Stipulation III(B)6Date:

Historic Properties Affected: The Forest Service shall consult according to 36 CFR 800.5.

Forest Specialist Date

For SHPO USE: For Historic Properties Adversely Affected, please indicate your opinion of our determination by marking the appropriate box below, sign and return this form to the Forest.

Exhibit 6. Project Consistency Evaluation Forms for treatment of PAUs that may affect federally ESA-listed species

PROJECT CONSISTENCY EVALUATION FORM - Part I
Deschutes and Ochoco National Forest

*****PROJECT LEAD: ATTACH PROJECT LOCATION MAP and HERBICIDE APPLICATION RECORD*****

Project Name: _____ District: _____ Size of area treated (Acres or miles): ____

Watershed(s) and Hydrologic Unit Code(s) _____ HUC6: _____

Legal Description (T/R/S): _____ Project Coordinator: _____

Project Reviewer for Consistency: _____ Title: _____

Treatment Type (Herbicide or non- _____

List Target Vegetation:

List tools or herbicide method planned for use:

Vegetation type (acres or % of project area) Forested _____ Road prism (Rd number): _____ _____ Riparian/wetland _____ Emergent Vegetation _____

Treatment Strategy (control, eradicate, or contain): _____

Is this a re-treatment?: If yes, list number of treatment:

Herbicide Information for Riparian and Emergent Vegetation Treatments

Is there a tank mixture?: If yes, attach tank mixture analysis to this form.

List waterbody name(s):

T&E fish species present: **Fill out Part II for each species.**

In-stream work window, if _____ Effective treatment required outside in-stream work window?: _____

List applicable herbicide use buffers: _____

Surfactants:: _____

Scheduled treatment dates and time: Start _____ End _____

Fiscal years in which project will occur: _____

Herbicide Information:

Broadcast, spot or hand	Product Name	Total amount of herbicide applied in area treated (lb)	Herbicide applied per acre (lb/acre)	Concentration applied

Other additional information:

Project Consistency Evaluation Form – Part II
Deschutes and Ochoco National Forest Specific Species Information

FISH CODES: MCS = Middle Columbia River Steelhead, EFH = Spring Chinook Essential Fish Habitat, CBT = Columbia River Bull Trout

1. Is the project in a sixth-field watershed that contains listed fish or designated critical habitat (Y/N)?

If No Þ What is your basis for this determination? _____
Project will have No Effect on listed fish or designated critical habitat

If Yes Þ go to question 2.

2. Do the stream(s) in which impacts may occur contain suitable habitat for listed fish? (Y/N) _____

If Yes, what species? _____

3. How far (approx., in river miles) is project from nearest suitable habitat or listed fish species? _____

4. Does the proposed action have the potential to alter or affect the following indicators: temperature, sediment, herbicide contamination/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency, pool quality, off-channel habitat, refugia, wetted width/depth ratio, streambank condition, floodplain connectivity, peak/base flows, drainage network, road density and location, disturbance history, function of riparian reserves in a manner that was not considered in the Invasive Plant EIS? Yes or No

If No Þ Project will have No Effect on listed fish or designated critical habitat. List the fish for which the project will have No Effect:

If Yes Þ Use Decision Pathway for Aquatic Effects Determinations to make effects determination, Enclosure A

Check Effects Determination for each listed species using codes:	_____ **NE**	_____ **NLAA**	_____ **LAA**
Critical Habitat	_____ **NE**	_____ **NLAA**	_____ **LAA**

Rationale **(based on project info and required conservation measures):**

Project Conservation Measures **(see project descriptions, generate additional measures if necessary):**

Submitted by: _____ **Date:** _____

Forest Service Fisheries Biologist

Level 1 Concurrence (required only for LAA):

_____ _____
Forest Service Representative **NMFS Representative**

_____ _____
USFWS Representative **Date:**

*****ATTACH PROJECT MAP AND SPECIES HABITAT/LOCATION MAPS*****

APPENDIX G – Deschutes and Ochoco National Forests and Crooked River National Grassland Invasive Plant Species Prevention Practices

January 2012

Introduction

In October 2004, Forests in Region 6 were directed to develop local invasive plant prevention practices. This document fulfills that obligation. The Invasive Plant Prevention Practices were developed using the Guide to Noxious Weed Prevention Practices (July 12, 2001).

The practices are preceded in this document by Forest Plan direction that was established with the Pacific Northwest Region Preventing and Managing Invasive Plants Record of Decision (October 2005). When the R-6 Invasive Plant Species FEIS ROD came out in October 2005, it amended R-6 Forest Plans and contained 23 Standards related to prevention and treatment of invasive plants. Additional direction for the management of invasive plants is contained in Forest Service Manual, Section 2080.

The invasive plant prevention practices are provided for use on the Deschutes and Ochoco National Forests and Crooked River National Grassland to minimize the introduction of invasive plants; minimize conditions that favor the establishment or spread of invasive plants; and to facilitate the integration of invasive plant management practices into resource programs. In order to display a complete list of the ways in which invasive plant establishment and spread can be prevented, required actions are also included. Specific prevention measure examples are included to demonstrate techniques used at the local level.

Desired Future Condition

In National Forest lands across Region Six, healthy native plant communities remain diverse and resilient, and damaged ecosystems are restored. High quality habitat is provided for native organisms throughout the region. Invasive plants do not jeopardize the ability of the National Forests and National Grassland to provide goods and services communities expect. The need for invasive plant treatment is reduced due to the effectiveness and habitual nature or preventative actions, and the success of restoration efforts.

Table G-1. Goals and Objectives (from the R-6 IPEIS ROD)

Goal 1- Protect ecosystems from the impacts of invasive plants through an integrated approach that emphasizes prevention, early detection, and early treatment. All employees and users of the National Forest recognize that they play an important role in preventing and detecting invasive plants.	
Objective 1.1	Implement appropriate invasive plant prevention practices to help reduce the introduction, establishment and spread of invasive plants associated with management actions and land use activities.
Objective 1.2	Educate the workforce and the public to help identify, report, and prevent invasive plants
Objective 1.3	Detect new infestations of invasive plants promptly by creating and maintaining complete, up-to-date inventories of infested areas, and proactively identifying and inspecting susceptible areas not infested with invasive plants.
Objective 1.4	Use an integrated approach to treating areas infested with invasive plants. Utilize a combination of available tools including manual, cultural, mechanical, herbicides, biological control.
Objective 1.5	Control new invasive plant infestations promptly, suppress or contain expansion of infestations where control is not practical, conduct follow up inspection of treated sites to prevent reestablishment.

Goal 2- Minimize the creation of conditions that favor invasive plant introduction, establishment and spread during land management actions and land use activities. Continually review and adjust land management practices to help reduce the creation of conditions that favor invasive plant communities.	
Objective 2.1	Reduce soil disturbance while achieving project objectives through timber harvest, fuel treatments, and other activities that potentially produce large amounts of bare ground
Objective 2.2	Retain native vegetation consistent with site capability and integrated resource management objectives to suppress invasive plants and prevent their establishment and growth
Objective 2.3	Reduce the introduction, establishment and spread of invasive plants during fire suppression and fire rehabilitation activities by minimizing the conditions that promote invasive plant germination and establishment.
Objective 2.4	Incorporate invasive plant prevention as an important consideration in all recreational land use and access decisions. Use Forest-level Access and Travel Management planning to manage both on-highway and off-highway travel and travel routes to reduce the introduction, establishment and spread of invasive plants.
Objective 2.5	Place greater emphasis on managing previously "unmanaged recreation" (OHVs, dispersed recreation, etc.) to help reduce creation of soil conditions that favor invasive plants, and reduce transport of invasive plant seeds and propagules.
Goal 3- Protect the health of people who work, visit, or live in or near National Forests, while effectively treating invasive plants. Identify, avoid, or mitigate potential human health effects from invasive plants and treatments.	
Objective 3.1	Avoid or minimize public exposure to herbicides, fertilizer, and smoke
Objective 3.2	Reduce reliance on herbicide use over time in Region Six
Goal 4– Implement invasive plant treatment strategies that protect sensitive ecosystem components, and maintain biological diversity and function within ecosystems. Reduce loss or degradation of native habitat from invasive plants while minimizing adverse effects from treatment projects.	
Objective 4.1	Maintain water quality while implementing invasive plant treatments.
Objective 4.2	Protect non-target plants and animals from negative effects of both invasive plants and applied herbicides. Where herbicide treatment of invasive plants is necessary within the riparian zone, select treatment methods and chemicals so that herbicide application is consistent with riparian management direction, contained in Pacfish, Infish, and the Aquatic Conservation Strategies of the Northwest Forest Plan.
Objective 4.3	Protect threatened, endangered, and sensitive species habitat threatened by invasive plants. Design treatment projects to protect threatened, endangered, and sensitive species and maintain species viability.
Goal 5– Expand collaborative efforts between the Forest Service, our partners, and the public to share learning experiences regarding the prevention and control of invasive plants, and the protection and restoration of native plant communities.	
Objective 5.1	Use an adaptive management approach to invasive plant management that emphasizes monitoring, learning, and adjusting management techniques. Evaluate treatment effectiveness and adjust future treatment actions based on the results of these evaluations.

Objective 5.2	Collaborate with tribal, other federal, state, local and private land managers to increase availability and use of appropriate native plants for all land ownerships.
Objective 5.3	Work effectively with neighbors in all aspects of invasive plant management: share information and resources, support cooperative weed management, and work together to reduce the inappropriate use of invasive plants (landscaping, erosion control, etc.).

The following standards and an implementation schedule are from the Pacific Northwest Region Invasive Plant Program Record of Decision (October 2005) which amended Forest Plans in the Pacific Northwest Region.

Table G-2. New Forest Plan Standards (from the 2005 R6 IPEIS ROD)

Standard #	Text of Standard	Implementation Schedule
1	Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis; fire and fuels management plans, Burned Area Emergency Recovery Plans; emergency wildland fire situation analysis; wildland fire implementation plans; grazing allotment management plans, recreation management plans, vegetation management plans, and other land management assessments.	This standard will apply to all assessments and analysis documents started or underway as of March 1, 2006; this standard does not apply to assessments and analysis documents signed or completed by February 28, 2006.
2	Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands. This standard does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time.	This standard will apply to permits and contracts issued after March 1, 2006. Ongoing permits/contracts issued before this date may be amended, but are not required to be amended, to meet this standard. This standard will apply to Forest Service force account operations starting March 1, 2006.
3	Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands. If State certified straw and/or mulch is not available, individual Forests should require sources certified to be weed free using the North American Weed Free Forage Program standards (see Appendix O) or a similar certification process.	Forests are already applying this standard on an informal basis; weed-free straw and mulch will be required as available, starting March 1, 2006.
4	Use only pelletized or certified weed free feed on all National Forest System lands. If state certified weed free feed is not available, individual Forests should require feed certified to be weed free using North American Weed Free Forage Program standards or a similar certification process. This standard may need to be phased in as a certification processes are established.	National Forest managers will encourage the use of weed-free feed across the National Forests in the Region. Pelletized feed or certified weed-free feed will be required in all Wilderness areas and Wilderness trailheads starting January 1, 2007. Pelletized or certified weed-free feed will be required on all National Forest System lands when certified feed is available (expected by January 1, 2009). Weed-free (or pelletized) feed requirements will be listed in individual Forest Closure orders.
5	No Standard	N/A

Standard #	Text of Standard	Implementation Schedule
6	Use available administrative mechanisms to incorporate invasive plant prevention practices into rangeland management. Examples of administrative mechanisms include, but are not limited to, revising permits and grazing allotment management plans, providing annual operating instructions, and adaptive management. Plan and implement practices in cooperation with the grazing permit holder.	This standard will apply to grazing permits beginning March 1, 2006.
7	Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialists.	This standard will apply to rock source management beginning March 1, 2006.
8	Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate.	This standard will apply to all road blading, brushing and ditch cleaning projects beginning March 1, 2006.
9	No Standard	N/A
10	No Standard	N/A
11	Prioritize infestations of invasive plants for treatment at the landscape, watershed or larger multiple forest/multiple owner scale.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
12	Develop a long-term site strategy for restoring/revegetating invasive plant sites prior to treatment.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
13	Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality and to help prevent the establishment of invasive species), 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants, 3) if native plant materials are not available, or 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation.	This standard will apply to restoration and rehabilitation projects beginning March 1, 2006.
14	Use only APHIS and State-approved biological control agents. Agents demonstrated to have direct negative impacts on non-target organisms would not be released.	This standard will apply to biological control projects beginning March 1, 2006.
15	Application of any herbicides to treat invasive plants will be performed or directly supervised by a State or Federally licensed applicator. All treatment projects that involve the use of herbicides will develop and implement herbicide transportation and handling safety plan.	This standard will apply to herbicide treatment projects as of March 1, 2006.
16	Select from herbicide formulations containing one or more of the following 10 active ingredients: chlorsulfuron,	This standard will be applied to invasive plant projects with NEPA

Standard #	Text of Standard	Implementation Schedule
	clopyralid, glyphosate, imazapic, imazapyr, metsulfuron methyl, picloram, sethoxydim, sulfometuron methyl, and triclopyr. Mixtures of herbicide formulations containing 3 or less of these active ingredients may be applied where the sum of all individual Hazard Quotients for the relevant application scenarios is less than 1.0. 1 All herbicide application methods are allowed including wicking, wiping, injection, spot, broadcast and aerial, as permitted by the product label. Chlorsulfuron, metsulfuron methyl, and sulfometuron methyl will not be applied aerially. The use of triclopyr is limited to selective application techniques only (e.g., spot spraying, wiping, basal bark, cut stump, injection). Additional herbicides and herbicide mixtures may be added in the future at either the Forest Plan or project level through appropriate risk analysis and NEPA/ESA procedures.	decisions signed after March 1, 2006.
17	No Standard	N/A
18	Use only adjuvants (e.g. surfactants, dyes) and inert ingredients reviewed in Forest Service hazard and risk assessment documents such as SERA, 1997a, 1997b; Bakke, 2003.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
19	To minimize or eliminate direct or indirect negative effects to non-target plants, terrestrial animals, water quality and aquatic biota (including amphibians) from the application of herbicide, use site-specific soil characteristics, proximity to surface water and local water table depth to determine herbicide formulation, size of buffers needed, if any, and application method and timing. Consider herbicides registered for aquatic use where herbicide is likely to be delivered to surface waters.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
20	Design invasive plant treatments to minimize or eliminate adverse effects to species and critical habitats proposed and/or listed under the Endangered Species Act. This may involve surveying for listed or proposed plants prior to implementing actions within unsurveyed habitat if the action has a reasonable potential to adversely affect the plant species. Use site-specific project design (e.g. application rate and method, timing, wind speed and direction, nozzle type and size, buffers, etc.) to mitigate the potential for adverse disturbance and/or contaminant exposure.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
21	Provide a minimum buffer of 300 feet for aerial application of herbicides near developed campgrounds, recreation residences and private land (unless otherwise authorized by adjacent private landowners).	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
22	Prohibit aerial application of herbicides within legally designated municipal watersheds.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.

Standard #	Text of Standard	Implementation Schedule
23	Prior to implementation of herbicide treatment projects, National Forest system staff will ensure timely public notification. Treatment areas will be posted to inform the public and forest workers of herbicide application dates and herbicides used. If requested, individuals may be notified in advance of spray dates.	This standard will apply to invasive plant treatment projects with NEPA decisions signed after March 1, 2006.
1. ATSDR, 2004. Guidance Manual for the Assessment of Joint Toxic Action of Chemical Mixtures. U.S. Department Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry.		

Deschutes and Ochoco National Forest and Crooked River National Grassland Integrated Invasive Plant Prevention Practices

These invasive plant prevention practices are supplemental to the previously listed Regional Prevention Standards, which are now Forest Plan Standards.

Education

Management Objectives:

1. Ensure public and employee knowledge of invasive plants to help reduce both the spread rate of existing invasive plants and the risk of infestation by new invasive plants.
2. Increase education and awareness to aid in the early detection of new invasive plant sites.

Table G-3. Invasive plants prevention - Education

#	Invasive Plant Prevention Practices	LRMP Objective
1.1	Educate employees on the Forests regarding the problems associated with and the identification of invasive plants. Add invasive plant awareness to Employee Orientation, Fire Effects and other training. Report infestation to the appropriate District Invasive plant Coordinator.	1.2
1.2	Work to increase public (including contractors and permittees) awareness of invasive plants and their potential negative impact on the environment. Use education programs to increase invasive plant awareness and prevent invasive plant spread	1.2
1.3	Increase the level of educational material regarding invasive plants displayed at trailheads and District offices. Use education programs to increase invasive plant awareness and prevent invasive plant spread by recreationists and other Forest users. Post prevention practices at NFS trailheads, roads, boat launches, and other forest recreation facilities.	1.2
1.4	Continue work with State, local and interested partners to develop additional educational materials that improve the understanding and identification of invasive plants in Central Oregon.	1.2; 5.3
1.5	Discuss invasive plant prevention practices at annual grazing permittee meetings and contractor pre-work sessions.	1.2
1.6	Coordinate invasive plant prevention efforts with other agencies.	1.2, 5.3
1.7	Project level personnel will be trained to recognize invasive plants occurring on or adjacent to their Districts and should be able to recognize potential invaders.	1.2

Project Need

Management Objectives:

1. Weigh the need of the proposed project against the risk of invasive plant infestation.
2. Address invasive plant prevention needs when planning soil disturbance activities.

Table G-4. Invasive plants prevention - Project Needs

#	Invasive Plant Prevention Practices	LRMP Objective or Standard Addressed
2.1	In the earliest stages of project consideration, look at the risks of invasive plant infestation and the long-term consequences of dealing with invasive plants. Determine which prevention practice / mitigation measure would apply and be effective to reduce the risk of invasive plant introduction or spread.	2.4, Standard #1
2.2	Evaluate the need for any ground disturbing activity and ways to minimize the possible effects of implementation, e.g. winter logging, minimizing openings.	2.1, 2.2
2.3	Be realistic during project size-up. Consider the cost and the chance of success of the invasive plant prevention practices.	
2.4	Invasive plant risk assessment and management will be considered in all NEPA planning activities where soil disturbance or invasive plant introduction or spread could result from that activity. Prevention will be emphasized as the preferred strategy for invasive plant management.	1.1, 1.2, 2.3, 2.4, 2.5 FSM 2080.03
2.5	NEPA analysis will consider the costs associated with preventing the occurrence or spread of invasive plants.	

Prevention – Minimize Transportation of Invasive Plant Seed

Management Objective

1. Reduce the spread of existing invasive plants across the Forests and Grassland and the risk of introducing new invasive species to project sites and other areas of the Forests/Grassland.

Table G-5. Invasive plants prevention – Minimize Transportation Of Seed

#	Invasive Plant Prevention Practices	LRMP Objective or Standard addressed
3.1	When possible, keep active road construction sites closed to vehicles not involved with construction.	2.1
3.2	Treat invasive plants at all Forest Service administrative sites including Ranger Stations, compounds, staging areas, trailheads, boat launches, campgrounds, parking lots, airstrips, interpretive and historic sites, and roads leading to trailheads.	1.4, 1.5
3.3	Encourage motorized trail users to inspect and clean their vehicles prior to using NFS lands. Post message at trailheads and get information to Motorized Clubs.	2.5
3.4	Require all Forest Service employees to inspect, remove, and properly dispose of invasive plant seed and plant parts found on their clothing and personal equipment prior to leaving a project site.	1.1, 1.2,
3.5	Consider using transitional pastures when moving livestock from invasive plant infested areas onto NFS lands, where livestock have been identified	R-6 Standard #6

#	Invasive Plant Prevention Practices	LRMP Objective or Standard addressed
	as a vector in transport of invasive plant seeds. (Transitional pastures are designated fenced areas that can be logistically and economically maintained in an invasive plant-free condition).	
3.6	Consider the exclusion of livestock, wildlife, and vehicles from high priority invasive plant sites where animals or vehicles are likely to cause a spread of the invasive plant off site.	1.1, 2.4, 2.5
3.7	The use of invasive plant-infested areas for fire camps, fire camp equipment, and crew bases should be avoided. Whenever possible, establish fire camps, vehicle and crew staging areas, helibases, helispots, and airstrips in areas inspected and verified as invasive plant-free. Where unavoidable, measures should be taken to prevent invasive plant spread. .	2.3, R-6 Standard #1
3.8	Work with other jurisdictions to identify and limit boat trailer introduction of aquatic invasive plant species to small lakes within the forest boundaries.	2.4

Project Planning, Design, and Special Use Permit Administration

Management Objectives:

1. Integrate invasive plant management practices into all resource programs and project planning.
2. Ensure that the risks of invasive plant introduction and/or spread, and the mitigation required to minimize that risk are properly considered before ground disturbing activities begin.

Table G-6. Invasive plant prevention – Project Planning, Design and Special Uses Permits

#	Invasive Plant Prevention Practices	LRMP Objective or Standard addressed
4.1	Invasive plant risk assessments will be completed, and invasive plant management will be considered in all NEPA planning activities where land disturbance or invasive plant introduction or spread could result from that activity.	1.1, FSM 2080.03
4.2	When conducting NEPA analysis, consider the costs associated with preventing the introduction or spread of invasive plants.	
4.3	For projects with the potential to introduce and spread invasive plants, involve the District invasive plant coordinator in the planning and implementation process.	1.1, 2.1, 2.4,
4.4	Project level personnel should be trained to recognize invasive plant species occurring on or adjacent to their Districts.	1.2
4.5	Project or contract maps should show known invasive plant infestations as a means to aiding avoidance or monitoring.	1.1, 1.2, 1.3, R6 Standard #1, 8
4.6	Consider Logging systems design that would provide for minimal land disturbance and avoid understory reductions in or adjacent to invasive plant infestations.	2.1, 2.2
4.7	Where inventories indicate an infestation, the project should be designed, in coordination with the District invasive plant specialist, to plan for the long-term management of the infestation and to prevent the spread of the infestation off the site.	1.1, 1.4,
4.8	Project should be designed to consider all resource values and tradeoffs, including the opportunity to restrict operators from working near high risk invasive plant sites during the time when invasive plants are capable of being spread by the operation, unless proper mitigation measures are used.	R6 Standard #8

#	Invasive Plant Prevention Practices	LRMP Objective or Standard addressed
4.9	Incorporate timber sale provisions C(T)6.6# (weed free seed) and B(T)6.35 (Equipment Cleaning)in all timber sale contracts. C(T)5.12# (Use of Roads by Purchaser), B(T)5.3 (Road Maintenance) and C(T)6.315# (Sale Operation Schedule) will be used as necessary to keep contract vehicles out of high-risk infestations during peak invasive plant seed dispersal periods. These types of requirements will also be incorporated in Federal Acquisition Regulation (FAR) contracts in Section H – Special Contract Requirements as deemed necessary (see page 22).	1.1, 1.2, 2.3
4.10	Revegetate disturbed land as soon as practical following ground-disturbing activities. Consider regeneration and other resource objective needs in planning for species to be seeded, timing, rates, etc.	1.1, 2.1
4.11	Favor the use of native species in preference to introduced species for re-vegetation seeding when the native species can accomplish the site objectives within a reasonable time frame, costs are not excessive, and seed is available.	1.1, 1.4
4.12	All seed purchased or otherwise designated or accepted for use on Forest System Lands will require testing for “All-States Noxious Weeds” according to AOSA (Association of Official Seed Analysts) standards and will be certified in writing by a Registered Seed Technologist or Seed Analyst as meeting the requirements of the Federal Seed Act and State Seed Law regarding the testing, labeling, sale and transport of prohibited and restricted noxious weeds. Only seed that has passed the testing for “All-States Noxious Weeds,” will be accepted and used on NFS lands. This measure will be incorporated into all new contracts, purchases, or agreements, as appropriate, prior to awarding or issuing such documents. It will also be incorporated by modification into all existing contracts or agreements where seed purchase or use is required and has not yet been completed.	1.1, 2.3
4.13	Consider the exclusion of livestock, wildlife, and vehicles (on and off-road) and other human activities from high priority invasive plant sites where such are likely to spread the infestation. Revegetate such sites as needed.	1.1, 1.5, 2.4, 2.5,
4.14	Where off-road vehicle (ORV) use is restricted to a specific area, that area will be closely monitored for invasive plants. Planning for the ORV area will consider prevention as a high priority.	2.4, 2.5
4.15	Road management objectives will consider allowing or encouraging desirable herbaceous vegetative growth on shoulders, cuts, and fills.	2.2, 2.4
4.16	Road maintenance planning will address practices to prevent the introduction and spread of invasive plants.	1.1, 2.4
4.17	Road closures will be coordinated with the District invasive plant specialist to ensure that invasive plant prevention is considered. If closed roads are to be seeded, certified weed free seed would be used.	2.4
4.18	Develop invasive plant management plans with grazing permittees for each allotment, include: location of and ground disturbance associated with salt licks, watering sites, yarding/loafing areas, corrals and other heavy use areas. Monitor these sites for invasive plants and treat them as needed. Consider invasive plant seed transportation, maintaining healthy vegetation to compete with invasive plant species, invasive plant control methods, revegetation, reporting and education.	1.1, 1.2, 5.1, 5.3, R6 Standard #6
4.19	Annual operating plans (AOPs) should provide information to grazing permittees concerning invasive plant locations and management activities.	1.1, 1.2, 5.1, 5.3, Standard #6
4.20	In Allotment Management Plans (AMPs) and AOPs, to the extent possible, consider the use of livestock as a tool in preventing palatable invasive plants from setting seed.	Standard 6
4.21	To reduce the risk of invasive plant introduction and spread following implementation of prescribed burning, pastures should be evaluated to	1.1, 5.1, 5.3, Standard #6

#	Invasive Plant Prevention Practices	LRMP Objective or Standard addressed
	determine if rest, deferment or other adjustments to livestock grazing use should be used.	
4.22	Review mineral operating plans to ensure measures are implemented to prevent the introduction and spread of invasive plants. Use material only from invasive plant-free sources. Ensure that disturbed sites are re-vegetated as soon after disturbance as possible.	1.1, 1.2 R-6 Standards #1, 7
4.23	Consider invasive plant risk and spread factors in travel plan (road closure) decisions.	2.4 R-6 Standard # 1
4.24	Consider road closures in areas that are invasive plant free and/or at unusually high risk to invasive plant invasion.	1.3, 2.4
4.25	Incorporate invasive plant prevention considerations into road layout and design. Minimize the removal of trees and other roadside vegetation during road construction, reconstruction, and maintenance, particularly on southerly aspects. Design roads that are self-maintaining, e.g. outslope roads, rolling dips, take advantage of natural features. Design roads for revegetation success by saving and applying topsoil, laying back slopes, etc.	2.1, 2.4
4.26	During trail planning and alternative development, evaluate invasive plant risk factors (presence of invasive plants, habitat type, aspect, shading, etc.) when determining trail location and design.	2.4
4.27	Include invasive plant prevention and control measures in all special use permits that involve ground disturbance.	1.1, 1.5 R-6 Standard #2
4.28	When administering Forest Roads and Trails Act and private road easements, require appropriate invasive plant prevention measures.	2.4
4.29	Plan for collection of KV or other funds to revegetate soil disturbance or treat invasive plants as needed after timber harvest and regeneration activities.	1.1, 1.4, 1.5, 2.1
4.30	Plan and apply for flood and/or fire rehabilitation funding to treat invasive plant infestations not treated effectively the first growing season after the disturbance event.	1.5
4.31	When possible, coordinate the timing of road maintenance activities and invasive plant control activities. Delay blading roads within two weeks of herbicide application. Delay spraying after blading until vegetative regrowth has occurred.	1.1, 1.2, 1.5 R-6 Standard # 8

Pre-Project Activity, Inventory, and Analysis

Management Objective:

1. Minimize the spread of existing invasive plants into new project areas

Table G-7. Invasive plants prevention - Pre-Project Activities

#	Invasive Plant Prevention Practices	LRMP Objective or Standard Addressed
5.1	Pre-project inventories should be completed and used during the project planning process. Develop site-specific plans for treatment of existing invasive plant populations. Maintain an invasive plant inventory and monitoring system.	1.3, 2.4, Standard 1, R6 Monitoring Framework

#	Invasive Plant Prevention Practices	LRMP Objective or Standard Addressed
5.1a	Establish Invasive Plant Prevention Areas (high value, invasive plant-free areas that are a priority to keep clean). Prioritize Invasive Plant Prevention Areas for Early-Detection/Rapid Response strategy.	
5.2	Whenever budgets allow, Botanical surveys, range analyses, and other resource inventories should be expanded to note all invasive plant infestations by species, size of infestation, and location.	1.3
5.3	Before construction equipment moves into a project area, treat seed-bearing invasive plants along existing Forest Service access roads leading to the project area. Pretreat existing weed infestations prior to creating new seed beds.	Goal 2
5.4	Treat invasive plants in road obliteration, closure, and reclamation projects before roads are made un-drivable. Monitor and retreat as necessary.	Goal 2
5.5	Treat pre-existing and proposed landings, skid trails and helibases that are invasive plant infested before logging.	Goal 2, Objective 2.3
5.6	Where practical, treat high risk areas for invasive plant infestations (e.g. roads, disturbed ground) before burning. Monitor and retreat after burning if necessary.	Goal 2

Project Implementation

Management Objectives:

1. Minimize ground disturbance and the exposure of mineral soil during project activities, thereby reducing the potential for invasive plants to become established on new sites and the need to conduct revegetation activities.

Table G-8. Invasive plants prevention - Project Implementation

#	Invasive Plant Prevention Practices	LRMP Objective or Standard Addressed
6.1	Minimize soil disturbance and conserve existing topsoil (A and B soil horizons) for replacement whenever possible in situations where ground disturbing activities are unavoidable.	2.1
6.2	Reduce disturbance when doing road maintenance. Limit the amount of ditch pulling only to the amount necessary to assure proper drainage. Limit blading to running surfaces and the minimum necessary on road shoulders.	2.1
6.3	Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities revegetate the area.	2.2
6.4	Consider rock armor in areas that are constantly disturbed (e.g. cattle watering sites, pump chances) at road/stream crossings.	Goal 2
6.5	In the overall context of meeting multiple resource objectives for a treatment area, Consider developing prescriptions and selecting logging and burning methods that minimize soil disturbance and that minimize weed establishment or spread.	1.1, 2.1
6.6	Minimize skid trails and the number and size of landings.	2.1
6.7	Minimize fire line and associated soil disturbance during prescribed burning. Utilize natural barriers and existing roads and skid trails for control lines where possible.	2.1

6.8	Where shoulders or drainage ditches are covered by desirable herbaceous cover, consider leaving it in place rather than blading it off if such a practice can be done without causing excessive damage to the road surface or significant public safety hazards.	2.2

Revegetation/Site Rehabilitation

Management Objective:

1. Re-establish desirable vegetation on exposed mineral soil due to project activity and unplanned events such as fire, flood, or other disturbances to minimize the introduction and/or spread of invasive plants.

Table G-9. Invasive plant prevention - Revegetation/Site Rehabilitation

#	Invasive Plant Prevention Practices	LRMP Objective or Standard Addressed
7.1	Revegetate disturbed land as soon as possible following disturbance. Consider revegetation (reseeding) unless it can be documented that natural regeneration can accomplish within a reasonable time frame the same prevention objectives as seeding.	Goal 2
7.2	Favor the use of native species in preference to introduced species when the native species can accomplish the site objectives in a reasonable time-frame, costs are not excessive, and seed is available.	R-6 Standard #13
7.3	All seed purchased or otherwise designated or accepted for use on Forest System lands will be required to be tested for invasive plants according to the Association of Official Seed Analysts standards and will be certified in writing by a Registered Seed Technologist or Seed Analyst as meeting the requirements of the Federal Seed Act and the State Seed law regarding the testing, labeling, sale and transport of prohibited and restricted invasive plants.	Goals 1 & 2
7.4	Measure 7.3 will be incorporated into all new contracts, purchases, and agreements as appropriate, prior to awarding or issuing such documents.	1.1
7.5	Decommissioned roads should be seeded with certified weed-free seed to minimize potential invasion by invasive plants.	R-6 Standard #13
7.6	Where shoulders or ditches are covered by desirable vegetation, consider leaving it in place rather than blading it off if such a practice can be done without causing excessive damage to the road surface or public safety hazards.	2.2
7.7	If fertilizer is determined to be beneficial, based on soil analysis and cost effectiveness, apply fertilizer one year after germination and establishment of grass has occurred. All contracts must include specific language for revegetation prescriptions, including the timing of application of fertilizer, if applied.	R-6 Standard #12
7.8	Minimize and/or exclude grazing on restoration areas if not compatible with achieving revegetation efforts.	1.1, Standard #6

Monitoring

Management Objective

1. Conduct project follow-up and review to determine success of invasive plant treatments and revegetation efforts and detect new invasive plant sites requiring treatment and make corrections

as necessary. Monitoring is a part of every project and as such, needs to be covered in NEPA discussions, and planned for as part of implementation. Conduct implementation compliance monitoring consistant with the 2005 ROD requirements – Appendix M of the FEIS.

Table G-10. Invasive plant prevention practices R6 FEIS Standards

#	Invasive Plant Prevention Practices R6 FEIS Standard	LRMP Objective or Standard Addressed
8.1	Determine if standards for use of herbicides are being adhered to, including mitigation measures, reducing reliance on herbicide, and record keeping.	3.1, 4.1, 4.2, 4.3
8.2	Determine if designated sites are being treated as proposed.	Goal 2
8.3	Determine whether prescribed health and safety measures are being followed, and if chemical labels are being followed.	3.1
8.4	Determine whether the trend of invasive plant infestations are increasing or decreasing. Accomplish this by revisiting treated sites annually for five years, or until project objectives are met, conducting a comparison of yearly records, and establishing photo monitoring stations at selected sites.	3.2, 5.1
8.5	Determine whether the prescribed treatments are having the desired effect and whether site objectives or treatment methods need to be changed. Accomplish this by determining if specific site objectives are still valid, deciding whether prescribed treatments are achieving site objectives, and whether prescribed mitigation measures and safety measures are working.	5.1
8.6	Conduct post-project monitoring for invasive plants for all activities that have the potential to introduce or spread invasive plants on Forest Service Lands, including but not limited to: prescribed burning, timber harvest, road maintenance, and stream restoration projects.	1.3, 5.1
8.7	Conduct monitoring after a wildfire event to determine whether the fire caused existing infestation to spread, whether the fire established favorable sites for new infestations, and if suppression activities caused new invasive plant introduction.	1.3, 2.3, 5.1
8.8	Monitor areas of concentrated livestock use for invasive plant establishment. Treat new infestations.	1.3, 1.4
8.9	Monitor rock pits and quarries to ensure no new invasive plant seeds are transported to the use site.	1.3 R-6 Standard #7
8.10	Retain performance bonds from mining operations until revegetation objectives are achieved.	Goal 2

USDA United States Department of Agriculture | Forest Service | Deschutes National Forest 1001 S. W. Emkay Drive Bend, OR 97702 | Ochoco National Forest 3160 NE 3rd Street Prineville, OR 97754

File Code: 1950-3 **Date:** June 7, 2007
Route To:

Subject: Invasive Plant Preventative Practices

To: All Employees, Deschutes and Ochoco NFs

The Deschutes and Ochoco National Forests and Crooked River National Grassland have put together a set of Invasive Plant Prevention Practices (IPPP) in response to the Region 6 Invasive Plant EIS Record of Decision (ROD) that was signed in October of 2005. The ROD put an emphasis on invasive plant prevention, and has amended our Forest Plans with several standards related to invasive plant prevention and management. The standards that were included in the R6 Invasive Plant EIS were scheduled to be implemented on March 1, 2006. The Invasive Plant Prevention Practice will help us implement the standards for invasive plant management.

These Invasive Plant Prevention Practices have been reviewed by many of you and your colleagues over the past year.

It is expected that over time these invasive plant prevention practices will become second nature to us and we will apply them to each project that is planned and implemented on the Forests and Grassland.

Remember, preventing weeds is all of our responsibility!

/s/ Jeff Walter
JEFF WALTER
Forest Supervisor, Ochoco National Forest

/s/ Cecilia R. Seesholtz (for)
LESLIE A.C. WELDON
Forest Supervisor, Deschutes National Forest

cc: Nancy Phelps
Steve_Robertson
Debbie_Norton

Attachment

Caring for the Land and Serving People

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Site Specific Examples of Prevention Measures

The purpose of this section is to help the reader understand how prevention measures are used in project activities on the Ochoco/Deschutes National Forests and Crooked River National Grassland. These are examples of specific prevention measures taken in addition to standard recurring measures such as cleaning heavy equipment prior to work on National Forest System Lands; not using rock and soil from infested material sites; educating employees and the public about invasive plants, etc. These examples were chosen by the District Weed Coordinators to show specific measures taken on a variety of project types.

Table G-11. Site-specific examples of prevention measures

Project	Location	Purpose	Prevention Measure Taken
South Bend Hazardous Fuels Reduction Project	Bend/Ft. Rock Ranger District, Deschutes NF	Avoid spreading weed populations of Dalmatian toadflax that are adjacent to or within Units 132-139, 141, 153, 251-255, 446.	Weed sites will be flagged and removed from harvest operations Those weed sites located within mowing operations would not be mowed, but the area surrounding them would be mowed to reduce fire intensity.
		To reduce the potential of weed spread from road shoulder adjacent to Units 251, 430, 447	No machinery is allowed within 30 feet of the road shoulder to prevent creating bare soil adjacent to weed sites.
		Avoid possible spotted knapweed spread into Unit 411	Treat infestations before working in Unit 411. Revegetate disturbed area in 411 using native seed.
Gebhardt Flat Range Allotment	Bend/Ft. Rock Ranger District, Deschutes NF	Prevent the Introduction of invasive plants from off-forest areas, including Permittee lands.	All cattle trucks, water trucks and OHVs used by Permittee operations will be cleaned prior to entering Forest Service land. The Range Program Manager will inspect the Permittee's ranch for noxious weeds Permittee will receive educational materials on invasive plant identification, biology and prevention at the Annual Operating Instruction meeting
		Prevent disturbance of an existing cheatgrass site at an old water trough location (T22S, R13E, Sec 19, SE1/4)	Do not place watersets, mineral blocks or other items adjacent to or within the cheatgrass location that may attract cattle.
Cultus Creek and Snow Creek Fish Passage Improvement	Bend/Ft. Rock Ranger District, Deschutes NF	Prevent disturbance and subsequent risk of spread of St. John's-wort at Site #2 (4630 Road)	The St. John's-wort site will be flagged by the noxious weed coordinator; machinery operation will avoid the site to the extent possible. The site will be monitored for two years to evaluate spread occurrence. Site 2 will be worked on last to prevent the possibility of seed spreading to other sites within the project. Wash the equipment at site 2 after work is done to avoid spread off forest.
Snowshoe Noncommercial Thinning & Slash Disposal Project	Lookout Mountain RD, Ochoco NF	Reduce the possibility of spread of spotted knapweed, medusahead, and field bindweed in Units 1, 4, 9, 16,	Hand piles will not be placed near invasive plants to reduce the spread potential, as bare ground is more susceptible to weed invasion.

Project	Location	Purpose	Prevention Measure Taken
		21 and 26	
		Avoid spreading houndstongue in heavily infested Units 17 and 18.	These units were dropped from the project proposal.
Drake and DKT Timber Sales	Lookout Mountain RD, Ochoco NF	Prevent the spread of knapweed from the road shoulder into Drake Timber Sale Unit 24	The area infested with knapweed was removed from the timber sale boundary, along with a buffer to prevent disturbance.
		Reduce the potential of spread through disturbance of Canada thistle in DKT Units 1, 2, 3, 4, 68	Canada thistle infestations were included on the sale area map. Entry of equipment into the site requires the equipment to be removed from Forest Lands and washed before returning to the project.
Canyon Fuels & Vegetation Management Project	Lookout Mountain RD, Ochoco NF	Prevent the spread of 11 different invasive species that occur within on adjacent to 33 timber sale units	Shade will be retained and no burning will occur within 100 feet of infestations to prevent the creation of bare ground. Landings will not be placed on areas that contain weeds. Sale Inspectors and fire crews will be given a map of all infestations. Prescribed burning will retain organic layers.
		Reduce the risk of weed introduction and spread on skid trails, landings, and roads closed by the timber sale.	Roads, trails and landings will be revegetated with native species.
		Reduce the risk of spreading teasel within the sale area.	Unit 148.1 will be harvested last, or the equipment will be cleaned prior to moving to another unit.
Big Summit Cluster Allotment Management Plans	Lookout Mountain RD, Ochoco NF	Concern about grazing areas that overlap with Canyon Timber Sale and burning units.	Pastures that are scheduled for a fall burning period will be grazed early the spring before to allow re-growth before burning. An interdisciplinary team would evaluate the results of burning to determine if rest of the pasture is needed to facilitate recovery of native vegetation. Pastures burned in the fall will be grazed late the next season to allow re-growth of vegetation
Sugar Creek Campground Vegetation Management	Paulina RD, Ochoco NF	Prevent spread of the Canada thistle site along Sugar Creek.	Crook County will treat the infestation with herbicide before harvest activities begin.
		Prevent spread of whitetop and spotted knapweed that occurs on the 58 Road into the campground.	The District Weed Coordinator will approve locations of parking and staging areas outside of weed locations. The harvest activities will be done during periods when the soil is dry; keep disturbance to a minimum. Disturbed areas will be revegetated using native seed if necessary. The campground area will be monitored for 3 years to determine efficacy of prevention measures.

Project	Location	Purpose	Prevention Measure Taken
Deep Cattle & Horse Allotment Management Plan	Paulina RD, Ochoco NF	Prevent spread of houndstongue from the Roba Allotment into the Deep Allotment (permittee has both allotments and grazes Roba first).	Construct a holding pasture on the north end of the Roba Allotment to keep cattle for a period of up to two weeks. Seed will generally fall off during this time period. Cows can then move into the Deep Allotment.
		Prevent the spread of high-priority weeds sites.	Cattle will be excluded from the spotted knapweed site within the South Pasture along road 42 down to the North Fork Crooked River. Ride or fence this area to prevent grazing. Cattle will be excluded from the houndstongue site within the South Pasture along road 42-741. Prevention effectiveness monitoring will be documented on the above two weed infestations every 1 to 5 years.
Roba Cattle & Horse Allotment Management Plan	Paulina RD, Ochoco NF	Prevent spread of houndstongue from the Roba Allotment into the Deep Allotment (permittee has both allotments and grazes Roba first).	Construct a holding pasture on the north end of the Roba Allotment to keep cattle for a period of up to two weeks. Seed will generally fall off during this time period. Cows will then be permitted to move into the Deep Allotment.
		Prevent the spread of high-priority weeds sites.	High priority weed sites include houndstongue areas with greater than 20% cover, which include lower Burnt Corral Creek near the Forest Boundary, the entire length of Roba Creek and the major tributary to the west, the length of Dipping Vat Creek and Hewed Log Creek. Cattle will be herded from these areas continually throughout the grazing season. Prevention effectiveness monitoring will be documented on six infestations listed in the AMP every 1 to 5 years.
Hardcorner Fuels Reduction	Paulina RD, Ochoco NF	Reduce spread potential of medusahead from Turnpike Pit.	The pit may not be used for staging vehicles or equipment. It may not be used for helicopter operations.
		Reduce spread risk of medusahead from Turnpike pit, 5840-720 road, 5840 road.	There is a risk of prevailing winds moving seed from infested areas into burned unifested areas east of the 5840 road. Burn units 11, 19, 7, 8, 28-32 in the spring to stimulate recovery of native vegetation before medusahead sets seed. These units will not be burned until the spring of 2008; the medusahead at the pit will be sprayed prior to that to reduce density.
		Prevent the spread of medusahead located on the 5850-140 road.	No vehicle traffic, including ATVs are allowed on the 5850-140 road, or within units 9, 11, or 19; this includes fueling operations and post-burn monitoring.
		Prevent the spread of North Africa grass	Do not allow fire within scablands.

Contract and Permit Clauses -- Examples

Mining Claims

CLEANING OF EQUIPMENT: Unless otherwise agreed, to prevent the introduction of seeds and noxious weeds onto National Forest System lands, the Claimant shall ensure all equipment moved onto National Forest System land is free of soil, seeds, vegetative matter, or other debris that could contain, or hold, seeds. The Claimant shall employ whatever cleaning methods necessary to ensure compliance with the terms of this provision. The Claimant shall notify the responsible Forest Service Officer prior to moving each piece of equipment onto National Forest System land, unless otherwise agreed in writing. Notification shall include identification of the location of the equipments most recent operation. Upon request by the Forest Service, arrangements shall be made for Forest Service inspection of each piece of equipment prior to entry upon National Forest System lands.

The Claimant shall certify compliance with the terms of this provision, in writing, prior to each entry of equipment onto National Forest System lands. For the purpose of this provision, “equipment” includes all construction and/or maintenance machinery, excluding pickup trucks, cars, and other passenger vehicles, used in the daily transport of personnel.

Special Uses

Non-Native, Invasive Plant Prevention and Control

(Use this clause in all authorizations involving ground disturbance, which could result in the introduction or spread of non-native, invasive plants. This clause may also be used where cooperative agreements for non-native, invasive plant control are in place with state and local governments).

The holder/grantee shall be responsible for the prevention and control of non-native, invasive plants of concern on the area covered by this authorization and shall provide prevention and control measures as directed by the Forest Service. Non-native, invasive plants of concern are defined as those species recognized, as such, by Forest Service and/or State authorities in the area, where the authorized use is located.

The holder/grantee shall also be responsible for prevention and control of non-native, invasive plant infestations, which are determined by the Forest Service to have originated from the authorized area, including on National Forest System lands, which are not within the authorized area.

When determined to be necessary by the authorized officer, the holder/grantee shall develop a site-specific plan for non-native, invasive plant prevention and control. Such plan shall be subject to Forest Service approval. Upon Forest Service approval, the non-native, invasive plant, prevention and control plan shall become a part of this authorization, and its provisions shall be enforceable under the terms of this authorization.

Equipment Cleaning to Prevent the Spread of Non-native, Invasive Plants

(Use this clause in authorizations involving ground disturbance where equipment cleaning is essential to prevent the spread of non-native, invasive species).

To prevent the introduction of seeds and non-native, invasive plants onto National Forest System lands, the holder/grantee shall ensure all equipment moved onto National Forest System land is free of soil, seeds, vegetative matter, or other debris that could contain, or hold, seeds. The holder/grantee shall employ whatever cleaning methods are necessary to ensure compliance with the terms of this provision. The holder/grantee shall notify the responsible Forest Service Officer prior to moving each

piece of equipment onto National Forest System land, unless otherwise agreed in writing. Notification shall include identification of the location of the equipment's most recent operation. Upon request by the Forest Service, arrangements shall be made for Forest Service inspection of each piece of equipment prior to entry upon National Forest System lands.

The holder/grantee shall certify compliance with the terms of this provision, in writing, prior to each entry of equipment onto National Forest System lands. For the purpose of this provision, "equipment" includes all construction and/or maintenance machinery, excluding pickup trucks, cars, and other passenger vehicles, used in the daily transport of personnel.

Public Works Contracts

H.7 NOXIOUS WEED CONTROL

(a) In order to prevent the potential spread of noxious weeds into the Ochoco or Deschutes National Forest, the Contractor shall be required to furnish the Forest Service with proof of weed-free equipment.

(b) Noxious weeds are defined as any exotic plant species established or that may be introduced in the State, which may render the land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses and which is designated by the Oregon Department of Agriculture or the Deschutes County Weed Board or by other appropriate agencies having jurisdiction.

(c) All equipment and vehicles to be used at the job site shall be cleaned and certified free of noxious weeds and their seeds prior to entrance onto the National Forest. The restriction shall include equipment and vehicles intended for off-road use as well as on road use, whether they are owned, leased, or borrowed by the contractor or subcontractor.

(d) Cleaning shall consist of the removal of all dirt, grease, debris, and materials that may harbor noxious weeds and their seeds. This may require the use of a pressure hose. Cleaning shall occur off Federal lands.

(e) Equipment, materials and vehicles shall be visually inspected by a designated Forest Service Officer, and certified in writing to be reasonably clean and weed free. Inspections will take place at a location designated by the Forest Officer in advance of equipment and material arrival. Equipment and vehicles are expected to proceed directly to the job site following the inspection. Materials to be used on the project will be delivered to the job site following the inspection and approval.

(f) Certification shall remain valid for each identified piece of equipment or vehicle only for the duration of the specified project and only as long as the vehicle or equipment remains at the job site. Equipment and vehicles (excepting passenger vehicles - this includes pickups and vans) that leave the job site will need to be re-certified as weed free before they are allowed to return to the job site or re-enter the National Forest.

APPENDIX H – Fisheries Analysis by Watershed and Tabular Data

Introduction

This appendix will address specific effects to listed fish populations and their habitats by subbasin, watershed or subwatershed, in which they occur under this project. This analysis is summarized in Table 76 of the DSEIS. Redband trout are Forest Service Region 6 Sensitive species and occur throughout the project area except for some areas on the Fort Rock portion of the Bend/Fort Rock Ranger District where there are no perennial streams or lakes, some areas of the upper Little Deschutes River, and a few other small closed systems that were historically fishless such as Sparks and Hosmer Lakes. Effects analysis for threatened fish species also applies to redband trout, except where effects to redband trout could be greater or different depending on treatment methods. Such effects to redband trout are discussed separately in the FEIS.

Within this appendix, most watershed discussions will center on proximity, probability, magnitude, and distribution. For general discussions on duration, nature, frequency, and timing. Maps of these watersheds, streams, and fish distribution are contained in the fisheries report.

Lower Deschutes Watersheds

Upper Trout Creek

(6th HUC – Headwaters Trout Creek 170703070103, Foley Creek 170703070102, Opal Creek 170703070101)

Streams in this watershed contain steelhead and redband trout (Refer to Fisheries Report for maps). Sites infested with invasive plants are primarily located upstream of known steelhead use. Invasive plant infestations are primarily located along roads with some of the mapped invasive plant sites crossing and running near streams.

Invasive plant species proposed for chemical or manual treatments are spotted knapweed, diffuse knapweed, Russian knapweed, sulphur, medusahead, St. Johnswort, and whitetop. First choice chemicals for treating these species are clopyralid, sulfometuron, metsulfuron and picloram. Picloram should only be used on sulphur-cinquefoil as that is the only effective chemical to really treat this species (Dave Langland, Oregon Dept. of Agriculture, personal communication) Other chemicals are low to moderate risk to fish and aquatic.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity, probability, magnitude, and distribution will be discussed here. Refer to the general discussion starting on page 117of the Fisheries Report for duration, nature, frequency, and timing of effects.

Proximity, Probability and Magnitude: There are four project area units that contain 61 infested invasive plant polygons that total 5.7 acres with the largest at 0.1 acres (Table H-1). Mapped infested invasive plant sites total 0.5 acres in 10 locations within 100 feet of perennial waterbodies (Table H-2). Actual acres of invasive plants to be treated in these 0.5 acres is less than this because they are not all filled with invasive plants; exactly how much less is not known. Potential areas of concern from proposed treatments are listed by subwatershed in Table H-3.

Table H-1. Acres and number of locations infested invasive plant sites occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed.

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	**HUC6 Number**	**Acres within 100' of Int. Streams**	**Number of areas 100' from Int. Streams**	**Acres on Int. Stream Channels**	**Number of Infested Invasive plant Sites**	**Total Invasive plant Acres in HUC6**	**Total Sub-watershed Acres**
Opal Creek	170703070101	0.00	0	0.00	3	0.27	11426
Foley Creek	170703070102	0.00	0	0.00	10	0.62	22009
Headwaters Trout Creek	170703070103	0.09	1	0.00	59	4.78	16662
	Totals	**0.09**	**1**	**0.00**	**72**	**5.67**	**50097**

Results represent sites proposed for some form of herbicide treatment.

Table H-2. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed.

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Opal Creek	170703070101	0.00	0	0.10	1	0.20	2
Foley Creek	170703070102	0.00	0	0.06	2	0.33	6
Headwaters Trout Creek	170703070103	0.03	1	0.34	7	1.50	21
	Totals	0.03	1	0.50	10	2.03	29

Results represent sites proposed for some form of herbicide treatment.

Table H-3. All PAU sites for the Upper Trout Creek Watershed by 6th field and potential areas of concern

6th Field	PAU #	Streams	Infested Areas of Concern
Opal Creek	71-56	Auger Creek	Sites near Auger Creek – see description below.
Foley Creek	71-55	Big Log Creek and Dutchman Creek	Sites along roads – only two within 100 feet of the stream
	71-59	Big Log Creek and Dutchman Creek	None – all sites on ridge
Headwaters Trout Creek	71-55	Cartwright, Potlid, and Trout Creek	Sites are small and scattered with 0.34 acres within 100' of streams in 7 locaitons.

Two of these sites contain sulphur cinquefoil each is 0.1 acre in size and would be treated with picloram. Picloram is known to be toxic to fish. One sulphur cinquefoil site is located approximately 100 feet from Auger Creek and the other approximately 600 feet from Potlid Creek. The small size of the sites and buffer distances between them and the streams will prevent any adverse affects to fish in these streams. Both intermittent and perennial streams would have buffers depending on application method. The buffer distance between these fish populations and the invasive plant sites would allow

time for the herbicides to break down and bind to soils. Because of the small size of the sites and because they are spread throughout three subwatersheds even if a thunderstorm event occurred a few days after application the amounts of herbicide reaching the stream would not be at high enough levels to directly harm or effect fish living downstream. SERA Worksheets results found exposure levels to fish for all first choice herbicides proposed for use to be far below levels of concern. Some indirect effects could occur to algae and macrophytes but these are not expected. If they did occur they would be very localized and infrequent and not at large enough scale that would affect fish or habitat.

It is unlikely detectable amounts of herbicide would reach the stream. If they did levels would not be high enough to cause direct harm to fish. Some short term and very localized effects to algae and macrophytes may occur.

PE 2 = Sedimentation or turbidity cause by removal of invasive plants from hand pulling, herbicide application, or tarping.

Manual Methods (Sedimentation)

Pulling could occur at 1-2 times yearly over all the entire infested invasive plant populations. The effect of pulling scattered plants along roadsides and even within the riparian areas would leave small patches of bare soil until covered with organics from the forest or new vegetation sprouted which could take 1-3 years depending on location. Pulling could occur at anytime during the spring summer or fall in most project areas. In most cases pulling would occur well away from stream channels. Amounts of sediment produced from pulling would be very small and immeasurable against the other actions and natural processes that have occurred or are occurring in the watershed. Pulling invasive plants in these subwatersheds will have no affect on steelhead.

PE 3 = Off channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves.

Temperature - Manual (Hand Pulling), Mechanical (Weed Whacking), Cultural (Tarping) or Herbicide (Herbicide) Methods

This project element would not be affected in these subwatersheds as there are no sites that contribute to shade or overhead cover due to proximity to the streams/water bodies and due to the types of weeds in these subwatersheds.

Upper Deschutes Watershed

Upper and Lower Metolius River Watersheds (HUC – Upper Metolius 1707030109 and Lower Metolius 1707030110)

The Upper and Lower Metolius River watersheds contain bull trout and redband trout. The reintroduction of chinook and sockeye salmon is expected in the next five years. At ribbon/reed canary grass sites activities could affect temperature, fine sediment, chemical input, cover and juvenile rearing areas. All other project areas could affect fine sediment and chemical input to these species.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity: Although the infested invasive plant polygons show 2,533 acres for the entire watershed (Table H-4) the professional estimate of actual acres of invasive plants on the ground is much less with only five sites estimated to have more than 10 acres of actual invasive plants, site 15-01 (13.8 acres),

site 15-05 (16.9 acres), site 15-12 (32.7 acres), site 15-14 (11.8 acres) and site 15-30 (33.9 acres). All of these larger sites except for the 15-01 site are in the Upper Lake Creek subwatershed or the Fly Creek Subwatershed. Mapped infested invasive plant sites total 74.6 acres in 32 locations within 100 feet of perennial waterbodies (Table H-5). Actual acres of invasive plants to be treated in these 74.6 acres is less than this because they are not all filled with invasive plants, exactly how much less is not known. Potential areas of concern from proposed treatments are listed by subwatershed in Table 25.

Sites in Upper Lake Creek subwatershed currently contain no TES listed fish but reintroduction of salmon and bull trout is likely to occur in Link Creek between Blue and Suttle Lakes. Mapped invasive plant sites are located higher in the watershed well upstream of Blue Lake.

No TE listed fish have been found or are historically documented in Fly Creek but redband trout are present. Anadromous fish migration to perennial sections of Fly Creek would be difficult because of a small 8-10 foot waterfall and the intermittent nature of the stream in the lower 4.4 miles (Dachtler 1998).

Table H-4. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed.

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC 6 Name	HUC6 Number	Acres within 100' of Int. Streams	Number of areas 100' from Int. Streams	Acres on Int. Stream Channels	Number of Infested Invasive plant Sites	Total Invasive plant Acres in HUC6 (intermittent and perennial streams)	Total Sub-watershed Acres
Dry Creek	170703010901	1.44	1	0.05	4	2.38	12497
Cache Creek	170703010902	0.98	1	0.03	12	126.58	11867
Upper Lake Creek	170703010903	12.79	4	0.31	53	270.52	11136
Lower Lake Creek	170703010904	10.52	3	0.32	30	244.18	10965
Headwaters Metolius River	170703010905	21.57	15	0.67	202	385.55	15501
First Creek	170703010906	5.94	4	0.17	30	122.14	13177
Jack Creek	170703010907	31.86	5	1.07	24	208.00	9207
Canyon Creek	170703010908	28.16	4	0.91	59	272.31	21068
Abbot Creek	170703010909	2.13	3	0.06	23	233.92	6391
Candle Creek	170703010910	0.00	0	0.00	10	61.97	10957
Middle Metolius River	170703011003	27.31	11	0.81	33	279.77	21208
Upper Fly	170703011004	1.62	2	0.00	2	10.35	16406

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC 6 Name	**HUC6 Number**	**Acres within 100' of Int. Streams**	**Number of areas 100' from Int. Streams**	**Acres on Int. Stream Channels**	**Number of Infested Invasive plant Sites**	**Total Invasive plant Acres in HUC6 (intermittent and perennial streams)**	**Total Sub-watershed Acres**
Creek							
Lower Fly Creek	170703011005	0.00	0	0.03	41	129.55	16227
Juniper Creek	170703011006	0.00	0	0.00	1	0.10	15088
Lower Metolius River	170703011007	12.85	7	0.40	31	185.91	24301
	Totals	157.16	60	4.84	555	2533.22	215997

Results represent sites proposed for some form of herbicide treatment.

Table H-5. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed

HUC 6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Dry Creek	170703010901	0.00	0	0.00	0	0	0
Cache Creek	170703010902	0.00	0	0.00	0	0	0
Upper Lake Creek	170703010903	0.66	7	7.56	18	34.48	24
Lower Lake Creek	170703010904	0.12	2	3.78	6	33.7	11
Headwaters Metolius River	170703010905	117.47	267	120.51	213	124.83	172
First Creek	170703010906	0.54	15	4.74	9	13.29	12
Jack Creek	170703010907	0.00	0	0.00	0	2.22	1
Canyon Creek	170703010908	1.54	8	14.92	18	51.41	28
Abbot Creek	170703010909	0.00	0	0.00	0	0.29	2
Candle Creek	170703010910	0.09	1	2.54	3	8.68	4
Middle Metolius River	170703011003	1.09	7	7.25	10	19.16	11
Upper Fly Creek	170703011004	0.00	0	0.00	0	0	0
Lower Fly Creek	170703011005	1.72	9	16.31	21	37.83	19

Juniper Creek	170703011006	0.00	0	0.00	0	0	0
Lower Metolius River	170703011007	0.32	10	2.80	10	5.53	9
	Totals	123.54	326	180.41	308	331.42	293

Results represent sites proposed for some form of herbicide treatment.

Table H-6. All PAU sites in the Upper and Lower Metolius Watershed by 6th field and potential areas of concern

6th Field	PAU	Streams	Infested Areas of Concern
Lower Metolius River	15-12	Spring Creek	Area near mouth of Spring Creek at Road 64 crossing
Lower Metolius River	15-14	Spring Creek	Stream crossings in upper drainage on 1150, 1180, 1190 road systems
Middle Metolius River	15-12	Street Creek	Area near mouth of Street Creek and along 64 Road adjacent to Metolius River, stream crossings on the 64 Road, 1158, and 1190 roads
Upper Metolius River	15-17	Metolius River	Areas adjacent to road 1499
Lower Fly Creek	15-12	Fly Creek	Areas adjacent to Fly Creek associated with road 1170-900 no access for T&E species
Lower Fly Creek	15-14	Six Creek Headwaters	Areas adjacent to Six Creek and stream crossings on the 11 and 1150 road Stream crossings or stream adjacent areas on roads 11, 11-800, 1160, 1150, 1140 – no access for T&E species
Upper Fly Creek	15-14	Fly Creek	none
Juniper Creek	75-38		none
Jefferson Creek	no sites		none
Candle Creek	15-02	Cabot Creek	None - ridge top sitesnone
Candle Creek	15-31	Candle Creek	Areas adjacent to Candle Creek along the 1292 road
Abbot Creek	15-01	Trib to Abbot Creek	Little Montana area and areas close to the 800 spur
Abbot Creek	15-02	Abbot Creek	at Creek crossings on 1280 road
Abbot Creek	15-21	Abbot Creek	Road 12 Dahl Ranch
Canyon Creek	15-01	Brush Creek	Little Montana on and adjacent to 800 spur
Canyon Creek	15-10	Bear Valley Creek, Canyon Creek	at Creek crossings 1230 Rd and spurs
Canyon Creek	15-13	Roaring Creek	Small sites along tributaries and mainstem
Canyon Creek	15-21	Canyon and Brush Creeks	at Creek crossings on the 1230 Rd, 090, 450, 455 spurs
Jack Creek	15-16	Jack Creek	No sites of concern
Jack Creek	15-10	Jack Creek	Small site near Head of Jack Creek on 118 spur
Jack Creek	15-21	Jack Creek	No sites of concern
Jack Creek	15-18	Jack Creek	No sites of concern
First Creek	15-16	First Creek	Spur 910
First Creek	15-18	First Creek	No sites of concern

6th Field	PAU	Streams	Infested Areas of Concern
First Creek	15-20	First Creek	180 spur
First Creek	15-21	First Creek	No sites of concern
First Creek	15-15	First Creek	1210 and 950 roads
Lower Lake Creek	15-05	Lake Creek	Highway 20 Crossing of Lake Creek
Lower Lake Creek	15-07	Lake Creek	No concern areas
Lower Lake Creek	15-09	Lake Creek	Suttle Lake shore areas
Lower Lake Creek	15-15	Lake Creek	No concerns - area around Round Lake and associated roads
Lower Lake Creek	15-18	Lake Creek	Road 1420 - Lake Creek crossing - located on private Land
Lower Lake Creek	15-20	Lake Creek	No sites of concern
Lower Lake Creek		Lake Creek	Road 12 Crossing of Lake Creek
Upper Lake Creek	15-05	Blue Lake/Highway 20	Intermittent tribs to Blue Lake
Upper Lake Creek	15-30	Meadow Lakes areas	none - closed basins
Cache Creek	15-05	Cache Creek	none - intermittent stream
Cache Creek	15-07	Cache Creek	none - intermittent stream
Cache Creek	15-19	Cache Creek	none - intermittent stream
Dry Creek	15-07	Dry Creek	none - intermittent stream
Dry Creek	15-25	Dry Creek	none - intermittent stream
Headwaters Metolius River	15-11	Black Butte Roads	none - no streams
Headwaters Metolius River	15-17	Metolius River	Areas adjacent to Metolius River 1499
Headwaters Metolius River	15-18	Metolius River	No sites of concern
Headwaters Metolius River	15-19	Metolius River	none - Road 14
Headwaters Metolius River	15-21	Metolius River	Lower Bridge Crossing
Headwaters Metolius River	15-32	Metolius River	All sites located in/adjacent to River

The highest concern area in the Upper and Lower Metolius River subwatersheds is site 15-32. The treatment of reed canarygrass/ribbongrass and yellow iris (site 15-32) with aquatic glyphosate or aquatic imazapyr along the Metolius River is one of the largest mapped sites (119.3 acres) with 117.5 acres mapped within 10 feet of the river. A survey conducted in 2006 (USFS 2006 data on file) found approximately 0.9 acres of actual reed canarygrass/ribbongrass and yellow iris plants (Table H-7). Most of the infestation occurs from Lake Creek down to the House of Metolius Private Land (2.7 river miles). Below this point there are a few small scattered patches.

Table H-7. Metolius River reed canary/ribbon grass infestations and other information collected during the 2006 survey

Reach	Number of Infestations	Total Area ft²	Total Acres	Length of River Bank ft	% of River Bank	% in Slow Water	% Emergent	% on Bank	% on Island or Wood
Lake Cr to House on the Metolius	216	39,950	0.917	3,563	7.586	15.7	42.0	6.9	51.1
Wizard Falls Hatchery to Candle Cr.	13	211	0.005	60	0.132	13.3	60.0	0.0	12.2

Probability and Magnitude

Application methods will include spot spraying for plants on the bank and hand application with a dripless wick for emergent plants along the waters edge and for plants on islands. These methods should keep most of the herbicide out of the water but it is possible some drift could enter the river or some drops could drip from the plants into the water. Glyphosate breaks down fairly rapidly but if a thunderstorm occurred after application residue could also wash into the water.

The Metolius is a large flowing waterbody and dilution should prevent any direct effects to fish in the mainstem and in areas with moderate velocities. Discharge measured below the Camp Sherman Bridge in September of 1999 was 358 cfs (Dachtler 2000). The only area where direct effects might occur would be in alcove and backwater rearing areas that juvenile TE fish often inhabit. These areas are located along the margins, are often shallow and have slow velocities that can be poorly mixed with the other water in the river. The fish habitat survey done by Dachtler (2000) on the upper Metolius River counted 26 alcove and backwater pool habitats in the section from Gorge Campground to Lake Creek. These totaled 13,244 ft² of habitat with depths ranging from 0.3 to 1.3 ft and an average volume of 560 ft³ (15.8 m³).

The following calculation was used to determine what the potential concentration of glyphosate would be in the water and how this could potentially affect bull trout or redband trout. If a patch of reed canarygrass/ribbongrass the same size as the average alcove was treated adjacent to the alcove and half of the applied glyphosate entered the alcove.

Application rate = lbs of active ingredient/acre

Aquatic toxicity level is in Mg/L

Calculations:

Step 1.
(lbs of active ingredient/acre) x (mg/lb) x acre = __Mg
Average aquatic glyphosate application rate = 2 lbs/acre
907,200 Mg /acre x 0.0129 acres = 11,703 Mg
Step 2.
Alcove: (m2 x m) / (1000 liter/ 1 m3) = __Liter
For an average alcove: If average alcove volume is 15.86 m3

15.86 m3 x (1000 liters/ m3) = 15,860 liters
Step 3.
Divide Mg by liters to get Mg/L 11,703 Mg/15,860 Liters = 0.74 Mg/L
Step 4.
Multiply by potential herbicide plant wash off fraction (SERA 2003),
for aquatic glyphosate = 0.5
0.74 Mg/L x 0.5 = 0.37 Mg/L
Step 5.
Compare 0.37 Mg/L to toxicity threshold used in this BA
Acute NOEC for Aquatic Glyphosate = 0.1 Mg/L (Tierney et al. 2006)

This analysis shows that the Acute NOEC for aquatic glyphosate is slightly exceeded. However, it is unlikely that half of the applied glyphosate would enter the alcove at one time because the dripless wick application method would apply glyphosate to the plants and much of it would not reach the ground or water. Spot spray would be limited to plants on the bank up to the waters edge and some overspray could occur but even under this application method not all of the glyphosate would enter the water. Glyphosate would also readily adhere to the plants, organic material and soils making this highly unlikely. Dibyendu et al. (1989) found no evidence of lateral movement or surface runoff of glyphosate on an 8◦ slope with clay soils. This analysis assumes that the alcoves would have no water flowing through them and although they are fairly slow moving there is some mixing that occurs with the main river. Water movement through the alcove would rapidly dilute the glyphosate making the duration very short that fish would be exposed to toxicity levels that would produce indirect effects. Michael (2004) reviewed several field studies and found that peak concentrations of herbicide runoff during storm events are short lived, generally lasted from a few minutes to half an hour. Michael (2004) also found spot applications directly to the soil surface resulted in observed concentrations in streams up 0.04Mg/L. This is well below the 0.1 Mg/L used for the acute NOEC for indirect effects (Tierney et al. 2006).

The GLEAMS Driver model was recently developed by SERA (2008) and made available for use during the course of this EIS. The GLEAMS Driver model takes into account many more site specific variables for a site than the SERA Worksheets does. Only rainfall, soils and herbicide application rate can be changed in the SERA Worksheets while the new GLEAMS Driver model allows for more refined site specific input on soils, precipitation, stream size, stream flow, vegetation, treatment area, hillslope and herbicide application rate. This model was run for a representative small alcove (6 ft wide) with a small amount of flowing water (0.5 cfs) along the Metolius River. Results from the GLEAMS Driver model showed a maximum peak concentration of 0.0003 mg/L of glyphosate that could enter the alcove. This is well below the 0.1 mg/L threshold for olfactory effects to salmonids (Tierny et al. 2006).

The following analysis similar to the previous one was calculated for aquatic imazapyr following the same assumptions:

Application rate = lbs of active ingredient/acre

Aquatic toxicity level is in Mg/L

Calculations:

Step 1.

(lbs of active ingredient/acre) x (mg/lb) x acre = __Mg
Average aquatic imazapyr application rate
= 0.45 lbs/acre = 204,117 Mg /acre x 0.0129 acres = 2,633 Mg
Step 2.
Alcove: (m2 x m) / (1000 liter/ 1 m3) = __Liter
For an average alcove: If average alcove volume is 15.86 m3
15.86 m3 x (1000 liters/ m3) = 15,860 liters
Step 3.
Divide Mg by liters to get Mg/L
2,633 Mg/15,860 Liters = 0.17 Mg/L
Step 4.
Multiply by potential herbicide plant wash off fraction (SERA 2004), for aquatic imazapyr = 0.9 0.17 Mg/L x 0.9 = 0.15 Mg/L
Step 5.
Compare 0.15 Mg/L to toxicity threshold used in the USFS Region 6 BA (USDA 2005b)
Acute NOEC for aquatic imazapyr = 0.5 Mg/L (USDA 2005b)

This analysis shows that the Acute NOEC for aquatic imazapyr is not exceeded and it is unlikely that a majority of the applied imazapyr would enter the alcove at one time because the dripless wick application method would apply imazapyr to the grass and much of it would not reach the ground or water. This also assumes that the alcoves would have no water flowing through them and although they are fairly slow moving there is some mixing that occurs with the main river.

Triclopyr a high risk herbicide would be used to treat Scotch broom at one site (15-31) in the Candle Creek subwatershed. This species would be treated with spot spray or cut stump application of triclopyr. Site 15-31 is mapped to be 100.4 acres but the professional estimate of actual invasive plant infestation on the ground is only 0.95 acres. The 0.95 acres is a mix of scotch broom and four other invasive plant species. Some of this mapped site is adjacent to Candle Creek but the actual small amount of scotch broom present, the selective application method, the use of the PDFs and large volume of water in Candle Creek for dilution if any triclopyr did reach the water would prevent any effects to bull trout. Summer low flow measurements from the most recent fish habitat survey was 72 cfs measured in August of 1995 (Houslet and Lovtang 1996).

Indirect effects to fish from aquatic plants or algae being affected by the use of sulfometuron, aquatic imazapyr or aquatic glyphosate could occur but is not expected because it is unlikely that large enough amounts of these herbicides will reach the stream and selective application methods and PDFs (see discussion starting on page 117 of Fisheries Report) that will minimize the risk for water contamination.

Direct effects to TES fish would include disturbance to individuals as a result of walking in or near the water during chemical application. In general, juvenile and adult fish will avoid the presence of human beings and will more than likely swim away from shadows overcast on waterbodies. The possibility of a fish being present in the immediate water column where spot spray or hand wick applications may be taking place up to the water's edge is high in the upper Metolius River. Fry and juveniles tend to avoid faster flows and rear along the shoreline or around large substrate/wood where flow is slower. Fry tend to avoid overcastting shadows as well but can return to their previous location after being disturbed.

Distribution: Sites are located throughout the watersheds (see table H-8) lists all the sites near stream. Most sites are located long distances from TES fish populations which allows for dilution and breakdown of herbicides. The use of PDFs, and the use of moderate and low risk herbicides would prevent any direct effects to fish.

PE 2 = Sedimentation or turbidity caused by removal of invasive plants, from hand pulling, herbicide application, or tarping.

Sedimentation – Manual (hand pulling) or Cultural Methods (tarping, soil enhancment)

Proximity and Probability: Hand pulling will mostly be in areas away from waterbodies but some individual plants may be pulled next to the stream or on islands. Along the Metolius River some of the emergent ribbon/reed canarygrass will be pulled. Tarping may be used in some locations to kill ribbon/reed canary and effects from this would be similar to pulling with less ground disturbance but larger single patches of soil would be devegetated. Replanting with native vegetation and soil enhancement such as mulching and amendments would be used on areas that were devegetated to help with water retention and in turn promote growth of native vegetation. Soil enhancement would have a beneficial effect on areas that had been treated by returning native vegetation to the site.

Pulling along the Metolius would occur within the project area (15-32) which recent surveys indicate there is approximately one acre of ribbon/reed canary grass, half an acre of which is emergent and suitable for pulling (USFS 2006 data on file). Most of this would occur from Lake Creek down to House of Metolius Private Land (2.7 river miles). Below this point there are fewer scattered populations.

The effect of pulling scattered plants in the uplands and even within the riparian areas would leave small patches of bare soil until covered with organics from the forest or new vegetation sprouted which could take 1-3 years depending on location. Pulling of ribbon/reed canary grass would target emergent plants that have root mats or clumps that are growing on the rivers substrate or on rocks or logs. Most of this sediment is already in the system and would get redistributed locally and to other locations just downstream in a small localized pulse. Some of the sediment would be fine silts that could travel for some distance in the water column before settling out.

Timing: Most sediment would settle and clear in 0-3 hours after pulling occurred at a given location. Pulling could occur at anytime from May 1 to October 31. Areas below bankfull adjacent to waters with TES listed fish such as the Metolius River pulling would happen during the ODFW in-water work period to avoid disturbance to spawners and redds.

Magnitude and Nature: Pulling plants in most project areas will not have a noticeable or measurable effect on fish except in the Metolius River where pulling of ribbon/reed canary grass could disturb both bull trout and redband trout juveniles. Adults of these species primarily use deeper main channel habitats and disturbance to them would not be likely. Disturbance could occur to juvenile fish while pulling plants in the shallows. Fine sediments disturbed from the substrate could affect the ability of fish to see predators and some sediment particles might irritate fish gills. Sediment effects would be localized around where individual clumps or plants were pulled. The youngest life stages of fish would be most vulnerable to the effects of pulling in the Metolius while larger fish would be less affected as they generally do not use the shallower margins.

Pulling invasive plants at all of the project areas will have little to no measurable effect on fish because they are often pulled away from the water and occur in scattered individual locations. The exception is project area 15-32 along the Metolius River where pulling could cause disturbance of

substrate sediments and to a lesser extent sediments at the waters edge. These actions could make fish relocate to other areas where they would be more vulnerable to predation. It may also cause some individual fish to stop eating for a short period of time, although fry sometimes will feed on aquatic insects floating in the water column from the disturbance. It is unlikely, but individual fish could get stepped on during the pulling by people standing in the water. Steelhead are not currently present but could stray into the system from recent reintroductions in adjacent watersheds. Turbidity and dissolved oxygen from these activities are not expected to reach levels that could noticeably effect fish survival or behavior.

PE 3 = Off channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves along the Metolius River.

Temperature - Manual (Hand Pulling), Mechanical (Weed Whacking), Cultural (Tarping) or Herbicide (Herbicide) Methods

Proximity and Magnitude: Most invasive plant species to be removed are not riparian dependent species and will occasionally be found only along the edge of water. At sites that contain ribbongrass, reed canarygrass and yellow iris removal of emergent plants may occur that are growing out of the shallows or along the edge of the water. Measurable changes in water temperature from invasive plant removal are not expected (see hydrology section of the EIS). Most invasive plants are small plants under 3 feet tall and do not contribute to overall shading in a forested riparian settings. Most shading comes from native trees and shrubs or from the aspect of adjacent slopes to a given waterbody.

The greatest potential effects from invasive plant removal would be at ribbon/reed canary grass sites. The Metolius River (treatment area 15-32) has the largest ribbon/reed canarygrass site that has only 0.9 acres of actual invasive plants of which approximately 0.5 acres is emergent vegetation that could be pulled easily (USFS 2006 data on file). However, the mapped polygon greatly overestimates the size of this infestation and shows 119 acres at this site.

Duration and Timing: At ribbon/reed canarygrass sites these methods would most likely only occur once per season of any individual plant. The amount of treatment each season will decrease as the infestation decreases from the subsequent treatments. The duration of invasive plant removal would most likely be short term and range from a one-time occurrence to once or twice a year for up to 3 years for the initial treatment. The rate at which native plants would provide shade for areas that plants were removed from through natural recolonization or from replanting of natives is estimated to take between 1 and 5 years. Pulling of invasive plants would occur during times to avoid bull trout spawning activities.

The removal of invasive plants is not expected to contribute to increased temperatures of streams of lakes that could contribute to increased mortality of any fish life stages. Species life histories and appropriately designed ODFW in-water work periods for pulling would avoid the times when more sensitive life stages may be present. Therefore the project will result in a neutral effect for temperature effects to fish and aquatics because most invasive plants are too small and individuals too scattered to provide large amounts of shading. Areas that contain ribbon/reed canarygrass may have some localized reduction of streamside shade but this is not expected to effect measurable changes in temperature requirements for bull trout or other fish for any waterbody this is being proposed near.

Herbicide application would result in a short term loss of cover on Site 15-32 in the Upper and Lower Metolius River watersheds until native plants and shrubs become reestablished. There is a very remote possibility aquatic glyphosate or aquatic imazapyr could enter an alcove and have sublethal effects on juvenile fish, although this is unlikely. The benefits of removing ribbongrass and replacing

it with native vegetation outweighs the possibility of affecting a few juvenile fish because native vegetation provides winter cover for the fish while ribbongrass dies back and does not provide cover during the winter. In addition, native vegetation will benefit aquatic invertebrates, providing a food source for the fish, and the Metolius River riparian ecosystem, by maintaining vegetative diversity on the islands and reducing the rate of channel narrowing.

Whychus (formerly Squaw) Creek Subwatersheds (HUC – Upper Whychus Creek 170703010802, Middle Whychus Creek 170703010808, Lower Whychus Creek 170703010809)

Bull trout inhabit the lower mile of Whychus Creek below Alder Springs and redband trout and are found up to near the wilderness boundary. Steelhead and Chinook historically used the creek and steelhead reintroductions started in the spring of 2007 and Chinook reintroductions are expected to start in the spring of 2009. Invasive plants in this area are located along road systems, the stream and surrounding uplands.

Invasive plants in the six project areas proposed for chemical treatment are spotted knapweed, diffuse knapweed, Canada thistle, and medusahead. Some large infestations occur of primarily medusahead and diffuse knapweed. Manual and herbicide methods will be used to treat these species. First choice chemicals for treating these species are clopyralid and sulfometuron. These chemicals are low to moderate risk to fish and aquatics. Chemical and sedimentation effects to fish bearing streams will only be addressed because these are the only two habitat indicators that could effect these fish populations.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity, probability, magnitude, and distribution will be discussed here. Refer to the general discussion starting on page 117 of the Fisheries Report for duration, nature, frequency, and timing of effects.

Proximity, Probability and Magnitude: Although the mapped invasive plant sites show 745 acres (Table H-8) for the three subwatersheds the professional estimate of actual acres of invasive plants on the ground is less than this. Most of the invasive plants acres and acres within 300 feet of perennial fish bearing streams are located in the lower Whychus Subwatershed (Table H-28). The largest site 75-56 has 647 acres of mapped invasive plants but the professional estimate of actual invasive plants on the ground is 143 acres consisting of mainly medusahead and diffuse knapweed. SERA risk assessments found exposure levels to fish for sulfometuron, and clopyralid to be far below levels of concern for forest service programs. This large site located in Lower Whychus Creek subwatershed has the potential for more sediment and herbicide delivery because of the sparse vegetation and steeper slopes that are associated with the canyon walls. Although flows above Alder Springs have been higher in recent years due to more water purchased from irrigators for instream flows they are still well below what would naturally be in the stream and can get below approximately 15 cfs in this section. There is a chance for increased indirect effects to fish because of potentially low summer flows that will have less of a dilution effect on herbicides should they reach water. To ensure there is no chance for detrimental indirect effects herbicide application will be restricted to no more than 10 acres of treated area per year where slopes exceed 10 % within the Whychus Creek canyon, in adjacent intermittent canyons and in areas within 300 feet of perennial streams. Potential areas of concern from proposed treatments are listed by subwatershed in Table H-10.

Table H-8. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	HUC6 Number	Acres within 100' of Int. Streams	Number of areas 100' from Int. Streams	Acres on Int. Stream Channels	Number of Infested Invasive plant Sites	Total Invasive plant Acres in HUC6 (intermittent and perennial streams)	Total Sub-watershed Acres
Upper Whychus Creek	170703010802	0.00	0	0.00	9	44.21	18291
Middle Whychus Creek	170703010808	0.00	0	0.00	1	47.50	14980
Lower Whychus Creek	170703010809	62.12	5	1.99	15	654.00	20237
	Totals	62.12	5.00	1.99	25.00	745.71	53508

Results represent sites proposed for some form of herbicide treatment.

Table H-9. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Upper Whychus Creek	170703010802	0.48	3	4.71	3	11.38	5
Middle Whychus Creek	170703010808	0.00	0	0.00	0	0	0
Lower Whychus Creek	170703010809	7.59	8	58.34	8	111.42	7
	Totals	8.07	11.00	63.05	11.00	122.80	12.00

Results represent sites proposed for some form of herbicide treatment.

There are 11.4 acres of mapped invasive plants within 300 ft of perennial water within the Upper Whychus Subwatershed (Site 15-03), but this area has more vegetation than on the CRNG because it is in a forested setting and the stream is much larger above the irrigation diversions. Average annual flow in Whychus Creek above the irrigation diversions is 105 cfs (USDA 1998). This site will be controlled by manual methods with no herbicide application.

Table H-10. All PAU sites In the Whychus Watershed by 6th field and potential areas of concern

6th Field	PAU #	Streams	Infested Areas of Concern
Upper Whychus Creek	15-03	Whychus Creek	Areas near Sisters along 16 Road and adjacent to Whychus Creek
Upper Whychus Creek	15-22	Pole Creek	None – site 0.5 miles from stream
Upper Whychus Creek	15-24	None	None
Middle Whychus Creek	None	None	None
Lower Whychus Creek	76-56	Whychus Creek	Alder Springs areas and those adjacent to Whychus Creek
Lower Indian Ford	15-04	Indian Ford Creek	At Pine Street Road crossing – no TE habitat or concerns
Lower Indian	15-05	Indian Ford Creek	At Highway 20 Road Crossing – no TE habitat or concerns
Lower Indian	15-11	None	15-11 road and roads around Black Butte.
Upper Indian Ford	15-27	Indian Ford Creek	Glaze Meadow - no TE habitat or concerns
Four Mile Butte	15-25	None	Little Butte – no streams or water
	15-05	none	Highway 242 – no water issues
Upper Trout Creek	15-22	Trout Creek	Trout Creek Swamp – No TE

The concern areas on Whychus Creek are sites 15-03 (manual control methods only) and 76-56 (see discussion above). All other sites are either located away from any streams or are located on streams that do not contribute flow to Whychus Creek in summer and fall when treatments would occur and do not contain TES listed species.

Distribution: Table H-10 lists all the existing sites near Whychus Creek. Most sites are located long distances from fish populations which allows for dilution and breakdown of herbicides. The use of PDFs and the use of moderate and low risk herbicides would prevent any direct effects to TES fish.

PE 2 = Sedimentation or turbidity cause by removal of invasive plants from hand pulling, herbicide application, or tarping.

The effect of pulling scattered plants in the uplands and even within the riparian areas would leave small patches of bare soil until covered with organics from the surrounding vegetation or new vegetation sprouted which could take 1-3 years depending on location. Pulling could occur from May 1 to October 31 in most project areas. Amounts of sediment produced from pulling would be very small and immeasurable against all of the other actions that have occurred in the watershed. Pulling invasive plants in these subwatersheds will have no affect on bull trout, redband trout or reintroduced steelhead or salmon.

PE 3 = Off channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves.

Temperature – Manual (hand pulling), Mechanical (weed whacking), Cultural (tarping) or Herbicide Methods.

This project element would not be affected in these subwatersheds as there are no sites that contribute to shade or overhead cover due to proximity to the streams/water bodies and due to the types of invasive plants in these subwatersheds.

Odell Subwatersheds (HUC - Odell Lake 170703010201, Odell Creek 170703010202, Moore Creek 170703010203, and Davis Lake 170703010204)

Bull trout and redband trout have been documented in Trapper Creek, Crystal Creek, Fire Creek, Odell Creek, Maklaks Creek and two unnamed tributaries to Odell Creek. Redband trout are also present in Ranger Creek. Trapper Creek is the primary spawning and rearing stream for Odell Lake bull trout. Invasive plant infestations in this area are located along Highway 58 and the railroad which run along the North and South shores of Odell Lake, respectively. In the Moore Creek subwatersheds invasive plant sites proposed for chemical treatment are mainly located in old timber sale units and are all more than 300 ft from Moore Creek. Moore Creek contains introduced brook trout in the upper end and goes intermittent before reaching Davis Lake. Invasive plant species in the three project areas proposed for chemical treatment are spotted knapweed, diffuse knapweed, Canada thistle, Dalmation toadflax, St Johnswort, butter and eggs, tansy ragwort, bull thistle and Scotch thistle. Manual and herbicide methods will be used to treat these species. First choice chemicals for treating these species are clopyralid, metsulfuron and picloram. These chemicals are low risk to fish except for picloram which is high risk. Chemical and sedimentation effects to fish bearing streams will only be addressed because these are the only two habitat indicators that could effect these fish populations.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity, probability, magnitude, and distribution will be discussed here.

Proximity, Probability and Magnitude: Herbicides would be applied to sites using broadcast, patch broadcast or hand spray application. This would be done once a season, generally in the spring or summer. Although the mapped invasive plants sites show 371 acres (Table H-11) for all the subwatersheds the professional estimate of actual acres of invasive plants on the ground is much less than this.

Table H-11. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed

		Intermittent Stream Info			Total for perennial and intermittent streams in each 6th field HUC		
HUC6 Name	HUC6 Number	Acres within 100' of Int. Streams	Number of areas 100' from Int. Streams	Acres on Int. Stream Channels	Number of Infested Invasive plant Sites	Total Invasive plant Acres in HUC6 (intermittent and perennial streams)	Total Sub-watershed Acres
Odell Lake	170703010201	0.00	0	0.00	49	219.90	23170
Odell Creek	170703010202	0.00	0	0.00	16	56.09	13830
Moore Creek	170703010203	0.00	0	0.00	6	13.59	14748
Davis Lake	170703010204	0.00	0	0.00	4	82.00	22505
	Totals	0.00	0.00	0.00	75.00	371.57	74254

Results represent sites proposed for some form of herbicide treatment.

Most of the invasive plant acres and acres within 300 feet of perennial fish bearing streams are located in the Odell Lake subwatershed (Table H-12). Sites 12-02 and 12-16 cross several streams that enter the lake and in several areas come within 300 feet of Odell Lake. Sites 12-02 and 12-16 where estimated to contain 31 and 11 acres of actual invasive plants but are mapped to be 128 and 125 acres, respectively. SERA risk assessments found exposure levels to fish for metsulfuron and clopyralid to be far below levels of concern for forest service programs so treatment of species with these herbicides should have no direct effects on redband or bull trout. Site 12-16 is located approximately 270 feet from Trapper Creek the primary spawning and rearing stream for bull trout and it does not cross any intermittent tributaries that feed into it. Calculations using the SERA Worksheets indicated that because of the high rainfall rates and porous soils there was a risk for direct effects to fish from the use of picloram at the highest application rate. There was also a risk of indirect effects to algae and macrophytes from using chlorsulfuron at typical or high application rates. To mitigate these risks chlorsulfuron will not be allowed for use and picloram will only be allowed for use up to the typical application rate. Potential areas of concern from proposed treatments are listed by subwatershed in Table H-13.

Table H-12. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Odell Lake	170703010201	0.95	14	10.67	27	68.87	34
Odell Creek	170703010202	0.30	5	2.77	7	7.15	9
Moore Creek	170703010203	0.00	0	0.00	0	0	0

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Davis Lake	170703010204	0.00	0	0.00	0	0	0
	Totals	1.25	19.00	13.44	34.00	76.02	43.00

Results represent sites proposed for some form of herbicide treatment.

Table H-13. All PAU sites in the Wickiup Watershed by 6th field and potential areas of concern

6th Field	PAU #	Streams	Infested Areas of Concern
Odell Lake	12-02	North Odell Lake Streams	ROW along Highway 58
Odell Lake	12-16	Trapper Creek and Crystal Creek	ROW along Railroad
Odell Creek	12-02	Odell Creek	ROW along Highway 58 at Odell Creek Crossing
Odell Creek	12-11	None	None
Moore Creek	12-01	None	None
Davis Lake	12-12	Davis Lake	None due to bio control of Canada thistle along north shoreline of Davis

Indirect effects to fish from reducing amounts of aquatic plants or algae by the use of sulfometuron or metsulfuron could occur but the amount would be localized and short term as it is unlikely that large enough amounts of these herbicides will reach the stream because of selective application methods and PDFs that will minimize the risk for water contamination.

Distribution: Sites are located throughout the watersheds. Table H-13 lists all the sites near streams. Most sites are located long distances from TE fish populations which allows for dilution and breakdown of herbicides. The use of PDFs, and the use of moderate and low risk herbicides would prevent any direct effects to TES fish.

PE 2 = Sedimentation or turbidity cause by removal of invasive plants from hand pulling, herbicide application, or tarping.

The effect of pulling scattered plants in the uplands and even within the riparian areas would leave small patches of bare soil until covered with organics from the grasslands or new vegetation sprouted which could take 1-3 years depending on location. Pulling above bankfull would occur from May 1 to October 31. Amounts of sediment produced from pulling would be very small and immeasurable against natural processes or all of the other actions that have occurred or are occurring in the subwatersheds. Pulling of invasive plants in these subwatersheds will have no effect on bull trout or redband trout.

Timing: Most sediment would settle and clear in 0-3 hours after pulling occurred at a given location. Pulling could occur at any time from May 1 to October 31. Areas below bankfull adjacent to waters with TES listed fish bearing waters would happen during the ODFW in-water work period to avoid disturbance to spawners and redds.

PE 3 = Off channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves.

Temperature - Manual (Hand Pulling), Mechanical (Weed Whacking), Cultural (Tarping) or Herbicide (Herbicide) Methods

This project element would not be affected in these subwatersheds as there are no sites that contribute to shade or overhead cover due to proximity to the streams/water bodies and due to the types of invasive plants in these subwatersheds.

McKay Creek and Allen Creek Subwatersheds (HUC –170703050501 and 170703050502)

Mckay Creek currently contains redband trout and juvenile MCR steelhead. Juvenile MCR steelhead were reintroduced into McKay Creek in May 2008, so effects to MCR steelhead will be analyzed.

Invasive plant species in the five project areas proposed for chemical treatment are spotted knapweed, diffuse knapweed, whitetop, field bindweed, houndstongue, St. Johnswort, sulphur cinquefoil, blessed milkthistle, medusahead and scotch broom. Manual and herbicide methods will be used to treat these species. First choice chemicals for treating these species are clopyralid, chlorsulfuron, metsulfuron, sulfometuron, triclopyr, and picloram. These chemicals are low to moderate risk to fish and aquatics except for picloram and triclopyr which are high risk. Chemical and sedimentation effects to fish bearing streams will only be addressed because these are the only two habitat indicators that could effect this population.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity, probability, magnitude, and distribution will be discussed here.

Proximity, Probability and Magnitude: Invasive plant infestations in this area are all are primarily along road systems that run up the valley bottoms of Mckay Creek, Little Mckay Creek and Allan Creek. There are 17.9 acres of infested invasive plant sites with 13 of these acres within 300 feet of fish bearing streams (Tables H-14 & H-15). These sites are scattered in 221 small infestations that range in size from 0.002 acres to 0.19 acres. Herbicides would be applied to sites using broadcast, patch broadcast or hand spray application. This would be done once a season from May 1 to October 31. Potential areas of concern from proposed treatments are listed by subwatershed in Table H-16.

Table H-14. Acres and number of locations of infested invasive plant sites that occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	HUC6 Number	Acres within 100' of Int. Streams	Number of areas 100' from Int. Streams	Acres on Int. Stream Channels	Number of Infested Invasive plant Sites	Total Invasive plant Acres in HUC6 (intermittent and perennial streams)	Total Sub-watershed Acres
Upper McKay	170703050501	0.43	8	0.02	216	17.43	20472

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	**HUC6 Number**	**Acres within 100' of Int. Streams**	**Number of areas 100' from Int. Streams**	**Acres on Int. Stream Channels**	**Number of Infested Invasive plant Sites**	**Total Invasive plant Acres in HUC6 (intermittent and perennial streams)**	**Total Sub-watershed Acres**
Creek							
Allen Creek	170703050502	0.00	0	0.00	5	0.48	18251
	Totals	0.43	8.00	0.02	221.00	17.91	38723

Table H-15. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Upper McKay Creek	170703050501	0.33	21	5.41	92	12.72	148
Allen Creek	170703050502	0.00	0	0.07	2	0.28	3
	Totals	0.33	21.00	5.48	94.00	13.00	151.00

Results represent sites proposed for herbicide treatment.

Table H-16. All PAU sites in the McKay Watershed by 6th field and potential areas of concern

6th Field	PAU #	Streams	Infested Areas of Concern	Fish Species
Upper McKay Creek	71-48	McKay, Little McKay, Tribs	Infestations of knapweeds, thistles, bindweed and others along roads and at some road crossings.	Steelhead, Redband Trout
Upper McKay Creek	71-59	Very upper, intermittent reaches of Little McKay	None - 1.0 intermittent miles upstream of potential steelhead habitat	Steelhead, Redband Trout
Allen Creek	71-58	Allen Creek and Fall Creek	Confluence of Allen and Fall Creeks – sites total are <0.3 acres – potential steelhead stream	Steelhead, Redband Trout

SERA risk assessments found exposure levels to fish for sulfometuron, metsulfuron, clopyralid and sulfometuron to be below levels of concern for forest service programs. Although sites are near fish bearing streams sites are small and scattered throughout the subwatersheds the majority of sites on USFS lands are in the Upper Mckay subwatershed. The scattered nature of these small infestations, the herbicides used and the PDFs to protect aquatic resources should prevent any direct effects to fish population.

Picloram and triclopyr can be toxic to fish. Triclopyr may be used to treat Scotch broom. Field bindweed and sulphur cinquefoil are the invasive plant species to be treated with picloram. They are

found at 13 sites with each site less than 0.1 acres. One site with Scotch broom is proposed to be treated with triclopyr. The site is 0.03 acres in size and plants will most likely be spot sprayed or cut and then painted with herbicide. This site is approximately 1,700 feet away from a perennial stream.

Indirect effects to fish from aquatic plants or algae being affected by the use of sulfometuron and chlorsulfuron could occur but should be localized and short term as it is unlikely that large enough amounts of these herbicides will reach the stream to effect the food chain for fish because of selective application methods and PDFs that will minimize the risk for water contamination.

The sites that are to be treated with high risk herbicides are small and scattered therefore effects should be negated with the use of PDFs and application methods. It is very unlikely that detectable amounts of picloram and triclopyr would reach a stream because of the small size of sites with these species and PDFs. There could be possible indirect effects to aquatic algae and macrophytes from herbicides but these are expected to be short term and localized.

PE 2 = Sedimentation or turbidity caused by removal of invasive plants from hand pulling, herbicide application, or tarping.

Manual Methods (Sedimentation)

In most project areas hand pulling will be used on small patches of invasive plants, where there are only a few scattered individuals distributed over a large area or in sensitive areas where the potential effects of hand pulling outweigh the potential effects of herbicide application. Hand pulling will mostly be in areas away from waterbodies but some individual plants may be pulled next to or in the bankfull channel.

Pulling invasive plants would leave small patches of bare soil until covered with organics or new populations. The effect of pulling scattered plants in the uplands and even within the vegetation sprouted which could take 1-3 years depending on location. Pulling could occur above bankfull from May 1 to October 31. Amounts of sediment produced from pulling would be very small and immeasurable against all of the other actions that have occurred in the watershed. Pulling invasive plants in these subwatersheds will have no affect on steelhead or redband trout.

PE 3 = Off channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves.

Temperature - Manual (Hand Pulling), Mechanical (Weed Whacking), Cultural (Tarping) or Herbicide (Herbicide) Methods

This project element would not be affected in these subwatersheds as there are no sites that contribute to shade or overhead cover due to proximity to the streams/water bodies and due to the types of invasive plants in these subwatersheds.

Lower John Day Subbasin

Bridge Creek Watershed

(6TH HUC - Headwaters Bridge Creek 170702040301, Upper Bridge Creek 170702040303, Upper Bridge Bear Creek 170702040304, West Branch Bridge Creek 170702040302)

Streams in this watershed contain steelhead and redband trout. Infested weed sites are located upstream of know steelhead use. Invasive plants proposed for chemical or manual treatments are spotted knapweed, yellow starthistle, sulphur cinquefoil, medusahead, St. Johnswort, field bindweed, houndstongue and lesser burdock. First choice chemicals for treating these species are clopyralid, sulfometuron, metsulfuron and picloram. Picloram should only be used on sulphur cinquefoil as that is the only effective chemical to really treat this species (Dave Langland, Oregon Dept. of Agriculture, personal communication). Picloram is a high risk chemical to fish while the other chemicals are low to moderate risk to fish and aquatics. Invasive plant sites are primarily located along roads with project areas crossing and running near streams. Chemical and sedimentation effects to fish in perennial streams will only be addressed because these are the only two habitat indicators that could affect fish with these invasive plant species and treatment methods.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity, Probability and Magnitude:

Herbicide Application (Herbicide Contamination)

There are 13 project areas that contain 94 infested invasive plant polygons that total 290 acres (Table H-17). Mapped infested invasive plant sites total 19 acres in 6 locations within 100 feet of perennial waterbodies (Table H-18). Actual acres of invasive plants to be treated in these 74.6 acres is less than this because they are not all filled with invasive plants, exactly how much less is not known. Potential areas of concern from proposed treatments are listed by subwatershed in Table H-19.

Table H-17. Acres and number of locations infested invasive plant sites occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	**HUC6 Number**	**Acres within 100' of Int. Streams**	**Number of areas 100' from Int. Streams**	**Acres on Int. Stream Channels**	**Number of Infested Invasive plant Sites**	**Total Invasive plant Acres in HUC6 (intermittent and perennial steams)**	**Total Sub-watershed Acres**
Headwaters Bridge Creek	170702040301	0.00	0	0.00	4	1.23	28608
West Branch Bridge Creek	170702040302	6.46	1	0.23	76	257.41	25399

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	**HUC6 Number**	**Acres within 100' of Int. Streams**	**Number of areas 100' from Int. Streams**	**Acres on Int. Stream Channels**	**Number of Infested Invasive plant Sites**	**Total Invasive plant Acres in HUC6 (intermittent and perennial steams)**	**Total Sub-watershed Acres**
Upper Bridge Creek	170702040303	0.43	1	0.01	3	26.84	25978
Upper Bridge Bear Creek	170702040304	0.10	3	0.00	35	2.33	16850
Middle Bridge Bear Creek	170702040305	0.00	0	0.00	21	1.71	21537
	Totals	6.99	5.00	0.24	139.00	289.52	118373

Results represent sites proposed for some form of herbicide treatment

Table H-18. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed. Results represent sites proposed for some form of herbicide treatment

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Headwaters Bridge Creek	170702040301	0.00	0	0.00	0	0.10	1
West Branch Bridge Creek	170702040302	1.71	6	18.37	9	58.86	20
Upper Bridge Creek	170702040303	0.00	0	0.00	0	0.00	0
Upper Bridge Bear Creek	170702040304	0.00	0	0.50	10	1.71	27
Middle Bridge Bear Creek	170702040305	0.00	0	0.00	0	0.16	2
	Totals	1.71	6.00	18.87	19.00	60.83	50.00

Results represent sites proposed for some form of herbicide treatment.

Table H-19. All PAU sites in the Bridge Creek Watershed by 6th field and potential areas of concern

6th Field	PAU #	Streams	Infested Areas of Concern
Headwaters Bridge Creek	71-10	Bridge Creek	None – located 1.0 miles above intermittent stream to steelhead habitat
Headwaters Bridge Creek	71-14	Bridge Creek	None – located 0.6 miles above intermittent stream to steelhead habitat
Headwaters Bridge Creek	71-23	Bridge Creek	None – located 1.0 miles above intermittent stream to steelhead habitat
West Branch	71-16	West Branch Bridge	None – nearest site is 1.3 miles above steelhead habitat

6th Field	PAU #	Streams	Infested Areas of Concern
Bridge Creek		Creek, Camp Creek	
West Branch Bridge Creek	71-32	West Branch Bridge Creek, Camp Creek	None – nearest site is 1.3 miles above steelhead habitat
West Branch Bridge Creek	71-33	West Branch Bridge Creek, Camp Creek	None – nearest site is 1.5 miles above steelhead habitat
Upper Bridge Creek	71-15	Bridge Creek	None – located 2.0 miles above intermittent stream to steelhead habitat
Upper Bridge Bear Creek	71-06	Bear Creek	None – located 2.5 miles above steelhead habitat
Upper Bridge Bear Creek	71-50	Bear Creek	None – located 1.0 miles above steelhead habitat
Upper Bridge Bear Creek	71-56	Bear Creek	None – located 3.0 miles above steelhead habitat
Middle Bridge Bear Creek	71-32	Dodds Creek	None – sites located at least 1.0 miles upstream of steelhead habitat

The largest site (71-16) at 243 acres was professionally estimated to have only 9.8 acres of actual invasive plants. It crosses two perennial streams with known steelhead use to occur approximately 1.3 miles downstream. It contains houndstongue which is typically treated with metsulfuron. The other two sites (71-10 and 71-32) over 10 acres were professionally estimated to have only 5.5 and 4.5 acres of actual invasive plants. Site 71-10 is approximately 650 ft to a nonfish bearing perennial stream. It has yellow starthistle and medusahead and will be treated with clopyralid and metsulfuron. Site 71-32 crosses a non ish bearing perennial stream that is located approximately 1.3 miles upstream of a known steelhead stream. It has houndstongue and will be treated with metsulfuron.

Thirteen sites contain sulphur cinquefoil and one site has field bindweed, each site is less than 0.1 acre in size and all total 1.3 acres. The 1st choice herbicide for these species is picloram, which is known to be toxic to fish. Some of these sites are located along upper Bear Creek and NF Bear Creek and the closest site to known steelhead usage is approximately 1.4 miles downstream.

The small size of the sites to be treated with picloram and long distance between them and steelhead streams will prevent any adverse effects to steelhead in these streams. Both intermittent and perennial streams would have buffers depending on herbicide and application method. The buffer distance between these fish populations and the invasive plant sites would allow time for the herbicides to break down and bind to soils. Because of the small size of the picloram sites and because they are spread throughout the subwatersheds even if a thunderstorm event occurred a few days after application the amounts of herbicide reaching the stream would likely not be at high enough levels to harm or effect fish living downstream. The SERA Worksheets found exposure levels to fish for picloram, clopyralid, sulfometuron, metsulfuron and clopyralid to be far below levels of concern in this watershed. These herbicides could cause some slight, localized indirect effects to aquatic algae and macrophytes but this is not expected to be at a large enough scale that it would cause changes in fish behavior or survival.

PE 2 = Sedimentation or turbidity caused by removal of invasive plants from hand pulling, herbicide application, or tarping.

Manual Methods (Sedimentation)

Hand pulling will mostly be in areas away from waterbodies but some individual plants may be pulled next to perennial streams or in intermittent channels. The effect of pulling scattered plants along roadsides and even within the riparian areas would leave small patches of bare soil until covered with organics from the forest or new vegetation sprouted which could take 1-3 years depending on location. Pulling above bankfull could occur at anytime from May 1 to October 31. Amounts of sediment produced from pulling would be very small and immeasurable against the other actions that have occurred in the watershed. Pulling invasive plants in these subwatersheds will have no affect on steelhead or redband trout.

PE 3 = Off channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves.

Temperature - Manual (Hand Pulling), Mechanical (Weed Whacking), Cultural (Tarping) or Herbicide (Herbicide) Methods

This project element would not be affected in these subwatersheds as there are no sites that contribute to shade or overhead cover due to proximity to the streams/water bodies and due to the types of weeds in these subwatersheds.

Upper John Day Watersheds

Mountain Creek, Rock Creek, Upper Middle John Day, and the Lower South Fork Watersheds (HUC - 1707020113, 1707020114, 1707020112, 1707020105)

Streams in this watershed contain steelhead and redband trout. Infested invasive plant sites are located upstream of known steelhead use. Invasive plant species identified for chemical or manual treatments are spotted knapweed, yellow starthistle, sulphur, medusahead, St. Johns wart, field bindweed, houndstongue, Himalayan blackberry and lesser burdock. First choice chemicals for treating these species are clopyralid, sulfometuron, metsulfuron, triclopyr and picloram. Picloram should only be used on sulphur cinquefoil as that is the only effective chemical to really treat this species (Dave Langland, Oregon Dept. of Agriculture, personal communication). Picloram is high risk to fish while the other chemicals are low to moderate risk to fish and aquatics. Weed infestations are primarily located along roads with project areas crossing and running near streams. Chemical and sedimentation effects to fish in perennial streams will only be addressed because these are the only two habitat indicators that could affect fish with these invasive plant species and treatment methods.

Project Element (PE) 1 = Chemical contamination indicator from herbicide application using hand select, spot spray or broadcast spray methods.

Proximity, probability, magnitude, and distribution will be discussed here. Refer to the general discussion starting on page 117 of the Fisheries Report for duration, nature, frequency, and timing of effects.

Proximity, Probability and Magnitude:

There are 13 project areas that contain 79 infested invasive plant polygons that total 22.3 acres (Table H-20). Mapped infested invasive plant sites total 12.2 acres in 23 locations within 100 feet of perennial waterbodies (Table H-21). Actual acres of invasive plants to be treated in these is less than

this because they are not all filled with invasive plants, exactly how much less is not known. The largest site (71-16) at 243 acres was estimated to have only 9.8 acres of actual invasive plants. Potential areas of concern from proposed treatments are listed by subwatershed in Table H-22.

There are 5 sites at the mouth of Black Canyon Creek, adjacent to the trailhead, which are within 10 feet of Black Canyon Creek and South Fork of the John Day River (72-53). In addition there is one site (72-06) located directly adjacent to a steelhead stream which is Mac Creek. This knapweed infestation is approximately 0.1 acres in size and is proposed to be treated with clopyralid. The next closest sites (72-10) to steelhead streams are located approximately 80 to 90 feet from NF Wind Creek and these are both approximately 0.1 acres in size. Proposed herbicides to treat invasive plants at these sites are chlorsulfuron and clopyralid. A 0.75 acre site (78-42) containing Himalayan blackberry is located approximately 150 ft from Cottonwood Creek and is proposed to be treated with aquatic approved triclopyr at the typical application rate. The next closest sites to steelhead streams are two sites estimated to each be 0.1 acres in size that are located approximately 600 to 700 feet from Badger Creek and SF Wind Creek. These are proposed to be treated with sulfometuron and chlorsulfuron. All other sites in the Upper John Day Watershed are located over 1,000 ft away from occupied steelhead streams.

Both intermittent and perennial streams would have buffers depending on herbicide and application method. The buffer distance between these fish populations and the invasive plant sites would allow time for the herbicides to break down and bind to soils. Because of the small size of most sites and because they are spread throughout the subwatersheds even if a thunderstorm event occurred a few days after application the amounts of herbicide reaching the stream would not be at high enough levels to harm or effect fish living downstream. The SERA Worksheets indicated exposure levels to fish for triclopyr, chlorsulfuron, sulfometuron, metsulfuron and clopyralid to be far below levels of concern in this watershed. It is unlikely high enough amounts of herbicide would reach the stream to harm fish or change their behavior.

Table H-20. Acres and number of locations infested invasive plant sites occur within specified buffers for intermittent (Int.) streams by subwatershed and total acres and number of infested invasive plant sites by subwatershed

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	HUC6 Number	Acres within 100' of Int. Streams	Number of areas 100' from Int. Streams	Acres on Int. Stream Channels	Number of Infested Invasive plant Sites	Total Invasive plant Acres in HUC6	Total Sub-watershed Acres
Wind Creek	170702010501	0.00	0	0.00	6	0.49	17589
Corner Creek Black Pine Creek	170702010502	0.10	1	0.00	15	9.31	18746
Black Canyon Creek	170702010503	0.00	0	0.00	13	2.69	20826
Jackass Creek	170702010504	0.00	0	0.00	3	2.30	17621
Cottonwood Creek	170702011202	0.00	0	0.00	7	1.46	19363
Upper Middle Mountain Creek	170702011301	0.00	0	0.00	8	1.05	26402

		Intermittent Stream Info			Total for perennial and intermittent streams in each HUC 6		
HUC6 Name	**HUC6 Number**	**Acres within 100' of Int. Streams**	**Number of areas 100' from Int. Streams**	**Acres on Int. Stream Channels**	**Number of Infested Invasive plant Sites**	**Total Invasive plant Acres in HUC6**	**Total Sub-watershed Acres**
Middle Mountain Creek	170702011302	0.00	0	0.00	7	1.99	34850
Upper Rock Creek	170702011401	0.12	2	0.00	20	2.98	31271
	Totals	0.22	3	0.00	79	22.27	186,668

Results represent sites proposed for some form of herbicide treatment.

Table H-21. Acres and number of locations infested invasive plant sites occur within specified buffers for perennial streams, rivers, lakes, and springs by subwatershed

HUC6 Name	HUC6 Number	Acres within 10' of perennial water	Number of areas 10' from perennial water	Acres within 100' of perennial water	Number of areas 100' from perennial water	Acres within 300' of perennial water	Number of areas 300' from perennial water
Wind Creek	170702010501	0.00	0	0.01	1	0.20	2
Corner Creek Black Pine Creek	170702010502	2.80	9	9.00	11	9.21	14
Black Canyon Creek	170702010503	0.00	0	0.00	0	0.00	0
Jackass Creek	170702010504	1.21	10	2.51	7	2.69	3
Cottonwood Creek	170702011202	0.03	1	0.47	1	0.75	1
Upper Middle Mountain Creek	170702011301	0.00	0	0.00	0	0.00	0
Middle Mountain Creek	170702011302	0.01	1	0.10	1	0.85	2
Upper Rock Creek	170702011401	0.00	0	0.10	2	0.30	4
	Totals	4.05	21	12.19	23	14.00	26

Results represent sites proposed for some form of herbicide treatment.

Table H-22. All PAU sites by 5th field, 6th field and potential areas of concern

5th Field	6th Field	PAU #	Streams	Infested Areas of Concern
Lower South Fork John Day	Wind Creek	72-10	North Fork Wind Creek	Two sites located 80-90 feet from the stream and 0.1 acres each
Lower South Fork John Day	Wind Creek	72-01	Trib to South Fork Wind	None – 2 miles above steelhead habitat
Lower South	Wind Creek	72-09	Trib to North	None – 3 miles above steelhead habitat

5th Field	6th Field	PAU #	Streams	Infested Areas of Concern
Fork John Day			Fork Wind	
Lower South Fork John Day	Corner Creek Black Pine Creek	72-10	Intermittent tribs to South Fork John Day	None – all sites 2+ miles above steelhead habitat on intermittent tribs.
Lower South Fork John Day	Black Canyon Creek	None	None	None
Lower South Fork John Day	Jackass Creek	72-53	Jackass Creek	Five invasive plant sites of concern located within 10 feet of streams
Upper Middle John Day	Cottonwood Creek	72-48	Cottonwood Creek	Site is located 150 feet from Cottonwood Creek – Himalayan Blackberry
Upper Middle John Day	Cottonwood Creek	72-07	Trib to Cottonwood Creek	None – sites are located along road 38 and spurs and are a minimum of 1.0 miles from steelhead habitat
Mountain Creek	Upper Middle Mountain Creek	71-42	Indian Creek	None – Sites are 1.5 miles above steelhead habitat
Mountain Creek	Upper Middle Mountain Creek	71-67	Badger Creek	4 Medusahead sites all <0.1 acres – closest site is 0.25 miles from Badger Creek
Mountain Creek	Middle Mountain Creek	72-06	Mac Creek	Site is located directly adjacent to Mac Creek - 0.1 acres of knapweed
Mountain Creek	Middle Mountain Creek	72-36	Trib to Mac Creek	None - Two sites in Barnhouse Campground treatment area. Canada thistle -
Mountain Creek	Middle Mountain Creek	72-61	Keeton Creek	None – Located 1.0 mile above steelhead habitat.
Rock Creek	Upper Rock Creek	72-07	Rock Creek	Sites located along 38 and 3820 road. No sites closer than 700 feet from Rock Creek
Rock Creek	Upper Rock Creek	72-49	Rock Creek	None – sites are located 0.5 miles from Rock Creek

PE 2 = Sedimentation or turbidity caused by removal of invasive plants from hand pulling, herbicide application, or tarping.

Manual Methods (Sedimentation)

In most project areas hand pulling will be used on small patches of invasive plants, where there are only a few scattered individuals distributed over a large area or in sensitive areas where the potential effects of hand pulling outweigh the potential effects of herbicide application. Hand pulling will mostly be in areas away from waterbodies but some individual plants may be pulled next to perennial streams or in intermittent channels.

The effect of pulling scattered plants along roadsides and even within the riparian areas would leave small patches of bare soil until covered with organics from the forest or new vegetation sprouted which could take 1-3 years depending on location. Pulling above bankfull could occur anytime from May 1 to October 31. Amounts of sediment produced from pulling would be very small and immeasurable against the other actions that have occurred in the watershed. Pulling invasive plants in these subwatersheds will have no effect on steelhead or redband trout.

PE 3 = Off-channel habitat in the form of instream and overhead cover along stream margins, backwaters, side channels and alcoves.

Temperature - Manual (Hand Pulling), Mechanical (Weed Whacking), Cultural (Tarping) or Herbicide (Herbicide) Methods

This project element would not be affected in these subwatersheds as there are no sites that contribute to shade or overhead cover due to proximity to the streams/water bodies and due to the types of invasive plants in these subwatersheds.

Table H-23. Road miles in RR/RHCA and in invasive plant treatment area by subwatershed

Watershed Name	Subwatershed Unit Name	Miles Of Road
Middle South Fork John Day	Pine Creek	0.3
Middle South Fork John Day	Sunflower Creek	7.6
Lower South Fork John Day	Wind Creek	3.7
Lower South Fork John Day	Corner Creek/Black Pine Creek	0.2
Lower South Fork John Day	Black Canyon Creek	0.6
Mountain Creek	Middle Mountain Creek	1.2
Rock Creek	Upper Rock Creek	3.3
Bridge Creek	Headwaters Bridge Creek	1.4
Bridge Creek	West Branch Bridge Creek	7.1
Bridge Creek	Upper Bridge Creek	0.5
Bridge Creek	Upper Bridge Bear Creek	14.8
Bridge Creek	Middle Bridge Bear Creek	0.0
Crane Prairie	Soda Creek	1.9
Crane Prairie	Quinn Creek	0.8
Crane Prairie	Elk Lake	1.6
Crane Prairie	Lava Lakes	3.5
Crane Prairie	Cultus Creek	0.5
Crane Prairie	Deer Creek	0.5
Crane Prairie	Cultus River	0.7
Crane Prairie	Charlton Creek	0.5
Crane Prairie	Crane Prairie	0.3
Wickiup	Odell Lake	5.0
Wickiup	Odell Creek	1.7
Wickiup	Davis Lake	1.4
Wickiup	Browns Creek	0.6
Wickiup	Davis Creek	0.2
Wickiup	Wickiup	0.5
Fall River	Dutchman Creek	2.1
Fall River	Spring River	0.4
Fall River	Fall River	0.7
Fall River	Pringle Falls	1.5
Fall River	Bates Butte	0.5

Watershed Name	Subwatershed Unit Name	Miles Of Road
Pilot Butte	Coyote Spring	4.2
Pilot Butte	Benham Falls	2.1
Pilot Butte	Bessie Butte	0.1
Pilot Butte	Lava Island Falls	1.5
Tumalo Creek	Upper Tumalo Creek	3.1
Tumalo Creek	Lower Tumalo Creek	1.8
Deep Canyon	Three Creek	1.3
Deep Canyon	Triangle Hill	0.2
Squaw Creek	Upper Squaw Creek	2.1
Squaw Creek	Upper Trout Creek	1.9
Squaw Creek	Upper Indian Ford	0.3
Squaw Creek	Lower Trout Creek	0.3
Squaw Creek	Lower Indian Ford	0.5
Squaw Creek	Lower Squaw Creek	1.5
Upper Metolius River	Dry Creek	0.7
Upper Metolius River	Cache Creek	0.5
Upper Metolius River	Upper Lake Creek	11.6
Upper Metolius River	Lower Lake Creek	3.3
Upper Metolius River	Headwaters Metolius River	3.9
Upper Metolius River	First Creek	11.6
Upper Metolius River	Jack Creek	4.0
Upper Metolius River	Canyon Creek	6.9
Upper Metolius River	Abbot Creek	2.8
Upper Metolius River	Candle Creek	0.6
Lower Metolius River	Upper Metolius River	6.2
Lower Metolius River	Middle Metolius River	5.9
Lower Metolius River	Upper Fly Creek	0.6
Lower Metolius River	Lower Fly Creek	3.0
Lower Metolius River	Lower Metolius River	4.7
Lake Billy Chinook	Stevens Canyon	0.0
Lake Billy Chinook	Carcass Canyon	0.4
Lake Billy Chinook	Geneva	0.1
Upper Little Deschutes River	Little Odell Creek	0.1
Upper Little Deschutes River	Bunny Butte	1.1
Upper Little Deschutes River	Gilchrist Junction	0.2
Crescent Creek	Lower Big Marsh Creek	0.1
Crescent Creek	Crescent Lake	3.3
Crescent Creek	Cold Creek	2.5
Crescent Creek	Middle Crescent Creek	1.5
Little Walker Mountain	North Paunina	0.3
Long Prairie	Beal	0.1

Watershed Name	Subwatershed Unit Name	Miles Of Road
Lower Little Deschutes River	Upper Paulina Creek	0.4
Lower Little Deschutes River	Lower Paulina Creek	0.2
South Fork Beaver Creek	Lower South Fork Beaver Creek	0.0
Upper Beaver Creek	Beaverdam Creek	1.5
Upper Beaver Creek	Powell Creek	2.4
Upper Beaver Creek	Sugar Creek	0.5
Paulina Creek	Upper Paulina Creek	8.9
Paulina Creek	Dry Paulina Creek	5.7
Lower Beaver Creek	North Wolf Creek	0.9
Lower Beaver Creek	Wolf Creek	13.1
Crooked River Above North Fork	Maury Creek	1.7
Camp Creek	Indian Creek	2.1
Camp Creek	Lower Camp Creek	0.1
Upper North Fork Crooked River	Gray Creek	0.0
Upper North Fork Crooked River	Elliott Creek	1.7
Upper North Fork Crooked River	Howard Creek	6.6
Upper North Fork Crooked River	Johnson Creek	2.9
Upper North Fork Crooked River	Headwaters North Fork Crooked River	0.1
Upper North Fork Crooked River	Peterson Creek	0.1
Upper North Fork Crooked River	Porter Creek	0.2
Upper North Fork Crooked River	Lower Big Summit Prairie	4.1
Deep Creek	Jackson Creek	8.9
Deep Creek	Little Summitt Prairie Creek	9.9
Deep Creek	Lower Deep Creek	11.8
Lower North Fork Crooked River	Upper North Fork Canyon	4.7
Upper Crooked River	Lost Creek	1.6
Upper Crooked River	Drake Creek	2.1
Upper Crooked River	Pine Creek	2.9
Upper Crooked River	Newsome Creek	9.0
Upper Crooked River	Upper Horse Heaven Creek	0.4
Bear Creek	Headwaters Bear Creek	9.0
Bear Creek	Upper Bear Creek	0.1
Bear Creek	Little Bear Creek	1.1
Upper Ochoco Creek	Headwaters Ochoco Creek	14.0
Upper Ochoco Creek	Upper Marks Creek	13.1
Upper Ochoco Creek	Lower Marks Creek	15.4
Upper Ochoco Creek	Duncan Creek	6.2
Mill Creek	Upper Mill Creek	5.1
Mill Creek	Lower Mill Creek	5.7
Lower Ochoco Creek	Veasie Creek	0.1
Mckay Creek	Upper Mckay Creek	14.8

Watershed Name	Subwatershed Unit Name	Miles Of Road
Mckay Creek	Allen Creek	0.7
Badlands	Kotzman	0.1
Crooked River Valley	Lone Pine Creek	2.5
Crooked River Valley	Mcallister Slough	0.4
Crooked River Grassland	Upper Crooked River Gorge	0.2
Crooked River Grassland	Lower Crooked River Gorge	0.2
Headwaters Deschutes River	Lake Simtustus	0.0
Willow Creek	Upper Willow Creek	0.1
Willow Creek	Rimrock Spring	2.1
Willow Creek	Middle Willow Creek	2.2
Willow Creek	Dry Canyon	2.5
Willow Creek	Lower Willow Creek	0.2
Upper Trout Creek	Opal Creek	2.5
Upper Trout Creek	Foley Creek	3.4
Upper Trout Creek	Headwaters Trout Creek	7.2
Mud Springs Creek	Upper Mud Springs Creek	3.5
Mud Springs Creek	Sagebrush Creek	0.6
	Total	380.2

Table H-24. Number of stream crossings by roads within infested invasive plant treatment sites on class 1, 2 and 3 TES fish steam

HUC	Crossing Without TES	Crossing With TES	Total Crossings
170702010304 - Sunflower Creek	3	12	15
170702010501 - Wind Creek		5	5
170702010503 - Black Canyon Creek	2	1	3
170702011302 - Middle Mountain Creek	2	1	3
170702011401 - Upper Rock Creek		4	4
170702040301 - Headwaters Bridge Creek	3	1	4
170702040302 - West Branch Bridge Creek	13		13
170702040304 - Upper Bridge Bear Creek	18	6	24
170703010101 - Soda Creek	6		6
170703010102 - Quinn Creek	4		4
170703010103 - Elk Lake	2		2
170703010104 - Lava Lakes		5	5
170703010105 - Cultus Creek		2	2
170703010106 - Deer Creek		2	2
170703010107 - Cultus River		1	1
170703010108 - Charlton Creek	1		1
170703010201 - Odell Lake	15	2	17
170703010202 - Odell Creek	1	1	2
170703010205 - Browns Creek	1		1

HUC	Crossing Without TES	Crossing With TES	Total Crossings
170703010207 - Wickiup		1	1
170703010306 - Bates Butte		1	1
170703010402 - Coyote Spring	1		1
170703010501 - Upper Tumalo Creek		5	5
170703010802 - Upper Squaw Creek	2		2
170703010803 - Upper Trout Creek	1	1	2
170703010807 - Lower Indian Ford		2	2
170703010809 - Lower Squaw Creek		2	2
170703010903 - Upper Lake Creek	6		6
170703010904 - Lower Lake Creek		2	2
170703010905 - Headwaters Metolius River	2	4	6
170703010906 - First Creek		1	1
170703010907 - Jack Creek		2	2
170703010908 - Canyon Creek	7	3	10
170703010909 - Abbot Creek		2	2
170703011003 - Middle Metolius River	1	2	3
170703011005 - Lower Fly Creek	1	1	2
170703020105 - Gilchrist Junction	1		1
170703020204 - Crescent Lake		1	1
170703020205 - Cold Creek	3	4	7
170703020206 - Middle Crescent Creek		2	2
170703020703 - Lower Paulina Creek	1		1
170703030801 - Beaverdam Creek		1	1
170703030802 - Powell Creek	1	6	7
170703030803 - Sugar Creek	1	1	2
170703030901 - Upper Paulina Creek	24	3	27
170703030902 - Dry Paulina Creek	3	6	9
170703031001 - North Wolf Creek	1	2	3
170703031002 - Wolf Creek		11	11
170703040103 - Maury Creek		3	3
170703040201 - Indian Creek	6	1	7
170703040302 - Elliott Creek	2	3	5
170703040303 - Howard Creek	5	8	13
170703040304 - Johnson Creek		11	11
170703040308 - Lower Big Summit Prairie	1	2	3
170703040401 - Jackson Creek	1	5	6
170703040402 - Little Summitt Prairie Creek	1	5	6
170703040403 - Lower Deep Creek	5	10	15
170703040501 - Upper North Fork Canyon		4	4
170703040601 - Lost Creek		1	1
170703040602 - Drake Creek	5	2	7

HUC	Crossing Without TES	Crossing With TES	Total Crossings
170703040603 - Pine Creek	3	1	4
170703040604 - Newsome Creek	2	7	9
170703040605 - Upper Horse Heaven Creek	2	1	3
170703040701 - Headwaters Bear Creek	8	7	15
170703050201 - Headwaters Ochoco Creek	8	25	33
170703050203 - Upper Marks Creek	13	18	31
170703050204 - Lower Marks Creek	17	20	37
170703050205 - Duncan Creek	7	13	20
170703050301 - Upper Mill Creek	3	7	10
170703050302 - Lower Mill Creek	2	3	5
170703050501 - Upper Mckay Creek	5	15	20
170703050502 - Allen Creek		1	1
170703051004 - Lone Pine Creek	1		1
170703051005 - Mcallister Slough	2		2
170703060201 - Upper Willow Creek		1	1
170703060202 - Rimrock Spring	2		2
170703060203 - Middle Willow Creek	7		7
170703060204 - Dry Canyon	3		3
170703070101 - Opal Creek	4	2	6
170703070102 - Foley Creek	3	3	6
170703070103 - Headwaters Trout Creek	10	8	18
Totals	255	296	551

Table H-25. Subwatersheds with infested weed sites 300 feet or greater distance from Class 1, 2, or 3 streams and perennial lakes and ponds and reservoirs

Watershed Name	Subwatershed Name	Huc6
Long Prairie	Beal	170703020605
Upper Beaver Creek	Beaverdam Creek	170703030801
Pilot Butte	Bessie Butte	170703010406
Pine	Big Hole	171200050601
Wickiup	Browns Creek	170703010205
Upper Little Deschutes River	Bunny Butte	170703020104
Mc Carty	Butte Well	171200050504
Lake Billy Chinook	Carcass Canyon	170703011102
Devils Garden	China Hat	171200050701
Upper Crooked River	Conant Creek	170703040608
Little Walker Mountain	Corral Springs	170703020501
Wickiup	Davis Lake	170703010204
Deep Canyon	Deep Canyon	170703010604
Devils Garden	Dome	171200050702
Upper Metolius River	Dry Creek	170703010901

Mc Carty	Dry Creek	171200050503
Fall River	Dutchman Creek	170703010301
Crane Prairie	Elk Lake	170703010103
Upper North Fork Crooked River	Elliott Creek	170703040302
Squaw Creek	Fourmile Butte	170703010804
Lake Billy Chinook	Geneva	170703011103
Upper Little Deschutes River	Gilchrist	170703020106
Long Prairie	Green Butte	170703020602
Pilot Butte	Green Mountain	170703010405
Squaw Creek	Headwaters Squaw Creek	170703010801
Upper Little Deschutes River	Hemlock Creek	170703020102
Upper Dry River	Horse Ridge	170703050709
Lower Dry River	Hunter	170703050803
Long Prairie	Ipsoot Butte	170703020604
Lower Metolius River	Juniper Creek	170703011006
Lower Little Deschutes River	Kawak Butte West	170703020705
Badlands	Kotzman	170703050604
Headwaters Deschutes River	Lake Simtustus	170703060103
Lower Little Deschutes River	Lapine	170703020704
Bear Creek	Little Bear Creek	170703040705
Upper Little Deschutes River	Little Odell Creek	170703020103
Little Walker Mountain	Little Walker Mountain	170703020504
Camp Creek	Lower Camp Creek	170703040205
Crooked River Grassland	Lower Crooked River Gorge	170703051102
Long Prairie	Lower Long Prairie	170703020609
South Fork Beaver Creek	Lower South Fork Beaver Cr	170703030704
Willow Creek	Lower Willow Creek	170703060205
Bridge Creek	Middle Bridge Bear Creek	170702040305
Upper Dry River	Millican East	170703050706
Long Prairie	Moffitt Butte	170703020603
Pilot Butte	Mokst Butte West	170703010401
Wickiup	Moore Creek	170703010203
Upper Beaver Creek	North Fork Beaver Creek	170703030804
Little Walker Mountain	North Paunina	170703020503
Badlands	Observatory Ridge	170703050606
Pine	Ooskan Butte	171200050603
Long Prairie	Paulina Peak South	170703020608
Upper North Fork Crooked River	Peterson Creek	170703040306
Pine	Pine Lake	171200050604
Upper Dry River	Pine Mountain	170703050707
Devils Garden	Porcupine	171200050704
Upper North Fork Crooked River	Porter Creek	170703040307
Badlands	Potholes	170703050605

Lower Dry River	Reynolds Pond	170703050805
Devils Garden	Sixteen Butte	171200050703
Crane Prairie	Soda Creek	170703010101
Fall River	Spring River	170703010303
Lake Billy Chinook	Stevens Canyon	170703011101
Lower Dry River	Stookey	170703050804
Lower Little Deschutes River	Sugar Pine Butte	170703020706
Long Prairie	Surveyors Lava Flow	170703020607
Upper Dry River	Teepee Draw	170703050708
Deep Canyon	Three Creek	170703010601
Deep Canyon	Triangle Hill	170703010602
Bridge Creek	Upper Bridge Creek	170702040303
Crooked River Grassland	Upper Crooked River Gorge	170703051101
Lower Metolius River	Upper Fly Creek	170703011004
Mountain Creek	Upper Mountain Creek	170702011301
Mud Springs Creek	Upper Mud Springs Creek	170703070401
Prineville Reservoir	Upper Prineville Reservoir	170703040801
Salt Creek/Willamette River	Upper Salt Creek	170900010301
Lower Ochoco Creek	Veasie Creek	170703050402
Lower Little Deschutes River	Wickiup Junction	170703020701

Table H-26. Infested weed site acres and high risk road crossing sites for class 1, 2 and 3 streams, perennial lakes ponds and reservoirs by subwatershed. Subwatersheds with TE steelhead or bull trout are in bold

Subwatershed Number and Name	Acres Within 100 ft of Class 1 Streams	Acres Within 100 ft of Class 2 Streams	Acres Within 100 ft of Class 3 Streams	Acres Within 100 ft Lakes	Acres 300 ft Around Road xings	Total Weed Site Acres in Aquatic Influence Zone	Total Acres of Subwatershed	Total Weed Acres in the Subwatershed	% of Subwatershed in Weed Acres
170702010303 - PINE CREEK			0.0				21107.0	0.6	0.00
170702010304 - SUNFLOWER CREEK		0.1	0.3			0.4	18546.5	11.8	0.06
170702010501 - WIND CREEK							17588.6	0.5	0.00
170702010502 - CORNER CREEK/BLACK PINE CREEK	7.5					7.5	18745.7	9.3	0.05
170702010504 - JACKASS CREEK	2.3					2.3	17620.7	2.7	0.02
170702011202 -	0.5					0.5	19363.	1.4	0.01

Subwatershed Number and Name	Acres Within 100 ft of Class 1 Streams	Acres Within 100 ft of Class 2 Streams	Acres Within 100 ft of Class 3 Streams	Acres Within 100 ft Lakes	Acres 300 ft Around Road xings	Total Weed Site Acres in Aquatic Influence Zone	Total Acres of Subwatershed	Total Weed Acres in the Subwatershed	% of Subwatershed in Weed Acres
COTTONWOOD CREEK							0		
170702011302 - MIDDLE MOUNTAIN CREEK		0.1				0.1	34850.4	2.0	0.01
170702011401 - UPPER ROCK CREEK		0.1	0.0			0.1	31271.1	2.9	0.01
170702040301 - HEADWATERS BRIDGE CREEK					0.1	0.1	28608.4	1.2	0.00
170702040302 - WEST BRANCH BRIDGE CREEK		6.1	11.6		12.5	30.1	25399.0	257.3	1.01
170702040304 - UPPER BRIDGE BEAR CREEK	0.1	0.4	0.1		0.2	0.7	16850.0	2.2	0.01
170703010101 - SODA CREEK				0.0			23332.7	5.6	0.02
170703010102 - QUINN CREEK				0.8		0.8	13257.7	3.3	0.02
170703010104 - LAVA LAKES	2.5			14.4	0.1	17.1	26874.7	31.2	0.12
170703010105 - CULTUS CREEK	0.4				0.7	1.1	22651.9	1.1	0.00
170703010107 - CULTUS RIVER	0.1				0.2	0.3	13289.4	0.8	0.01
170703010108 - CHARLTON CREEK		0.6		2.1		2.7	18940.4	10.6	0.06
170703010109 - CRANE PRAIRIE	0.3			22.4		22.7	25284.9	25.8	0.10
170703010201 - ODELL LAKE		8.4	0.8	1.5	13.9	24.6	23170.1	219.9	0.95
170703010202 - ODELL CREEK	1.8	1.0			3.6	6.4	13830.3	56.1	0.41
170703010206 - DAVIS CREEK				4.3		4.3	17638.7	50.6	0.29
170703010207 - WICKIUP	0.5			8.1		8.6	26963.6	11.8	0.04
170703010305 - PRINGLE FALLS	4.7					4.7	16854.9	21.5	0.13
170703010306 -	0.2				0.5	0.7	11243.	1.5	0.01

Subwatershed Number and Name	Acres Within 100 ft of Class 1 Streams	Acres Within 100 ft of Class 2 Streams	Acres Within 100 ft of Class 3 Streams	Acres Within 100 ft Lakes	Acres 300 ft Around Road xings	Total Weed Site Acres in Aquatic Influence Zone	Total Acres of Subwatershed	Total Weed Acres in the Subwatershed	% of Subwatershed in Weed Acres
BATES BUTTE							5		
170703010402 - COYOTE SPRING	0.3					0.3	15537.2	120.2	0.77
170703010403 - BENHAM FALLS	0.2					0.2	22900.0	73.4	0.32
170703010406 - BESSIE BUTTE				0.0			47956.4	151.7	0.32
170703010407 - LAVA ISLAND FALLS	0.1					0.1	29267.4	132.9	0.45
170703010501 - UPPER TUMALO CREEK	2.2	0.1			0.6	2.9	20744.1	5.7	0.03
170703010502 - LOWER TUMALO CREEK	0.1					0.1	16967.5	3.6	0.02
170703010802 - UPPER SQUAW CREEK			4.7		0.7	5.5	18290.5	44.2	0.24
170703010803 - UPPER TROUT CREEK		10.3			1.0	11.3	12105.0	44.8	0.37
170703010807 - LOWER INDIAN FORD		4.6			3.6	8.3	23659.9	276.1	1.17
170703010809 - LOWER SQUAW CREEK	55.9				4.1	60.0	20237.0	654.0	3.23
170703010903 - UPPER LAKE CREEK		3.0	2.3	1.1	2.5	8.8	11136.1	270.5	2.43
170703010904 - LOWER LAKE CREEK		1.3		2.5	1.8	5.6	10965.4	244.2	2.23
170703010905 - HEADWATERS METOLIUS RIVER	116.9	3.2	1.5		2.8	124.4	15501.3	435.4	2.81
170703010906 - FIRST CREEK	4.7				0.8	5.5	13177.3	122.1	0.93
170703010908 - CANYON CREEK	3.8	1.7	0.1		3.8	9.4	21068.4	272.3	1.29
170703010910 - CANDLE CREEK	3.3					3.3	10956.7	62.9	0.57

Subwatershed Number and Name	Acres Within 100 ft of Class 1 Streams	Acres Within 100 ft of Class 2 Streams	Acres Within 100 ft of Class 3 Streams	Acres Within 100 ft Lakes	Acres 300 ft Around Road xings	Total Weed Site Acres in Aquatic Influence Zone	Total Acres of Subwatershed	Total Weed Acres in the Subwatershed	% of Subwatershed in Weed Acres
170703011002 - UPPER METOLIUS RIVER	10.8		1.0			11.8	31553.5	184.0	0.58
170703011003 - MIDDLE METOLIUS RIVER	3.6		2.8		4.0	10.4	21208.1	279.8	1.32
170703011005 - LOWER FLY CREEK	6.0	10.3			0.5	16.8	16226.5	129.5	0.80
170703011007 - LOWER METOLIUS RIVER		2.8		0.0		2.8	24301.0	185.7	0.76
170703011102 - CARCASS CANYON				0.5		0.5	16128.0	677.4	4.20
170703020202 - LOWER BIG MARSH CREEK	0.4					0.4	19535.8	2.7	0.01
170703020204 - CRESCENT LAKE	2.2			44.7	0.9	47.8	17589.5	176.4	1.00
170703020205 - COLD CREEK	3.9	6.3			9.8	20.1	13435.5	133.3	0.99
170703020206 - MIDDLE CRESCENT CREEK	2.0				2.3	4.3	18051.4	120.3	0.67
170703020702 - UPPER PAULINA CREEK				5.2		5.2	13290.2	5.6	0.04
170703020703 - LOWER PAULINA CREEK	1.3				0.6	1.9	19554.1	11.9	0.06
170703030802 - POWELL CREEK		2.0	0.7		2.7	5.4	20096.6	11.2	0.06
170703030803 - SUGAR CREEK	2.0				0.5	2.5	10351.6	5.0	0.05
170703030901 - UPPER PAULINA CREEK		14.2	113.1	6.5	12.7	146.6	18083.0	616.0	3.41
170703030902 - DRY PAULINA CREEK		8.2	9.7	1.5	2.0	21.3	15860.2	222.2	1.40

Subwatershed Number and Name	Acres Within 100 ft of Class 1 Streams	Acres Within 100 ft of Class 2 Streams	Acres Within 100 ft of Class 3 Streams	Acres Within 100 ft Lakes	Acres 300 ft Around Road xings	Total Weed Site Acres in Aquatic Influence Zone	Total Acres of Subwatershed	Total Weed Acres in the Subwatershed	% of Subwatershed in Weed Acres
170703031002 - WOLF CREEK	0.6	4.1			0.2	4.9	21525.3	22.6	0.10
170703040103 - MAURY CREEK		0.2				0.2	19195.8	2.3	0.01
170703040201 - INDIAN CREEK		0.3				0.3	12414.2	1.6	0.01
170703040303 - HOWARD CREEK		0.2				0.2	11706.2	0.6	0.01
170703040304 - JOHNSON CREEK		0.5			0.1	0.5	18399.1	0.6	0.00
170703040306 - PETERSON CREEK				0.4		0.4	16814.7	22.0	0.13
170703040401 - JACKSON CREEK		0.1				0.1	24237.6	27.2	0.11
170703040402 - LITTLE SUMMITT PRAIRIE CREEK	0.1		0.1			0.2	16601.1	1.0	0.01
170703040403 - LOWER DEEP CREEK	0.8	0.6	0.3		0.2	1.8	14577.7	23.6	0.16
170703040501 - UPPER NORTH FORK CANYON		0.1				0.1	19690.8	8.4	0.04
170703040601 - LOST CREEK		0.1				0.1	20388.0	0.2	0.00
170703040602 - DRAKE CREEK		3.4			2.1	5.6	10346.7	33.5	0.32
170703040603 - PINE CREEK		0.1				0.1	29909.0	0.4	0.00
170703040604 - NEWSOME CREEK		0.3				0.3	21125.3	6.2	0.03
170703040605 - UPPER HORSE HEAVEN CREEK			1.4		2.1	3.5	18731.2	43.6	0.23
170703040701 - HEADWATERS BEAR CREEK		0.5	0.2		0.2	1.0	23377.2	3.2	0.01
170703050201 - HEADWATERS OCHOCO CREEK	0.2	0.3	0.0		0.5	0.9	16124.6	8.0	0.05

Subwatershed Number and Name	Acres Within 100 ft of Class 1 Streams	Acres Within 100 ft of Class 2 Streams	Acres Within 100 ft of Class 3 Streams	Acres Within 100 ft Lakes	Acres 300 ft Around Road xings	Total Weed Site Acres in Aquatic Influence Zone	Total Acres of Subwatershed	Total Weed Acres in the Subwatershed	% of Subwatershed in Weed Acres
170703050203 - UPPER MARKS CREEK	0.3	0.1			0.1	0.4	20560.6	6.3	0.03
170703050204 - LOWER MARKS CREEK	0.6	0.1			0.1	0.8	18236.2	6.5	0.04
170703050205 - DUNCAN CREEK			0.1		0.9	1.0	22510.0	9.1	0.04
170703050301 - UPPER MILL CREEK	0.4	0.3	0.1		0.1	0.9	21460.0	1.2	0.01
170703050302 - LOWER MILL CREEK	0.1		0.0		0.2	0.3	24540.2	1.5	0.01
170703050501 - UPPER MCKAY CREEK	1.0	4.1	0.3		0.7	6.1	20471.6	16.8	0.08
170703050502 - ALLEN CREEK		0.1			0.2	0.3	18251.5	0.5	0.00
170703051005 - MCALLISTER SLOUGH			22.1		8.1	30.2	34276.0	734.6	2.14
170703060201 - UPPER WILLOW CREEK		0.6			0.4	0.9	30758.3	49.6	0.16
170703060202 - RIMROCK SPRING		0.8	33.0	2.4	7.5	43.7	11085.2	1374.5	12.40
170703060203 - MIDDLE WILLOW CREEK			25.3		11.8	37.1	20726.4	181.6	0.88
170703060204 - DRY CANYON		7.5		5.0	4.6	17.0	34023.1	146.4	0.43
170703070101 - OPAL CREEK		0.1				0.1	11425.6	0.3	0.00
170703070102 - FOLEY CREEK		0.1				0.1	22008.7	0.6	0.00
170703070103 - HEADWATERS TROUT CREEK	0.2		0.1		0.4	0.7	16662.2	4.6	0.03
Total Weed Site Acres in Aquatic Zone	244.5	109.2	231.8	123.4	130.2	839.1	1731178.7	9145.6	0.53

APPENDIX I – Watershed Information

Table I-1. Watersheds

Field	Area	Name	*6th Field (Subwatersheds)*
1st	Region	Pacific Northwest	
2nd	Sub-Region	Middle Columbia River	
3rd	River Basin	John Day River	
4th	Sub-Basin	Upper John Day River	
5th	Watershed	Mdl SFk John Day River	*Corral Creek, Izee Falls, Lower Deer Creek, Morgan Creek, Pine Creek, Rosebud Creek, Sunflower Creek*
		Lwr SFk John Day River	*Black Canyon Creek, Corner Creek/Black Pine Creek, Corral Creek, Jackass Creek, Lower South Fork John Day River, Utley Creek, Venator Creek, Wind Creek*
		Upr Middle John Day River	*Cottonwood Creek, Franks Creek, Mascal Ranch*
		Mountain Creek	*Fopiano Creek, Lower Mountain Creek, Middle Mountain Creek, Upper Mountain Creek, Waterman Flat*
		Rock Creek	*Lower Rock Creek, Middle Rock Creek, Upper Rock Creek*
4th	Sub-Basin	Lower John Day River	
5th	Watershed	Bridge Creek	*Headwaters Bridge Creek, Lower Bridge Bear Creek, Lower Bridge Creek, Middle Bridge Bear Creek, Middle Bridge Creek, Upper Bridge Bear Creek, Upper Bridge Creek, West Branch Bridge Creek*
3rd	River Basin	Deschutes River	
4th	Sub-Basin	Upper Deschutes River	
5th	Watershed	Crane Prairie	*Charlton Creek, Crane Prairie, Cultus Creek, Deer Creek, Elk Lake, Lava Lakes, Quinn Creek, Soda Creek*
		Wickiup	*Browns Creek, Davis Creek, Davis Lake, Moore Creek, Odell Creek, Odell lake, Wickiup*
		Fall River	*Bates Butte, Dutchman Creek, Fall River, Pringle Falls, Siah Butte, Spring River*
		Pilot Butte	*Benham Falls, Bessie Butte, Coyote Spring, Green Mountain, Lava Island Falls, Lockit Butte, Mokst Butte West*
		Tumalo Creek	*Lower Tumalo Creek, Upper Tumalo Creek*
		Deep Canyon	*Bull Creek, Deep Canyon, Three Creek, Triangle Hill*
		Middle Deschutes	*Buckhorn Canyon, Big Cove, Chicken Spring Canyon, Cline Falls, Eagle Creek, Horse Cave, Laidlaw Butte, Little Cove, Long Butte, McKenzie Canyon, Nena Creek, Odin Falls, Rice Creek, Steelhead Falls, Wapinitia Creek*
		Whychus Creek	*Fourmile Butte, Headwaters Whychus Creek, Lower Indian Ford, Lower Whychus Creek, Lower Trout Creek, Middle Whychus Creek, Upper Indian Ford, Upper Whychus Creek, Upper Trout Creek*
		Upper Metolius River	*Abbot Creek, Cache Creek, Candle Creek, Canyon Creek, Dry Creek, First Creek, Headwaters Metolius*

Field	Area	Name	*6th Field (Subwatersheds)*
			River, Jack Creek, Jefferson Creek, Lower Lake Creek, Upper Lake Creek
		Lower Metolius River	*Juniper Creek, Lower Fly Creek, Lower Metolius River, Middle Metolius River, Upper Fly Creek, Upper Metolius River, Whitewater River*
		Lake Billy Chinook	*Carcass Canyon, Geneva, Round Butte Dam, Stevens Canyon*
4th	Sub-Basin	Little Deschutes River	
5th	Watershed	Upr Little Deschutes River	*Bunny Butte, Clover Butte, Gilchrist, Gilchrist Junction, Hemlock Creek, Little Odell Creek*
		Crescent Creek	*Cold Creek, Crescent Lake, Lower Big Marsh Creek, Lower Crescent Creek, Middle Crescent Creek, Summit Lake, Upper Big Marsh Creek*
		Middle Little Deschutes R	*Cryder Butte East, Dorrance Meadow, Hamner Butte*
		Sellers Creek	*Grasswell, Lower Sellers Creek, Sellers Marsh, Upper Sellers Creek*
		Little Walker Mountain	*Corral Springs, Crescent Butte, Little Walker Mountain, North Paunina, North Walker, South Paunina*
		Long Prairie Slough	*Beal, Green Butte, Ipsoot Butte, Lower Long Prairie, Moffitt Butte, Paulina Peak South, Stams Mountain, Surveyors Lava Flow, West Long Prairie*
		Lower Little Deschutes R	*Kawak butte West, LaPine, Lower Paulina Creek, Sugar Pine Butte, Upper Paulina Creek, Wickiup Junction*
4th	Sub-Basin	South Fork Crooked R	
5th	Watershed	South Fork Beaver Creek	*Camp Creek, Freeman creek, Lower South Fork Beaver Creek, Swamp Creek*
		Upper Beaver Creek	*Beaverdam Creek, North Fork, Beaver Creek, Powell Creek, Sugar Creek*
		Paulina Creek	*Dry Paulina Creek, Lower Paulina Creek, Upper Paulina Creek*
		Lower Beaver Creek	*Alkali Creek, Drift Canyon, North Wolf Creek, Wolf Creek*
4th	Sub-Basin	Upper Crooked River	
5th	Watershed	Crooked River above North Fork	*Kelly Creek, Maury Creek, Watson Creek*
		Camp Creek	*Clover Creek, Indian Creek, Lower Camp Creek, Middle Fork Camp Creek, West Fork Camp Creek*
		Upper N Fk Crooked River	*Elliot Creek, Gray Creek, Headwaters North Fork Crooked, Howard Creek, Johnson Creek, Lower Big Summit Prairie, Peterson Creek, Porter Creek*
		Deep Creek	*Jackson Creek, Little Summit Prairie Creek, Lower Deep Creek*
		Lower N Fk Crooked River	*Lower North Fork Canyon, Upper North Fork Canyon*
		Upper Crooked R Valley	*Conant Creek, Drake Creek, Lost Creek, Lower Horse Heaven Creek, Newsome Creek, Pine Creek, Upper Horse Heaven Creek, Wickiup Creek*

Field	Area	Name	*6th Field (Subwatersheds)*
		Bear Creek	*Headwaters Bear Creek, Little Bear Creek, Lower Bear Creek, Middle Bear Creek, Sage Hollow, Upper Bear Creek*
		Prineville Reservoir	*Lower Prineville Reservoir, Upper Prineville Reservoir*
4th	Sub-Basin	Lower Crooked River	
5th	Watershed	Upper Ochoco Creek	*Duncan Creek, Headwaters Ochoco Creek, Lower Marks Creek, Upper Marks Creek, Wolf Creek*
		Mill Creek	*Upper Mill Creek, Lower Mill Creek,*
		Lower Ochoco Creek	*Lawson Creek, Ochoco Reservoir, Prineville, Veasie Creek*
		McKay Creek	*Allen Creek, Lower McKay Creek, Upper McKay Creek*
		Badlands	*Antelope Butte, Cold Camp Creek, Grub Hollow, Indian Creek, Lower Ward Creek, Upper Ward Creek*
		Upr Dry River	*Badlands WSA, Brothers, Fehrenbacker Reservoir, Hirsch Reservoir, Horse Ridge, Millican East, Pine Mountain, Pine Ridge, Pringle Flat Reservoir, Smith Canyon, Teepee Draw*
		Lwr Dry River	*Alfalfa, Hunter, North Powell Butte, O'Neil, Reynolds Pond, South Powell Butte, Stookey, West Butte, Williamson Creek*
		Lwr Crooked River Valley	
		Crooked River Grassland	*Lower Crooked River Gorge, Upper crooked River Gorge*
4th	Sub-Basin	Lower Deschutes River	
5th	Watershed	Hrwtrs Deschutes River	*Box Canyon, Lake Simtustus, Seekseequa Creek*
		Willow Creek	*Dry Canyon, Lower Willow Creek, Middle Willow Creek, Rimrock Spring, Upper Willow Creek*
4th	Sub-Basin	Trout Creek	
5th	Watershed	Upper Trout Creek	*Amity Creek, Big Whetstone Creek, Board Hollow, Foley Creek, Headwaters Trout Creek, Little Trout Creek, Long Hollow, Opal Creek, Tub Springs Canyon*
		Hay Creek	*Little Willow Creek, Lower Hay Creek, Upper Hay Creek, Wilson Creek*
		Mud Springs Creek	*Lower Mud Springs Creek, Sagebrush Creek, Upper Mud Springs Creek*
2nd	Sub-Region	Oregon Closed Basins	
3rd	River Basin	Oregon Closed Basins	
4th	Sub-Basin	Summer Lake	
5th	Watershed	McCarty	*Butte Well, Dry Creek, McCarty Butte, Morehouse Lake, Pasture Rock*
		Pine	*Big Hole, Ooskan Butte, Pine Lake, Willow Butte*
		Devils Garden	*Buck Butte, China Hat, Devils Garden, Dome, Harrison Place Well, Hogback Butte, Porcupine, Sixteen Butte, Twin Buttes*
		Walker Creek	*Lower Walker Creek, Middle Walker Creek*

Field	Area	Name	*6th Field (Subwatersheds)*
1st	Region	California	
2nd	Sub-Region	Klamath/N California Co	
3rd	River Basin	Klamath	
4th	Sub-Basin	Williamson	
5th	Watershed	Klamath Marsh/Jack Cr	*Dillon Creek, Jack Creek, Mosquito creek, Skellock Creek, Wildhorse Ridge*
		NW of Klamath Lake	*Baker Creek, Cottonwood, Deep Creek, Lost Creek, Miller Lake, Shoestring Creek, Tiny/Desert*

Stream Buffer Widths

Abbreviations for the following table:

NWFP – Northwest Forest Plan (1994)

PACFISH – Interim Strategies for Managing Anadromous Fish Producing Watersheds (1995)

INFISH – Inland Native Fish Strategy (1995)

WA – watershed analysis

RR – riparian reserve; terminology for riparian areas used by the NWFP

RHCA – riparian habitat conservation area; terminology for riparian areas used by PACFISH/INFISH

Local Deschutes/Ochoco NFs Stream Class Definitions:

Class I stream - perennial or intermittent streams with either high densities of fish, or use as a domestic water source, or enough water to be a major contributor to the quality of water in a downstream reach.

Class II stream – perennial or intermittent streams with moderate densities of fish or enough water to be a moderate contributor to the quality of water in a downstream reach

Class III stream – all perennial streams that do not contain fish

Class IV stream – All other streams that do not meet the above criteria (i.e. intermittent streams)

Definitions of stream categories used by INFISH/PACFISH/NWFP

- Category 1 areas (fish-bearing streams) will consist of a riparian area that incorporates the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest. Category 1 areas are defined on the Ochoco as Class I or II streams.
- Category 2 areas (perennial non-fish-bearing streams) will consist of a riparian area that incorporates the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year flood plain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-

potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest. Category 2 areas are defined on the Ochoco as Class III streams.

- Category 3 areas (ponds, lakes, reservoirs, and wetlands greater than 1 acre) will have a riparian area that consists of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.
- Category 4 areas (seasonally flowing or intermittent streams, wetlands less than one acre, landslides, and landslide-prone areas) will consist of a riparian area that includes the extent of landslides and landslide-prone areas, or the intermittent stream channel and the area to the top of the inner gorge, or the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation; or for Key Watersheds the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest, or for watersheds not identified as Key, the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greatest. Category 4 areas are defined on the Ochoco as Class IV streams.
- In non-forested rangeland ecosystems, the interim RHCA width for permanently flowing streams is the extent of the 100-year floodplain.

Stream Buffer Widths Based on Management Direction

Management Direction	Riparian Type	Stream Class	Category	Description	RR/RHCA width (each side)
NWFP	RR	1 & 2	1	fish-bearing, anadromous or public water supply	300
NWFP	RR	3	2	perennial, non-fish bearing	150
NWFP	RR	4	4	intermittent	100
NWFP	RR	NA	3	Lakes and natural ponds	300
NWFP	RR	NA	3	> 1 ac wetlands,constructed ponds and reservoirs	150
NWFP	RR	NA	3	< 1 ac wetlands and unstable and potentially unstable areas; springs	100
PACFISH/INFISH	RHCA	1	1	fish-bearing, anadromous or public water supply	300
PACFISH/INFISH	RHCA	2	1	fish-bearing	300
PACFISH/INFISH	RHCA	3	2	perennial, non-fish bearing	150
PACFISH/INFISH	RHCA	4	4	intermittent, priority watershed	100
PACFISH/INFISH	RHCA	4	4	intermittent, non-priority watershed	50
PACFISH/INFISH	RHCA	NA	3	> 1 ac ponds, lakes, reservoirs, and wetlands	150
PACFISH/INFISH	RHCA	NA	3	< 1 ac wetlands, landslides and landslide prone areas in priority watersheds; springs	100
PACFISH/INFISH	RHCA	NA	3	< 1 ac wetlands, landslides and landslide prone areas in non-priority watersheds; springs	50
Revised Stream Buffer Widths Based on Watershed Analysis and Riparian Management Objectives					
Melious WA	RR	1	1	fish-bearing, anadromous or public water supply	320
Melious WA	RR	2	1	fish-bearing	320
Melious WA	RR	3	2	perennial, non-fish bearing	160
Melious WA	RR	4	4	intermittent	160
Melious WA	RR	NA	3	lakes and natural ponds	320
Melious WA	RR	NA	3	> 1 ac wetlands,constructed ponds and reservoirs	160
Melious WA	RR	NA	3	< 1 ac wetlands and unstable and potentially unstable areas; springs	160
Whychus WA	RR	1	1	fish-bearing, anadromous or public water supply	300
Whychus WA	RR	2	1	fish-bearing	300
Whychus WA	RR	3	2	perennial, non-fish bearing	150
Whychus WA	RR	4	4	intermittent	150
Whychus WA	RR	NA	3	lakes and natural ponds	300
Whychus WA	RR	NA	3	> 1 ac wetlands,constructed ponds and reservoirs	150
Whychus WA	RR	NA	3	< 1 ac wetlands and unstable and potentially unstable areas; springs	150
Whychus WA	RHCA	1	1	fish-bearing, anadromous or public water supply	300
Whychus WA	RHCA	2	1	fish-bearing	300
Whychus WA	RHCA	3	2	perennial, non-fish bearing	150
Whychus WA	RHCA	4	4	intermittent, priority watershed	140
Whychus WA	RHCA	4	4	intermittent, non-priority watershed	70
Whychus WA	RHCA	NA	3	> 1 ac ponds, lakes, reservoirs, and wetlands	150
Whychus WA	RHCA	NA	3	< 1 ac wetlands, landslides and landslide prone areas in priority watersheds; springs	140
Whychus WA	RHCA	NA	3	< 1 ac wetlands, landslides and landslide prone areas in non-priority watersheds; springs	70

See next page for codes and definitions

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page 1 of 2

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APPENDIX J – Public Comments on the Draft Supplemental EIS and Forest Service Responses

Response to Comments

The objective of this section is to display all of the public comments received by the Forest Service regarding the Draft Supplemental EIS and to provide responses to them (Tables J-2 through J-25). The substantive comments were used to update, improve, clarify, and finalize the analysis in the Final Supplemental EIS, and to help the responsible officials select an alternative.

Comment Period

Notification of the availability of the Draft Supplemental EIS was published in the Federal Register on June 26, 2009, initiating the formal 45-day comment period, which ended August 10, 2009. A legal notice appeared in The Bulletin on Wednesday July 1, 2009. The document or notification of its availability was mailed to the organizations, agencies, and individuals listed in Chapter 4.3. The document was also made available on a Forest Service web site (http://www.fs.fed.us/r6/invasiveplant-eis/site-specific).

Responding to Comments

During the public comment period, 15 responses were received (see Table J-1). Responses to these comments are found in Table J-2 through J-24. In addition, there were three comment letters received outside the comment period. Response to #16 is found at the end of this appendix, in letter form, and responses to #17 and #18 are found in Table J-25. Consistent with the National Environmental Policy Act, 40 CFR 1503.4(b), this appendix addresses substantive comments on the DSEIS. Substantive comments include those which challenge the information in the DSEIS as being inadequate or inaccurate, or which offer specific information that may have a bearing on the decision. Non-substantive comments are those that express opinions or position statements without any accompanying factual basis or rationale to support the opinion. Comments were given a number and were grouped by subject matter. All comments and response are part of the administrative record for this FSEIS, and have been considered during the decision-making process.

Consistent with NEPA, 40 CFR 1503.4a, possible responses to substantive comments include:

1. Modify alternatives including the proposed action.
2. Develop and evaluate alternatives not previously given serious consideration by the agency.
3. Supplement, improve, or modify its analyses.
4. Make factual corrections.

Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position, and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

Table J-1. List of commenters

Letter #	Postmark	Author, Title	Organization/Agency
1	6/27/09	Richard Artley	
2	7/30/09	Megan Prince	
3	7/23/09	Steve Davis	Jefferson County, OR Public Works
4	7/27/09	Jean Kern	
6	7/08/09	Richard Artley	
7	8/6/09	Christine Reichgott, Manager	US Environmental Protection Agency
8	8/03/09	Helen Seidler	
9	8/10/09	Preston A. Sleeger, Regional Environmental Officer	Department of the Interior, Office of Environmental Policy and Compliance
10	8/10/09	William Prince	
11	8/10/09	Susan Prince	
12	8/7/09	John Volle, Sunnyfield Farms, Inc.	
13	8/10/09	Asante Riverwind, Eastern Oregon Forest Organizer	Oregon Chapter, Sierra Club
14	8/10/09	Karen Coulter, Director	Blue Mountain Biodiversity Project, League of Wilderness Defenders
15	7/31/09	Susan Prince	
16	9/30/09*	Bill Hansell, Chairman, Oregon State Weed Board	Oregon Department of Agriculture
17	5/31/09*	Richard Artley	
18	10/14/09*	Richard Artley	

Table J-2. Response to comments – Toxicity of Herbicides

TOXICITY OF HERBICIDES	
14-28	*Picloram and Clopyralid, which are contaminated with Hexachlorobenzene, should also not be allowed to enter Oregon waters as HCB bioaccumulates and could accumulate in stream or lake sediments, adversely affecting aquatic life and public health. As the DSEIS notes, Hexachlorobenzene is listed in Table 33A of the state Water Quality Toxic Guidance Values due to its carcinogenic and bio-accumulative properties: "However Hexachlorobenzene (HCB), a contaminant in picloram and clopyralid, is listed on Table 33A, EPA Number 88. HCB is a persistent carcinogen and bio-accumulates." (DSEIS p. 248) Yet Clopyralid is apparently the herbicide that would be most widely used and Picloram would be used despite its high mobility and known tendency to travel with surface runoff into streams and into ground water.*
Response	The Forest Service analysis indicates that the amount of picloram and clopyralid (and hexachlorobenzene) that might enter surface or ground water is below a threshold of concern. The limitations on use of these two herbicides found in the PDFs exceed existing label restrictions and are expected to keep picloram and clopyralid out of surface and groundwater (DSEIS P. 49-66, 302-303).
4-2	*Rodeo seems less damaging of the three listed [glyphosate, imazapyr, sethoxydim].*
Response	The Proposed Action and Alternative 3 include many measures to protect people and the environment (see FSEIS Chapter 2). Used according to the PDFs, Rodeo (glyphosate) is less selective than the other herbicides and has the potential to damage or kill a variety of non-target plant species. Imazapyr and sethoxydim are more selective, which means it poses less risk to non-target plants when compared to glyphosate. . The PDFs (#42-71) and Buffer Tables 15 and 16 minimize the potential for any herbicide to have harmful effects by limiting the type of herbicide, the method of application, the rate of application, and the extent and location of treatment in a given watershed.
13-3	*The management approaches advocated by the DSEIS are likely to result in irreparable and unlawful adverse impacts from herbicides upon human health, fish and wildlife, and non-target native plants.*
Response	Alternatives 2 and 3 incorporate a risk reduction framework to ensure the safe and effective use of herbicides. First, label requirements, federal and state laws, and the EPA approval process provide an initial level of protection regarding herbicide use. Next, the SERA Risk Assessments (2001, 2003a, 2003b, 2003c, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f) disclosed hazards associated with worst-case scenarios (maximum rate according to the herbicide label, no buffers, broadcast application). SERA risk assessments identified and evaluated incomplete and unavailable information that is potentially relevant to human health and ecological risks. Each risk assessment identified and evaluated missing information for that particular herbicide and its relevance to risk estimate. Such missing information may involve any of the three elements needed for risk assessments: hazard, exposure, or dose-response relationships. A peer-review panel of subject matter experts reviewed the assumptions, methodologies and analysis of significance of any such missing information. SERA incorporated the findings of this peer review in its final herbicide risk assessment. The R6 2005 FEIS included an additional margin of safety by reducing the level of herbicide exposure considered to be of concern to Threatened and Endangered fish and wildlife. The R6 2005 ROD adopted standards to minimize or eliminate risks to people and the environment (prevention measures and specifically, standards 14, 15, 16, 18-23). Alternatives 2 and 3are designed to comply with the R6 2005 ROD standards through project design and Project Design Features (DSEIS p. 49-62). Finally, the PDFs further reduce the risks associated with herbicide treatments by eliminating or minimizing as much as possible the impacts to the environment (FSEIS, Chapter 2.4). The implementation planning and monitoring and

	adaptive management processes described in Chapter 2 and Appendix F ensure that effective treatments are completed according to PDFs, and undesired effects are indeed minimized. Cumulative effects are addressed throughout Chapter 3, however minimal effects are predicted because of the type of herbicides used and the buffers and PDFs limit the extent and duration of effects.
14-206	*P. 368 -The comparison to high background levels of toxins to downplay the significance of adding more toxins to the environment ignores both cumulative effects and the desirability of having a non-toxic environment.*
Response	Cumulative effects are discussed throughout Chapter 3. The relative toxicity of herbicide use proposed is low compared to nursery, agricultural and general forestry applications. This is because our treatment sites are small and scattered, the least damaging herbicides are approved for use, and the PDFs and buffers minimize the potential for adverse effects to occur from herbicide exposure. The herbicide use proposed in this project will not increase risk of "cancer to animals," the subject of the cited paragraph. Despite the desirability of having a "non-toxic" environment, the Final SEIS Chapter 3at section 3.1.3 discusses how even non-developed watersheds near the Clackamas River were found to contain chemical residues (Carpenter, K.D and others 2008).
14-158 14-51 14-159 14-154 13-21	*Potential for cumulative effects of multiple herbicide applications. Regarding cumulative effects, it's not guaranteed that repeat applications of persistent herbicides would be over a year apart. Three commonly used herbicides persist for up to about a year. (See DSEIS p.326, #2 and discussion under #5, p. 327 re: persistence of Chlorsulfuron, Clopyralid, and Glyphosate.) Imazapic can persist for up to three years, Picloram for up to a year, Triclopyr for up to 10 months, Chlorsulfuron in subsurface soils for more than a year, and Glyphosate for up to a year. The DSEIS admits: "Herbicides such as chlorsulfuron, imazapic, or picloram that can persist for more than (a) year could lead to some accumulation in soils at the invasive plant treatment site." (DSEIS p. 329)*
Response	Applications of persistent herbicides that have the potential to leach into certain soil types or impact aquatic resources are restricted by the PDFs (DSEIS p. 55-56 #45,46,47,49,54,55 and Table 14) and buffers (DESIS p. 64-65 tables 15, 16), minimizing specific risks to the environment. Given the design of the project, repeat applications of herbicides are not likely to result in cumulative effects. Herbicide risk Assessments consider chronic exposures that would result from ongoing exposure to herbicides.
14-47 14-183 14-186	*What are the "specified conditions" under which dose addition analysis is believed to provide a reasonable estimate of the cumulative toxicity of herbicide mixtures? This condition implies that under other, unspecified conditions, dose addition analysis does not reliably indicate the cumulative toxicity of herbicide mixtures, though this is assumed in the DSEIS risk calculation. P. 363 -. Multiple herbicides used in a mixture may not just have additive, but synergistic effects so that "dose addition analysis may be insufficient to predict effects.*
Response	Dose addition is a reasonable estimate of the toxicity of mixtures when the expected doses of each component are low (subtoxic) (EPA 2000, ATSDR 2004). These conditions are described in more detail on p. 364, paragraphs 1-5 and the Final SEIS has been edited for clarification.
14-62 14-170	*The DSEIS admits that synergistic effects to human health could occur as a result of exposure to herbicides considered in this analysis, but fails to analyze this in site-specific scenarios or even disclose which herbicide formulas could cause these effects and what the effects could be.*
Response	The DSEIS states on p. 338, paragraph 6 that "it is possible, but unlikely, that synergistic effects could occur as a result of exposure to the herbicides considered in this analysis." The realm of "possibility" cannot be ruled out with human health analyses because humans are so variable in responses, existing exposures to chemicals (incidental or by choice) is unknown, and herbicides are not tested directly on

	humans. The conclusion stating that synergistic effects are unlikely is well supported by the best available science, as cited on p. 338, paragraph 6 in the DSEIS (ATSDR 2004, EPA/ORD 2000).
14-116	*Re page 257 What are the potential effects of such residue in combination with later herbicide applications?*
Response	Paragraph 3 on p. 257 of the DSEIS states that potential concentrations of herbicide will be extremely small to not detectable." Effects of very low concentrations on water quality are discussed on pages 257-258 where it is stated that PDFs in place for the alternative would be "sufficient to protect groundwater recharge areas. Alternative 2 would meet State Water Quality Standards for toxic substances." There are no plausible measurable lingering or cumulative effects.
14-205 14-225	*P. 368 - There's the possibility of impurities, contaminants, and adjuvants not being toxic in isolation, but acting synergistically to form toxins in the formula. P. 373 In other words, synergistic effects of multiple active ingredient formulas cannot be ruled out. Again there is not full disclosure: what studies found out what exactly? Re: synergistic effects for what species under what conditions, and with what dose of which chemical combination? What about synergistic effects re: more than one herbicide used over time.*
Response	The impact of impurities, contaminants and adjuvants on the toxicity of the herbicides in question is discussed in detail in the DSEIS on pages 368-373. There are no known synergistic effects at the exposure levels predicted for this project. The type of herbicides approved for use in Region Six do not bioaccumulate so chronic synergistic effects are very unlikely. The DSEIS discussed uncertainties related to risk assessments No data exists for specific tests on synergistic potential for the herbicides proposed to all of the species present in the project area. These sources of incomplete and unavailable information are disclosed in the R62005 FEIS, as well as in the DSEIS on pages 90, 294-300, 373 and 391. The DSEIS concluded that herbicide use proposed, synergistic impacts are not likely, because the potential for two different exposures over a level of concern to overlap in time and space is very small, and synergistic effects are unlikely for chemicals with low toxicity (ATSDR 2004).
14-212 14-213	*P. 369 . List 3 only means that the inert ingredients is insufficiently tested to determine hazard or toxicity, not that it is safe. So inerts or list 1,2, and 3 should not be used in formulas, not just being not "preferred".*
Response	The issue of inert ingredients was discussed and analyzed in the R6 2005 EIS, and summarized in the DSEIS (e.g. p. 295, 367-368). The Ochoco/Deschutes/Crooked River Grassland Forest Plans require that only inert ingredients that have been reviewed in risk assessments or other hazard assessment documents can be used in Forest Service treatments. The risk assessments address risks associated with inert ingredients. The DSEIS stated (p. 369), "List 3 includes substances for which EPA has insufficient information to classify as either hazardous (List 1 or 2) or non-toxic (List 4)." The effects from inert ingredients are discussed throughout the DSEIS (e.g. p. 295, 367-368).
14-215	*P. 371. Which formulations does the Forest Service use with NP or NPE surfactants, and with which active ingredients?*
Response	NPE is a common class of surfactant added to herbicide formulations or sold as a stand-alone surfactant to be added to the mixture by the applicator. A complete listing is impracticable because NPE might be present in a variety of applications depending on the site and target species to be treated. The effects of NPE application either added by the manufacturer or by the applicator were discussed throughout the DSEIS (e.g. 292, 298-299, 371-372,375-393,etc.). The project includes design features for surfactants to minimize potential for exposure to NPE.

Table J-3. Response to comments – Human Health

HUMAN HEALTH	
1-1 1-2 1-3 1-4 1-5 6-1	*Glyphosate is considered "highly toxic" and even lethal. New research shows that brief exposure to herbicides containing glyphosate caused liver damage in rats, as indicated by the leakage of intercellular liver enzymes. Recent studies have shown a close association between Glyphosate use and non-Hodgkin lymphoma. Another study in Iowa and North Carolina of 54,315 private and commercial licensed pesticide applicators showed a link between Glyphosate use and multiple myoeloma, which has been associated with agents that cause either DNA damage or immune suppression. Several websites are listed that discuss glyphosate toxicity. I demand that you eliminate all herbicides containing glyphosate from consideration. I am aware of the potential for glyphosate to kill and harm mammals (including humans) with cancer, neurological diseases, and birth defects; drop glyphosate. .. See:* *http://www.projectcensored.org/top-stories/articles/13-new-evidence-establishes-dangers-of-roundup/* *http://s6.invisionfree.com/Arty_Farty_N_Gardens/ar/t198.htm* *http://www.i-sis.org.uk/GTARW.php* *http://www.treehugger.com/files/2009/06/pesticide-ingredients-shown-toxic-human-lab-tests.php?dcitc=daily_nl* *http://www.ehponline.org/realfiles/members/2005/7728/7728.html* *http://teamsugar.com/group/3275802/blog/3379862* *http://www.ibiblio.org/ecolandtech/SoilWiki/message-archives/JoeCummins/msg00377.html* *http://www.ghorganics.com/Glyphosate.htm* *http://www.herbshealing.com/A_Campaign_for_Organic_Lawns2.htm* *http://www.alternatives2toxics.org/pdfs/glyphosate.pdf* *I demand that you eliminate all herbicides containing glyphosate from consideration for use with your Invasive Plant Treatments project.*
Response	Glyphosate is included in all alternatives including No Action; it was one of the few herbicides approved for use prior to the R6 2005 ROD. It is one of the most frequently used herbicides in Oregon (see DSEIS basis for cumulative effects). Several invasive target species are effectively treated with glyphosate. The R6 2005 FEIS found that adding more herbicide options would reduce the relative use of glyphosate. The PDFs and buffers are designed to minimize or eliminate risks of herbicide use, including glyphosate. Glyphosate is the first choice herbicide for only three species, quackgrass, ribbongrass, and reed canarygrass, which occur in riparian areas; the aquatic form of glyphosate is prescribed, which does contain surfactants. The DSEIS concluded that based on the best available science, herbicide exposure from this project would not affect human health (DSEIS section 3.8). The websites/literature cited by the commenter were reviewed and no new or opposing science regarding glyphosate was found (Desser 2012, Mistretta 2011). Studies linking glyphosate to cancer, neurological diseases, and birth defects generally are for rates, formulations, or uses that are dissimilar to this project. Some of the websites refer to cellular level studies that are not applicable to real world exposure risks. Research conducted on whole organisms (e.g. rats, quail, etc.) using plausible exposure routes (e.g. dietary, direct spray) with glyphosate provide the best available science regarding risk from Forest Service applications. Whole organism studies have been conducted, have been reviewed by EPA, are included in FS risk assessments, and form the basis of our conclusions. The risk assessments and other information in this EIS constitute best available science. Specifically: 1) The studies investigating non-Hodgkin's lymphoma (NHL) associated with glyphosate use (e.g. DeRoos et al. 2003), have some

	serious limitations. A similar study was reviewed by EPA (2002) and discussed in the glyphosate risk assessment (SERA 2003): a. EPA stated that, "*This type of epidemiologic evaluation does not establish a definitive link to cancer. Furthermore, this information has limitations because it is based solely on unverified recollection of exposure to glyphosate-based herbicides.*" (EPA/OPP 2002). b. The glyphosate risk assessment states: "*Given the marginal mutagenic activity of glyphosate and the failure of several chronic feeding studies to demonstrate a dose-response relationship for carcinogenicity and the limitations in the available epidemiology study, the Group E classification* (evidence for non-carcinogenicity) *given by the U.S. EPA/OPP (1993a, 2002) appears to be reasonable*. (SERA 2003). c. The more recent studies contain the same limitations, as acknowledged by the authors. Risk of NHL from glyphosate exposure is still adequately addressed by the 2003 risk assessment. 2) The suggested link to myeloma is from DeRoos et al. (2005). The authors conclude, "Glyphosate exposure was not associated with cancer incidence overall, or with most of the cancer subtypes we studied. There was a suggested association with multiple myeloma incidences that should be followed up." The authors caution, "Certain limitation of our data hinder the inferences we can make regarding glyphosate and its association with specific cancer subtypes." The authors suggest their results are a starting point for further research rather than providing chemical specific conclusions. The information with its limitations is not sufficient to overturn the current weight-of-evidence concerning the carcinogenicity of glyphosate. 3) Effects to the liver from exposure to glyphosate or POEA surfactant are documented in some studies cited in the glyphosate risk assessment (SERA 2003) and the review of risks associated with surfactants (SERA 1997). A specific study reporting "leakage of intracellular enzymes" only tested a formulation manufactured in Brazil containing POEA surfactant. Since no tests were conducted with glyphosate alone, the results of the tests cannot be attributed to the active ingredient. 4) Cellular level studies are not applicable to real world exposure risks. These types of studies are appropriately used as rapid screening assessments to target chemicals for further research at the organism level. In the case of glyphosate, this research has already been conducted. Research conducted on whole organisms (e.g. rats, quail, etc.) using plausible exposure routes (e.g. dietary, direct spray) with glyphosate provide the best available science regarding risk from Forest Service applications. Such studies have been conducted, reviewed by EPA and in FS risk assessments, and form the basis of our conclusions. 5) All of the websites provided by Respondent #1 were reviewed. Those not mentioned above could either not be found or did not provide new information that hadn't been addressed in the DSEIS.
10-2 11-2 15-1	*I am against the Preferred Alternative because I am very concerned about the back up plan to use herbicides imazatyr and setozydim if the glyposate isn't effective. These products are known to be very toxic to humans and animals (especially fish). I am noticing that both imazatyr and setoxydim are proposed as options to be used on the ribbon grass if these glyphosate isn't effective. These sound way worse on the environment.*
Response	Appendix A lists herbicides that are effective on specific species. Glyphosate, imazapyr and sethoxydim are the 1st, 2nd and 3rd effective herbicides on ribbongrass. PDFs and buffers along streams are intended to minimize the potential risks associated with these herbicides. The aquatic formulations of glyphosate and imazapyr may be used, by hand application only, along perennial streams. Sethoxydim can not be used within 50 feet of perennial streams. Used in the manner proposed, none of these herbicides are likely to result in adverse effects to

	the environment. PDF's 52, 54, 55, 56 provide appropriate and redundant measures to minimize adverse impacts. The SDEIS noted that some non-target plants could be killed, which could indirectly affect animal and fish habitats, however the scale of impact is relatively small (see effects summary in Table 18).
14-7	*Some of the herbicide formulas and active ingredients proposed for use pose much greater risks than others; not all pose only "low" risks to humans and non-target organisms as claimed. Such a statement ignores, for instance, glyphosate formula toxicity to fish, the sulfonylurea herbicides' greater risk to native plants due to their potency, the greater risk of Picloram and Clopyralid to human health due to their contamination with carcinogenic Hexachlorobenzene, the greater risk revealed in SERA risk assessments regarding the use of Triclopyr, etc.*
Response	The best available science indicates that the herbicides proposed for use in the DSEIS pose a low risk of adverse effects to humans and the environment. The DSEIS does not claim that there is "no" risk of any effect (e.g. p. 90) The toxicity of the herbicides to humans and non-target organisms is thoroughly discussed in the SERA risk assessments (SERA 2001, 2003, 2004), the R6 2005 FEIS (incorporated by reference), and Chapter 3 of the DSEIS.
14-113	*p. 252. Below LD50 levels = not very reassuring – so fewer of us die? Instead of 50% of us?*
Response	The reference to LD_{50} levels in the DSEIS was not intended to imply anyone would die from herbicide use proposed on this project, which poses very low to no risk to human health. See the Human Health section of Chapter 3 of the SDEIS for more information. The Water Resources section of Chapter 3 in the FSEIS has been edited to explain that herbicide concentrations in ground water would not exceed drinking water standards, which are far lower than LD50's for people. No ground water would be contaminated with herbicide from this project. The amount of herbicide predicted to enter water, even in a worst case modeling scenario, is less than the amount that would kill fish (see Fisheries section of Chapter 3).
14-165	*p. 333 - Proposed actions take no precautions for people with chemical sensitivities (a growing # in the US), or those particularly vulnerable (eg. Children, elderly, chronically ill).*
Response	People with chemical sensitivities were considered in the risk assessments. The SDEIS noted (page 333) that "Even with an HQ of less than 1, a person could conceivably become sick. Some people may be particularly sensitive to individual chemicals and affected at very low doses." The precautions taken include posting areas and notifying people on request so that they can avoid particular areas on the Forest. Some people feel that they suffer from Multiple Chemical Sensitivity (MCS), which is sometimes referred to as Idiopathic Environmental Intolerances (IEI). In general, individuals with MCS report that they experience a variety of adverse effects as a result of exposures to very low levels of environment chemicals (including herbicides) that are tolerated by individuals who do not have MCS (Bornschein et al. 2008a,b; Das-Munshi et al. 2006, 2007). There is a distinction should be made between sensitive individuals in the general population and individuals reporting MCS. RfDs derived by the U.S. EPA and used in Forest Service risk assessments incorporate an uncertainty factor of 10 to account for sensitive individuals, which may or may not eliminate risk that an individual may suffer symptoms. While not explicitly noted, the uncertainty factor for sensitive individuals addresses variability in tolerances within a normal population. Individuals reporting MCS assert, either explicitly or implicitly, that they are atypically sensitive. More information about chemically sensitive people has been added to the FSEIS Human Health section.
14-59 14-251	*There should be no spraying of blackberries or any other edible berries, mushrooms, cultural use plants, or medicinal herbs. These are such an obvious route to human and wildlife poisoning! There should be no herbicide use in special forest product gathering areas. Why is*

14-250	*public desire not to have wild foods contaminated not respected? There is a public expectation that wild foods, unlike so many corporate farmed and processed foods, will be natural-this is also a Native people's right. Culturally important plants in Oregon do not only exist in riparian areas, so other areas must also be protected. From the forest Blue Mountains Biodiversity Project and Sierra Club staff and volunteers commonly eat currants, elderberries, huckleberries, wild strawberries, wild mushrooms, nettles, rosehips, miner's lettuce, fawn lily leaves, Dandelion leaves, and other edible plants. We also commonly gather and use medicinally: Arrowleaf Balsamroot, Oregon grape, Prince's pine, Arnica, and other medicinal plants. Our routes of exposure to herbicide toxicity therefore are pervasive and numerous and cumulative. Part of the rural lifestyle and the advantages of living and working in the forest is to be able to eat and gather wild plants with no fear of toxins, along with eating uncontaminated venison, fish, elk meat, etc. This is a reasonable expectation and value that should be protected. We are very concerned by the high # of camp sites, day use areas, trailheads, etc. proposed for herbicide use. These should all be managed with manual, non-toxic invasive plant control due to the high level of public exposure.*
Response	The project is designed to minimize impacts to non-target plants and avoid impacts to species of local concern, including herbal medicinals and wild foods (see FSEIS Chapter 2 PDFs and the sections on Native Vegetation, Human Health and Cultural Resources). The Forest coordinates regularly with Native American tribes, who have not expressed disagreement with this project. This project is designed to avoid all but minimal risks to people and the environment. Currently, one Himalayan blackberry site proposed for herbicide application (PAU 72-48) involves potential conflict with wild food gathering (no other sites pose a are in these types of sites). People using wild foods and medicinal on the Forests and Grassland are unlikely to be affected by treatment of this site, access is difficult and the site would be posted as required by PDF#26, as well as PDFs 36-41. Treatment of campsites, day use areas, trailheads and other sites would be done in a manner that minimizes impacts on people (see references above).
14-61	*Herbicides may be persistent in soils from season to season, so timing of herbicide applications is not a full remedy. Also people buying wild mushrooms and other forest products assume they are uncontaminated. These economic and cumulative health impacts should not be ignored. Forest visitors may miss postings, permit hand-outs, and on-the-ground signing. The damage is done to the wild mushroom industry once the harvest is contaminated. There is no alternative offered that is significantly better for protecting human health from herbicide use.*
Response	A number of factors additional to the timing of applications would limit the risk of herbicide contamination on edible mushrooms under this decision. The allowable application rates permitted under the FSEIS and the surface area of individual fruiting bodies both limit the amount of residue capable of landing on a fruiting body should direct application occur. A risk assessment of herbicide residue contamination to edible mushrooms from direct spray applications was completed under contract for the USFS and showed that plausible exposures were below those identified as a risk to Human Health (Durkin and Durkin, 2005). The habitat preference of the majority of edible mushrooms also reduces the likelihood of their presence on the highly disturbed sites proposed for treatment. Despite this, the FSEIS does not make a claim for the absence of a contamination risk to edible mushrooms from direct herbicide applications or from indirect pathways following applications. The potential for mushrooms to contain herbicides as a result of growing up through contaminated soil was investigated. There is no data available on the transport of herbicides from sub-surface soil into the fruiting body of a mushroom. A few studies have looked at the uptake of some herbicides by fungal mycelia (the portion of the fungus that would be in the soil) (Klimek et al. 2001, Benoit, et al. 1998,

	Baarschers, et al. 1988). Results are variable with fungal species and herbicides, but in general, fungal mycelia can hold herbicide on their outer surface (adsorb), take herbicide molecules into the mycelia (absorb), metabolize and degrade herbicide molecules. Time, environmental conditions, and perhaps the fungal mycelia themselves degrade herbicides and would make less available for uptake into fruiting bodies. These considerations along with the lack of data on transport of herbicide into mushrooms indicate that the amount of residues persistent in the soil and capable of accumulating on the surface of a fruiting body would be less than that applied directly to a fruiting body from spray applications.
14-55 14-69 14-207	*The "exposure of concern" level is being determined in the DSEIS by the Forest Service, not by the public. It is true that many people believe the potential cost to human health is too high from herbicide use and that other methods should be used to control invasive plants. (See DSEIS p.331, par. 2) So why isn't this significant concern met with an alternative that addresses it? The majority of the public share this concern. Statements meant to reassure such as "Scientific risk assessments do not indicate that any person would be adversely affected in any way by these herbicides used in the manner proposed" are simply not reassuring or good enough--especially in light of all the uncertainties underlying the SERA risk assessment and all the serious mistakes the Forest Service has made in the past while claiming science to be on their side. Long-term health effects admitted include cancer, reproductive, endocrine, immunologic, neurological effects, and genetic mutations. (DSEIS) p.331, par.5). Health effects don't get much more serious than these short of death; these are major long-term effects to be glossing over and discounting! SERA risk assessments are dependent on data from the corporations manufacturing the herbicides-a true case of the fox in the henhouse, throwing into question the objectivity and accuracy of the risk assessments. Some of the limitations of SERA risk assessments include use of surrogate species that may not adequately indicate risks to wild species and failure to test whole formulas of herbicides, which may have greater toxicity from mixed active ingredients, additives, metabolites, and/or impurities.*
Response	The exposure of concern level is based on the best available science, including extensive herbicide risk assessments (DSEIS page 50, 78, 89, 331-338, Appendix D and the R6 2005 FEIS). This was identified as a significant issue, however, the project design features eliminated scenarios associated with even a low threshold of concern. Project design features minimize potential for exposure and no adverse effects on human health are predicted. The listing of potential effects to human health on p. 331, paragraph 5 are the general listing of hazards identified for herbicide exposures. This is referred to as the "hazard identification" process in risk assessment. It is not a list of the expected effects to humans from the use of the herbicides proposed. The FS (SERA) risk assessments do utilize data generated from manufacturers for the registration of the herbicides, along with data from independent peer-reviewed literature. Impacts to the risk assessment from use of surrogate species, formulation versus active ingredient, adjuvants, metabolites, and impurities is thoroughly discussed in the 2005 FEIS, Appendix Q (R6 2005 FEIS) and incorporated by reference in the SDEIS.
14-276	*P. 338. What are the assumptions behind these conclusions? Are there any other risk analyses by non-FS scientists for comparison?*
Response	Assumptions in the risk analyses are described in SERA (2007) and in each worksheet attached to each risk assessment (see project file). The SERA risk assessments were prepared by an independent, nationally and internationally known Ph.D. risk assessor and adjunct professor at SUNY College of Environmental Science and Forestry who does not work directly for the Forest Service. Appendix Q of the R6 2005 FEIS also described the Human Health Risk Assessment scenarios and assumptions in detail. Risk Assessment assumptions are detailed, supported by numerous peer-reviewed literature citations, and are typical of methodology used by EPA and other agencies. .Forest Service Risk Assessments use lower thresholds of concern than generally accepted methodologies in part due to the presence of fish and wildlife species of concern on national forests in the region (DSEIS pages 88—93).

	The human health risk assessment utilized a variety of assumptions about people, the environment, and the rate of herbicide use. As described in the Water Resources and Human Health sections of the SDEIS, the amount of herbicide exposure is expected to far less than assumed in the risk assessments because PDFs, buffers, and safe work practices are intended to prevent the exposures from occurring. Page 338 described the potential for cumulative effects based on chronic and additive exposures.
14-216	*Re page371 - These statements are in direct contradiction to each other. If the amount of toxic "inert" is unknown, exposure & dose can't be calculated. Invalidating conclusions of no addictive toxicity.*
Response	The context of the comment was the toxicity of known inert ingredients in Garlon formulations relative to the active ingredient triclopyr. Because triclopyr is more toxic than the inerts, it is the most toxicologically relevant ingredient to assess. In addition, the DSEIS clearly states on p. 317, paragraph 3, "Use of formulations containing toxic inert ingredients may increase the risk of toxic effects to wildlife above that, or in addition to, the risk discussed for the active ingredient."
14-13 14-254	*These are public lands, not the Forest Service's private back yard-many people like ourselves choose not to expose themselves to herbicides at all, but the Forest Service would force us to then not use public lands, as they would apply herbicides in campgrounds, special forest product gathering areas, in riparian zones-just about everywhere, on a much more extensive basis than currently, and thus much harder to avoid. This is taking away our right to protect ourselves as we see fit. P. 426 The perception of risk from "relatively safe and short life span" herbicide is of real risks. What is "relatively safe" and who determines our safety?*
Response	Herbicide could be applied to up to 16,000 acres per year across the two Forests and Grassland (annual herbicide cap, about 0.6% of the total land base). As stated in the SDEIS on page 45, the realistic treatment level would likely be substantially less than 16,000 acres based on historical budgets and workforce capacity. Most of the application would occur along road shoulders. There would remain many areas untreated for the public to use. Relatively safe means that risks from the herbicide use proposed is very low compared to the types of chemicals used in agriculture and industry. This finding is based on Risk Assessments using scientifically accepted methodologies with additional layers of caution compared to EPA standards.
14-40	*We are concerned about the impacts of surface runoff, herbicide mobility in soils, and potential ground water contamination, especially with Picloram, Chlorsulfuron, Clopyralid, and Hexachlorobenzene contamination of Picloram and Clopyralid. We believe that municipal watersheds should not be subject to herbicide use. There are examples given in the DSEIS of Picloram detection in springs and downhill of plots, as well as of Picloram persistence. Picloram was found in two springs 460 feed below test plots (Neary et al. 1985), making a 200 foot buffer from wells, springs, and diversions inadequate to protect them from Picloram contamination. It seems an affront to the concerned public for the Forest Service not only to allow toxic chemical use within municipal watersheds but to further decide that specific project design features are not needed to protect state (DEQ) delineated ground water Drinking Water Source Areas. (See DSEIS p. 256).*
Response	PDFs #6, 7, 26, 29, 29.1, 30, 43-50, and 54 will prevent exposures over a threshold of concern for drinking water, including all (DEQ) state standards. The study described (Neary 1985) involved broadcast application on two 5 acre plots, using 12.7 times the typical active ingredient application rate. Pang and others (2000) used 62.9 times the typical application rate in the study described on DSEIS page 256. The scale, intensity and concentration of active ingredient of picloram in these studies are substantially more than anything proposed in this project. As indicated at the bottom of page 256, HCB (the persistent carcinogen found in picloram and clopyralid) was not found as a contaminant in any of the public well tests reviewed within the watersheds covered by this analysis. As stated in paragraph 2 on DSEIS

	page 257, the cancer risk from HCB from picloram or clopyralid, would be at least 5 orders of magnitude less than 1 chance in 1 million for all chronic contamination drinking water scenarios. Within Municipal Watersheds, herbicide applications may include spot spraying individual plants, stem injection, or dabbing (wicking/wiping). Broadcast spraying could not be used without the agreement of the entity managing the watershed and any herbicide use would be coordinated with water boards, managing agencies or associations (project design features #8 and #27, DSEIS p. 51 and 54, respectively). Under Alternatives 2 and 3 the closest spot spraying to live water would be at least 10 feet from the edge of water for aquatic formulations of glyphosate and imazapyr and further for other chemicals (See Tables 15 and 16, DSEIS pages 64-65). Herbicides would not be applied within 100 feet of the water intake or within 100 feet of the stream for the first 600 feet above the intake (project design feature #28, DSEIS p. 54). The 600 foot long 100 foot no chemical treatment buffer was derived from Evens and Duseja (1973), finding that picloram concentrations were diluted 85 to 98 percent 100 meters (328 feet) below treatment area. The Forest Service/SERA accomplished risk assessments for the R6 2005 FEIS using the GLEAMS (Groundwater Loading Effects of Agricultural Management Systems) model to estimate levels of herbicide in ambient water based on the range of application rates. An acute exposure scenario of a small child drinking water contaminated by runoff and/or percolation from an adjacent herbicide treatment area and a chronic scenario of an adult drinking water for a lifetime from a pond contaminated by leaching and/or percolation from an adjacent herbicide treated area resulted in herbicide exposures below the level of concern. The assessment concluded that for the chemicals proposed for use in the Deschutes/Ochoco/Crooked River National Grassland EIS, Forest Service herbicide applications near domestic water sources that complied with R6 2005 FEIS standards, without additional mitigations, should pose no plausible risks to human health (R6 2005 FEIS, Appendix Q, page Q-30; 2005) . The only drinking water scenario, for chemicals proposed for use in Alternatives 2 or 3 that resulted in levels of concern was from a small child drinking directly from a quarter acre pond shortly after a 200 gallon spill into the pond, which would not result from any of the proposed alternatives (DSEIS, p. 257). The risk of potential delivery of picloram, chlorsulfuron, clopyralid, and hexachlorobenzene to drinking water would be further reduced by PDFs 45-47.
14-52 13-18	*See our comments re: human health concerns from herbicide use in our Region 6 FEIS appeal since the discussion in this FEIS clearly defers to and tiers to the FEIS analysis.*
Response	The appeal and WO appeal response upholding the R6 2005 ROD were reviewed during scoping for this project. Site-specific analysis adequate to address the type and extent of herbicide use proposed was completed to address issues raised in the appeal. Project Design Features (PDF) were developed reduce the risks associated with herbicide treatments by eliminating or minimizing as much as possible the impacts to the environment (FEIS, Chapter 2.4). The implementation planning and monitoring and adaptive management processes described in Chapter 2 and Appendix F ensure that effective treatments are completed according to PDFs, and undesired effects are indeed minimized
14-57 14-164 14-162 14-163 14-171	*We are greatly concerned by the lack of adequate testing for human health effects of numerous inerts, adjuvants, impurities, and metabolites present in herbicide formulas proposed for use. The DSEIS admits that: "Of these categories of substances, only the NPE group of surfactants has been tested and data produced that identify specific and quantifiable hazards to human health (Bakke, 2004)." (DSEIS p.332, par. 2) Proposed actions take no precautions for people with chemical sensitivity or those particularly vulnerable such as children, the elderly, and chronically ill people. Hazard Quotients (HQs) measure acute toxicity only, not chronic effects such as cancer or endocrine disruption, immune disorders, neurological effects, and genetic mutations, all of which are serious and probably disabling*

	health problems. Testing for synergistic and chronic effects is incomplete. Pg 332. Cause for concern - lack of adequate testing for human health effects of numerous inerts, adjuvants, impurities, and metabolites present in herbicide formulas proposed for use. Pg. 332. it is well known that animals are poor surrogate for humans.
Response	The exposure of concern level is based on SERA and other risk assessments, which are based on the best available science (DSEIS page 50, 78, 89, 331-338, Appendix D). No scientific information has been presented to refute the findings in the risk assessments. The FSEIS includes further discussion on unknown and incomplete information. As discussed on DSEIS pages 88-93, this project goes beyond EPA approved label guidance to minimize the potential that herbicide exposure from this project would harm people.

Table J-4. Response to Comments – Water Quality

WATER QUALITY	
14-29 14-115	*Given numerous uncertainties in the risk analysis, these herbicide uses could potentially violate state water quality standards and contaminate drinking water, affect public health (particularly as municipal watersheds would receive herbicide applications). Re Pg 257 1st par. Yet hexachlorobenzene is found in Table 33A, is obviously a problem since it is both carcinogenic and bioaccumulates and occurs in both picloram & clopyralid with both proposed for use. This seems to be a violation of state water quality standards*
Response	State water quality standards indicate that toxic substances may not be at levels that adversely affect public health, safety, or welfare, or aquatic life, or other designated uses. The value in Table 33A is what the state has determined this to be for hexachlorobenzene (HCB). As indicated at the bottom of page 256, HCB was not found as a contaminant in any of the public well tests reviewed within the watersheds covered by this analysis. As stated in paragraph 2 on page 257, the cancer risk from HCB from picloram or clopyralid, in Alternative 2 or 3, would be at least 5 orders of magnitude less than 1 chance in 1 million for all chronic contamination drinking water scenarios.
14-26	*There is already a serious problem with toxic algae blooms for Crane Prairie Reservoir, Wickiup Reservoir, Paulina Lake, Lava Lake, and Davis Lake. Proposed spot spraying up to the edge of the water for Reed Canarygrass, Ribbon grass, and Yellow iris with Glyphosate could further stimulate detrimental algae growth. (See DSEIS p. 247) As the DSEIS admits: "However during algal blooms, there is a low or moderate risk of spot spray applications of glyphosate for emergent vegetation in ponds, lakes, and reservoirs, stimulating algal growth which would increase pH and chlorophyll a and decrease DO." (DSEIS p. 248) This would be a water quality standard violation as 303(d) listed streams are meant to be protected from any further impairment for the detrimental condition for which they are listed. As the DSEIS states: "State water quality standards state that toxic substances may not be introduced above natural background levels in waters of the state in amounts that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bio-accumulate in aquatic life to levels that adversely affect public health, safety, or welfare, or aquatic life, wildlife, or other designated beneficial uses. Tables 20, 33A, and 33B, in Division 41-Water quality Standards and Beneficial Uses of the Oregon Administrative Rules (OAR 340-341)" (DSEIS p. 248)*
Response	The minimum spot spray application buffer for aquatic formulations of glyphosate and imazapyr is 10 feet from edge of water for emergent species (reed canarygrass, ribbongrass, and yellow iris) to prevent accidental overspray or drift of these chemicals into adjacent water. Closer than 10 feet, selective (wicking, wiping) or non-herbicide methods would be used. The minimum spot spray application buffers for all other chemicals proposed for use in the proposed action are greater than 10 feet from the edge of water. Based on implementation of

	proposed PDFs and buffers and intensity of treatments, potential herbicide delivery to surface water would be substantially reduced and should be below detection levels and would not result in any measurable change in algae growth (see (FSEIS, Chapter 3, Water Resources, Environmental Consequences, Alternative 2, pH/DO/Chlorophyll a).
14-39	*The subsequent contrasting conclusion "that herbicide levels in surface and groundwater would be below the level of concern and meet water quality standards" (DSEIS p. 253) are based only on un-tested new project design features (PDFs) that depend on avoiding rainfall soon after application, spot spray buffers being adequate, and lowest effective rates of application not contributing too much herbicide to the water.*
Response	Project Design Features were designed and based on peer reviewed literature (i.e Berg 2004). The R6 2005 FEIS Appendix Q considered plausible direct, acute, and chronic exposures for the chemical proposed in this document. The risks from two hypothetical acute scenarios were summarized on page 257 of the DSEIS. Both of these scenarios evaluated much higher levels of contamination than proposed treatments in either Alternative 2 or 3 would produce. Only a small child drinking from a ¼ acre pond shortly after a 200 gallon spill produced results that were of concern. The matter of acute or "worst case" scenarios is newly addressed in the FSEIS under the topic of Accidental Spill in the Water Resources section. This exposure scenario would not happen under this project given the scale of operations and the PDFs, including herbicide transportation and handling safety practices.
14-23, 14-104	*How can accidental spills not be considered within the scope of this project? Obviously they could happen and need to be analyzed fully as a worst case scenario. The DSEIS makes general and non-conclusive statements that need to be analyzed as to potential effects of an accidental spill, such as: "The concentration of herbicide in the water as a result of an accidental spill depends on the rate of application and the streams' ratio of surface area to volume. The persistence of the herbicide in water depends on the length of stream where the accidental spill took place, velocity of stream flow, and hydrologic characteristics of the stream channel." These statements do not clear indication of the risks at stake without application to potential site specific situations in the planning area.*
Response	The FSEIS wording has been changed to explain that worst-case scenario evaluations are not required, rather than use "outside the scope". Alternative 2 and 3 incorporate project design features to reduce the risk of a spill and associated impacts (see PDFs 18, 19, 20, 21, 24, 25 & 52 in Chapter 2). However, it is not possible to predict the risk or magnitude of a spill and it is not required to evaluate worst case scenarios under NEPA. However even though it was not required, a spill scenario was evaluated. The R6 2005 FEIS Appendix Q considered plausible acute and chronic exposures for the chemicals proposed in this document. One of these was from a small child drinking from a ¼ acre pond shortly after a 200 gallon spill and is summarized on page 257 of the EIS.
14-120	*Re page 270 - This is not all that rare, unforeseen heavy rainfall this summer 2009.*
Response	We recognize that it is not all that rare in the Central Oregon area to have intense, short duration summer rain storms. These types of storms are also typically very predictable. PDF 17 was developed to prevent treatments when measurable precipitation is forecasted to occur within 24 hours. Even if rain were not predicted within 24 hours, an operator wouldn't apply chemicals if it looked like it was going to rain. The 24 hour interval in the PDF is intended to allow the herbicide to dry on the plant or soil particles or to allow the chemical to be absorbed by the plant, but the process is continuous from the time the herbicide is applied. In other words if the forecast is wrong and it rained within 18 hours instead of 24, there would still be a reduction in potential mobility of the herbicide. Also PDF 17 does not function in isolation. It was understood when the PDFs were developed that it might rain in less than 24 hours after application even if not forecast.

	That's why there is an overlap of PDFs such as the Minimum Buffers for Herbicide Application in Tables 15 and 16 and the soil PDFs (PDF 43-49).
14-24 14-107	*Judging by Oregon state water quality standards as described on DSEIS p. 240, existing protective design elements listed on DSEIS p. 241 should be made more protective, not less.*
Response	The Record of Decision for the Deschutes National Forest Noxious Weed Control EA (Deschutes NF, 1998) and the Ochoco National Forest/Crooked River National Grassland Integrated Noxious Weed Management EA (Ochoco NF, 1998) were signed and implemented over ten years ago and is the existing condition (Alternative 1) under which these forests currently operate. Changing these EAs is outside the scope of this analysis. The design elements (PDFs) for Alternative 2 and 3 have been made more protective (see Chapter 2 of the EIS). None of the chemicals proposed for use in Alternative 2 and 3 are found on state water quality tables 33A-33C. HCB, a contaminant of picloram and clopyralid, was discussed in the response to 14-40 in Human Health. Per direction in Table 33C for toxic substances not listed, guidance values were determined through a review of literature. These were accomplished by the Syracuse Environmental Research Associates, Inc. (SERA) for the R6 2005 FEIS using peer reviewed articles and current EPA documents, including confidential business information (DSEIS p. 248). PDFs were designed to keep herbicide residues in surface and ground water below levels that may be harmful, may chemically change to harmful forms, or that may accumulate in sediments or bio-accumulate in aquatic life to levels that adversely affect public health, aquatic life, wildlife, or other designated beneficial uses (DSEIS p. 249). Based on this analysis, both Alternative 2 and 3 would meet state water quality standards.
14-25	*We are very concerned by potential further degradation of 303(d) listed streams and water bodies in the project area that are listed for pH, dissolved oxygen, or chlorophyll. We are concerned by the potential of herbicide application to emergent aquatic plants to alter water chemistry-pH, dissolved oxygen, and amount of chlorophyll A, negatively affecting 303(d) listed streams listed for these chemical balance constituents.*
Response	pH is normally a concern as a result of herbicide treatments killing vegetation in the water which can lower the pH. This is not a problem under Alternatives 2 & 3 because the waters in the project area are listed for being too high (basic) not low (acidic) and proposed treatments would not kill measurable amounts of vegetation in the listed waters. As with pH, dissolved oxygen (DO) normally is a concern as the result of decomposing vegetation in the water, but it also is affected by increased water temperatures. As indicated on DSEIS pages 245-247, treatments would not produce any measurable increase in water temperature. It appears, based on the Upper Deschutes River Basin R-Map (ODEQ, 1999) that the large fluctuations in DO are attributable to respiration associated with large algae blooms and above threshold pH values from photosynthesis. In Alternative 2 of the FSEIS, the minimum spot spray application buffer for aquatic formulations of glyphosate and imazapyr is 10 feet from edge of water for emergent species (reed canarygrass, ribbongrass, and yellow iris) so it is the same as for other invasive plants species. Any treatment of emergent invasives with these two formulations within this 10 foot buffer will be by hand application (wicking). The minimum spot spray application buffers for all other chemicals proposed for use in this alternative are greater than 10 feet from the edge of water. There is no application of any herbicides within a minimum of 10 feet of water in Alternative 3 (see DSEIS, Tables 15 & 16). Based on implementation of proposed PDFs and buffers, limited spatial scale of infestations, and intensity of treatments, potential herbicide delivery to surface and ground water should be substantially reduced and should be below detection levels from treatment of invasive vegetation and would not result in any measurable change in algae growth or increase in dead aquatic vegetation (FSEIS, Chapter 3, Water Resources, Environmental Consequences, Alternative 2, pH/DO/Chlorophyll a).

Table J-5. Response to comments – Riparian Buffers

RIPARIAN BUFFERS	
14-31 14-33 14-110 14-141 14-142 14-145 14-146 14-147 14-148 14-149 14-119 14-235	*Science findings presented in the DSEIS indicate that a minimum 100 foot buffer from water for herbicide 'use would be needed to represent a precautionary approach that could preclude toxic chemicals from entering state water ways. However even 100 foot buffers could be insufficient to ensure that state waters are not contaminated and that aquatic life or public health is not adversely affected. Not only does the DSEIS fail to enforce 100 foot buffers in all cases for either action alternative, but other routes of entry could also bring herbicide contamination to surface waters as well as to ground water tables: "Since Alternative 2 does not buffer seasonally intermittent streams when dry for clopyralid, imazapic, or metsulfuron methyl, there is a risk of elevated herbicide concentrations associated with runoff events soon after application of herbicides in intermittent and ephemeral streams that were dry at the time of herbicide application. There is also a concern that road ditch lines that empty directly into a stream could function the same as an intermittent or ephemeral streams. Wood (2001) collected samples of several herbicides (including sulfometuron methyl and glyphosate) following roadside application. Wood detected concentrations of sulfometuron methyl and glyphosate along road shoulders through the period…" (DSEIS pp. 249-250) How would runoff from intermittent stream beds that were dry at the time of herbicide us or from hydrologically connected roadside ditches be mitigated? There appears to be no planned mitigation to avoid these effects. The DSEIS also cautions: "Sediment delivery to streams of herbicides bound to soil particles can be a major source of contamination and is indicative of overland flow which could directly delivery (sic) dissolved herbicide to the water body." (DSEIS p. 249) The DSEIS then notes that the values in Table 61 should depict the area of highest potential for delivery to streams and lakes-- in other words the high number of acres of planned herbicide use analysis units that include herbicide use within 100 feet of surface waters or within 100 feet of riparian reserves or RHCAs. (See Table 61, DSEIS p. 248) Again the DSEIS cautions: "The highest risk of getting herbicides in surface or ground water in surface or ground water occurs within 100 feet of live streams, perennial lakes, reservoirs, and ponds, wetlands, and springs. The closer you get, the higher the risk." (DSEIS p. 250) Yet wicking of non-emergent aquatic plants is proposed within 10 feet of water between bankfull level which could be filled with water later and the water surface with glyphosate, imazapyr, and triclopyr- TEA and aquatic formulations of glyphosate and imazapyr could be less discriminately spot sprayed within 10 feet of water, within the bankfull zone for emergent aquatic plants. (DSEIS p. 250) See our copied notes from the pages of the DSEIS re: specific recommendations--eg. re: Tables 71 and 72. There should be no predictable delivery of herbicide residues to surface waters allowed.*
Response	The DSEIS indicates that the highest risk of herbicide delivery is within 100 feet of surface water or wetlands. However, a 100 foot no herbicide buffer is not needed to assure that toxic chemicals are not introduced above natural background levels in the waters of the state in amounts that may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments of bio-accumulate in aquatic life to levels that adversely affect public health, safety, or welfare, or aquatic life, wildlife, or other designated beneficial uses. The state of Oregon does not require “no predictable delivery” to surface waters. Even so, due to limited spatial scale of infestations, intensity of treatment, the required PDFs and buffers, potential herbicide delivery to surface and ground water would be substantially reduced and should be below detection levels in adjacent water from chemical treatments of invasive vegetation within the 100 foot zone depicted in Tables 45, 46, and 50. Page 247 of the DSEIS states that, “Herbicide-specific buffers were developed for this analysis based on risk assessment results regarding toxicity, persistence, and environmental fate (see Tables 15 and 16). Herbicides were

	grouped by characteristics such as mobility and potential affects to fish and other aquatic organisms based on R6 2005 FEIS SERA risk assessments and a review of those developed by other Forests and agencies. The less mobile, persistent, or potentially toxic to aquatic organisms, the closer to the stream that herbicide could be used and the more general the application method (broadcast spray to spot spray to hand application). The minimum spot spray application buffer for aquatic formulations of glyphosate and imazapyr is 10 feet from edge of water for emergent species (reed canarygrass, ribbongrass, and yellow iris) in Alternative 2 to prevent accidental overspray or drift of these chemicals into adjacent waters. The minimum spot spray application buffer for emergent vegetation with these two herbicides is the same as for other invasive plants species. The minimum spot spray application buffers for all other chemicals proposed for use in this EIS are greater than 10 feet from the edge of water. There is no application of any herbicide within a minimum of 10 feet of water in Alternative 3 (see Table 16). Direct, indirect, and cumulative affects to Human Health, Fisheries and Aquatic Organisms, Water Resources, and Terrestrial Wildlife Species are discussed in Chapter 3 of the EIS. The rest of the sentence by Wood (USGS, 2001) on page 250 of the DSEIS referred to by the commenter indicated that Wood did not find measurable amounts (below detection levels) in the adjacent stream of the two herbicides proposed for use in this EIS. The highest risk of chemical application in dry channels and hydrologically connected roar ditches is from area spraying such as aerial spraying and broadcast spraying. Aerial spraying is not proposed in this EIS and due to the effectiveness of herbicide treatments under the existing Noxious Weed EAs, very little broadcast spraying is currently being done. In Alternative 2, broadcast and spot spraying restrictions adjacent to perennial streams, intermittent streams when flowing, and lakes/wetlands would substantially reduce the potential of chemical application in dry channels within these buffers and reduce the amount of herbicide applied in hydrologically connected road segments and vegetated ephemeral draws (see Table 15). Alternative 3 is even more restrictive (see Table 16). In addition, the implementation of Early Detection Rapid Response (EDRR) would allow treatment of invasive plants before they had spread so more treatments, such as spot spraying and/or wicking, that target individual plants, could be used. The primary risk of submergence of areas treated with herbicides between bank full and edge of water is treatment of emergent vegetation in lakes and reservoirs. Since there is a bank full to 50 foot minimum herbicide application buffer even for hand application for non aquatic formulations of glyphosate and Imazapyr and for sethoxydim, there is little likelihood that they would be used to treat emergent vegetation below bank full. Therefore in Alternative 2 only hand application (to edge of water) or spot spraying (to 10 feet from edge of water) of aquatic formulations of glyphosate and Imazapyr would be used to treat emergent vegetation in this zone. In Alternative 3 there is no chemical treatment within 10 feet of water. Hand application (wicking) applies the herbicide directly on the target plant for absorption. Spot spraying can produce some overspray but the concentration of active ingredient applied could be less than hand application due to lower active ingredient concentrations used for spot spraying. The herbicide would be applied while the water level was still falling or near minimum pool. Any residue left when the water body refilled (primarily from snow melt) would further have broken down. Sampling runoff collected directly below sprayed ditchline test plots within 24 hours of application, Wood (USGS, 2001) found only about 1-2% of applied glyphosate with a simulated 0.3 inch/hr storm (equivalent to a 2 year storm event in the project area) and this was further reduced by 1.5 orders of magnitude from test plots taken the second week after application. Based on continued breakdown, delusion, intensity and scale of treatment, residues should be below detection levels when the reservoirs refilled.
14-35	*We feel that mobile herbicides should not be used at all on seasonally high water tables or on course textured soils.*

14-114	
Response	Clopyralid and metsulfuron methyl have label advisories that identify an elevated risk of mobility due to low adsorption rates and moderate solubility. PDF #45 prevents the use of clopyralid and metsulfuron methyl on high porosity soils (coarse textured soils in Class 3 and 4) where seasonal water tables are present in order to minimize the risk of transport of herbicide residues into ground water aquifers or to spring outlets connected to surface waters (DSEIS, p. 55). Picloram has a label advisory addressing the risk to groundwater contamination where soils are permeable and the water table is shallow due to a high solubility and low adsorption rate (Neary, et al. 1989). In the FSEIS, Picloram has been added to PDF #45 in order to prevent the percolation of this herbicide into groundwater on sites with coarse textured soils and seasonally high water tables. The use of the word “limiting” on page 252 of the DSEIS is an inaccurate representation of the intention of PDF #45 and should not be construed as allowing application under certain conditions. This wording has been changed in the FSEIS to convey the restrictive nature of the PDF. Picloram is included in PDF #47 to address mobility risks associated with the high solubility of this herbicide that increases the risk of residue transportation in surface runoff generated on fine textured soils with low infiltration rates (DSEIS, p.56).
14-44	*All of the critical habitat riparian areas listed in Table 63 should be off-limits to herbicide use. There is no guarantee that toxic or long-term effects and degradation of native plant habitat and reduction of insect prey by herbicide use would not result in mortality and/or reproductive viability loss and in uplisting of Steelhead trout, Bull trout, and Chinook salmon (and Coho salmon?) or their populations being extirpated. (See Table #63, pp. 271-272). Evidently the only healthy Bull trout populations are in the Metolius River and "Lake" Billy Chinook, with most historic populations extinct, all the more reason for a precautionary approach of not using herbicides to control Ribbon grass in one of the most pristine rivers in the region. Steelhead trout are also in trouble in the Deschutes River Basin, with spawning and rearing only in the Trout Creek watershed. Redband trout are struggling in the Crooked River basin, Whychus Creek drainage, and the Little Deschutes River. (See substantiation in Table 66, DSEIS pp. 273-274) All essential fish habitat and critical habitat should be fully protected from herbicides, as well as new critical habitat that still needs to be designated.*
Response	There are very little proposed treatments in riparian areas where steelhead or coho critical habitat occur. See discussion on TE listed subwatersheds in the DSEIS Appendix H. Critical habitat for coho salmon is designated in the Trout Creek drainage even though there is no data or anecdotal evidence that this species was present. Essential Fish Habitat (EFH) for Chinook and Critical Habitat for bull trout is designated in the project area. Only selected herbicides with selected application methods are allowed to treat invasive plants in riparian areas near waters with fish (PDFs pages 48-63)). This will allow for selected treatment of individual invasive plants with little effect to surrounding native riparian vegetation. There is no indication based on the scientific literature (SERA 2001, SERA 2003a-d, SERA 2004a-e,h) that these types of treatments, with these herbicides would reduce insect prey for fish to such a degree that it would lead to an uplisting of steelhead trout, bull trout, and Chinook salmon and coho salmon (SERA 2001, SERA 2003a-d, SERA 2004a-e,h; DSEIS p. 318). There is no indication that the treatment of ribbon grass and yellow iris along the mainstem Metolius River with aquatic approved glyphosate or imazapyr will have detrimental direct effects to individual bull trout in these areas from the herbicides (See fisheries specialist report, Supplemental Analysis to the Biological Assessment for Designated Critical Habitat for Bull Trout, and Stehr et al. 2009). Also the majority of bull trout spawning and rearing in the Metolius Basin takes place in tributary streams that do not contain ribbon grass

	or yellow iris and will not be treated for these species (Wise 2008, Houslet and Riehle 1998). In the Deschutes river basin steelhead spawning and rearing takes place in several other locations besides the Trout Creek watershed. Some of these areas include Buck Hollow Creek, Bakeoven Creek, Nena Creek, the mainstem Deschutes River, Warm Springs River and Shitike Creek (Zimmerman and Reeves 1996). Also, the majority of steelhead spawning and rearing in Trout Creek takes place off forest on private lands. Buffers and PDFs (Tables 14, 15 and 16 DSEIS pages 62-65) will ensure that EFH and critical habitat will be maintained by limiting treatment types, and methods in these riparian areas. New critical habitat is designated by the regulatory agencies (NOAA and USFWS) and when and where this might occur in the future is unknown at this time. These same buffers and PDFs would be applied to any new critical habitat that may in the future be designated by the regulatory agencies (NOAA and USFWS).
14-49	*The DSEIS also admits that: "Different forest types along with soil types and topography can influence effectiveness of buffer strips and studies are lacking on effectiveness for all these scenarios. The effectiveness of buffers reducing runoff caused water quality effects has not been able to be modeled in forested situations " (DSEIS, p. 303) For ground applications of herbicides, the DSEIS reports that: "Comerford et al. (1992 in Berg 2004) concluded that for forestry application strips of 15 m (49.2 feet) or larger were effective in minimizing pesticide residue that may enter streams. These authors also added that subsurface macropore flow can cause much wider buffers to be ineffective at completely keeping residues out of surface waters." (DSEIS p. 303) So why is herbicide use planned right up to the water's edge and within 10 feet of water when 50 foot minimum buffers at least are needed to minimize pesticide residue and may not be effective at keeping residues out of surface waters?*
Response	Research on buffer designations and effectiveness recommends the use of “modeling and professional judgment” incorporated with a variety of physical factors to determine widths for reducing herbicide transport to surface waters (Berg, 2004). The buffers determined for broadcast spray applications under this EIS conservatively apply the 50 ft minimum buffers determined by the Comerford study to be effective for minimizing the transport of herbicides from aerial spray applications, which are not proposed under this EIS. The EIS also uses stream type and herbicide toxicity to determine buffer widths for the various herbicides and application methods proposed under this project (DSEIS, Tables 15 &16). However, many invasive plant populations in the planning area are within 50 ft of waterbodies and would not be effectively treated with manual methods alone (DSEIS, Table 6; Chapter 2.5, pp. 67, 69; Chapter 3.3). As a result, spot spray or hand applications of herbicides with the least amount of aquatic concerns were proposed for use within 50 ft of waterbodies under Alternative 2, including localized hand application of two aquatic approved herbicides up to the water’s edge and spot spray applications of these two herbicides to within10 ft of water. In order to comparatively analyze aquatic issues associated with herbicide transport, Alternative 3 was developed to further restrict broadcast spray applications of all herbicides to beyond 300 ft from perennial waterbodies and hand application of even the aquatic approved herbicides to beyond 10 ft (DSEIS, Chapter 2.3.3; Table 15 & 16). In addition, the EIS includes a number of project design features for both Alternatives 2 and 3 that are intended to minimize the accumulation and transport of herbicide residues to surface waters for all application methods. These include: 1) minimizing herbicide mix concentrations; 2) allowing only herbicides with low or moderate cause for concern to aquatics for use within 10 feet of waterbodies; 3) applying herbicides with hand select methods which wipe or wick herbicide directly on individual plants to eliminate overspray; 4) allowing herbicide application only if precipitation is not predicted within

	24 hours; 5) prohibiting the use of certain herbicides on soil types that contain high water tables, have highly permeable textures, or have fine textured surface soils susceptible to overland flows (DSEIS, PDFs 43 – 47); and 6) Implementing Treatment Caps within any 6th field subwatershed (DSEIS, p.45) Analysis of the potential effects of herbicide applications on aquatic resources under Alternative 2 was completed to determine the viability of applying herbicides within 50 ft of water. GLEAMs model scenarios run to predict possible concentrations of herbicides in surface water following broadcast spray applications show that concentrations would be below levels of concern for fish or other aquatic species (DSEIS, Appendix H, SERA 2001, SERA 2003a-d, SERA 2004a-e,h,). Since the runs assume contiguous broadcast spray application of herbicides to the water's edge, it can be concluded that the herbicide concentrations in surface water following non-contiguous spot spray or hand application methods proposed under Alternative 2 would be lower than the model runs and unlikely to be in concentrations high enough to be detrimental to aquatic species. It is also likely that the amount of herbicide residue percolating into subsurface macropore flows would be less than that modeled to reach surface waters via overland transport due to local soil conditions and implementation under PDFs 43- 47. Limited water quality monitoring was available at the time of analysis, although two local water samples collected for a USGS Water Sampling study following streamside herbicide application on private lands show concentrations below levels of concern for aquatic species (USGS, 2009). As a result, spot spray and hand application proposed within 50 ft of waterbodies was determined to not adversely affect aquatic resources or water quality.
14-70	*Re Table 15, Alternative 2. The lowest buffers (and lack thereof) are of the greatest concern to us – esp. down to only 50-15 feet with broadcast spraying, down to only 15-10 emergent vegetation in water (!) with spot spraying, and down to 15 feet, bank or no buffer (!) with hand spraying. This is crazy – esp. when allowing such minimal non-existent buffers for herbicides above the toxicity level of concern for aquatic organisms and for fish – all of them except clopyralid and imazapic and given the high risks presented by glyphosate, triclopyr, picloram, and sethoxydim, including "aquatic" formulations of glyphosate and triclopyr.*
Response	Buffer distances (Tables 14-16, DSEIS p. 62-65) were determined by review of numerous publications and expert opinion, based on monitoring results in the field (DSEIS p. 49-50 and Desser 2008). General aquatic risk categories for the various herbicides were determined by results of the risk assessments, which assume no buffer at all (e.g. broadcast spraying right up to the water's edge as stated on page 91 of the DSEIS). The amount of herbicide that would actually be applied near streams would be below rates that would cause concern…spot and hand treatments that are approved within the buffers necessarily reduce the amount of herbicide that could reach surface waters (ibid.). Limitations on the ingredients, rate and/or the method of application (PDF #s 9-25, 27-30, 42-62, DSEIS p. 51-57) under certain conditions provide effective and redundant measures to minimize the potential for water contamination (ibid, explained in detail in Water Resources and Fisheries sections of the DSEIS). Herbicides labeled for aquatic use have been subject to extensive testing in the aquatic environment.
14-73 14-71	*Very minimal buffers of 10-15 feet and even to banks for seasonal waterbodies, ignoring herbicide persistence in soils and potential for leaching, runoff and volatization. Re table 16, Alternative 3. While we appreciate the "no broadcast spraying within buffers", no herbicide use within 10 feet of water (which are just common sense to us) and prohibition of using glyphosate, picloram, and triclopyr BEE within 300 feet of water in Alt. 3*

Response	Table 18 in the DSEIS compared alternatives, indicating that both action alternatives involve low risk to the aquatic environment. Major impacts to listed fish species are avoided (DSEIS page 73). Run-off, leaching, persistence and other factors were considered when characterizing the risk of water and soil contamination (DSEIS p. 205-206). As stated in the DSEIS, Alternative 3 provides, largely through the use of broader buffers and additional restrictions in the use of specific herbicides, a greater level of protection to ensure herbicide will not enter streams. However, Alternative 2 also poses low risk of herbicide entering streams in concentrations over a level of concern, based on the best available scientific risk assessments and the additional PDFs and buffers that minimize potential for herbicide exposure (DSEIS, p. 253, 257-258).
14-76 14-77 14-256	*The majority of sensitive plants known or suspected to occur in the project area would be substantially more protected with greater riparian buffers restrictions (including and beyond Alt. 3) as we suggest since they are associated with riparian conditions (35 out of 50). Re p125 Table 28- of the 16 sensitive plants known to be in project area units 10 are associated with riparian habitats and 2 are partially associated with riparian habitats. So increased riparian buffers and restrictions would greatly help protect them herbicide use.*
Response	Yes, many of the sensitive plants are associated with moist or wet habitats. Both Alternatives 2 & 3 incorporate a risk reduction framework that includes Project Design Features to reduce the risks associated with herbicide treatments and ensure Forest Service Botanists are involved in designing invasive plant treatments to protect sensitive plants (PDF #s 63-71, DSEIS p. 57-58). Relative to Alternative 2, Alternative 3 features increased riparian herbicide buffers and restrictions on the use of specific herbicides. Under Alternative 3, riparian sensitive plants would continue to be impacted by rhizomatous invasive plant species, such as reed canarygrass and ribbongrass, which are difficult to control without the use of herbicides. Lavergne and Molofsky (2004; DSEIS p. 136) cite that invasion of reed canarygrass can occur relatively quickly, and has been shown to occupy up to 40% of islands and shorelines of a river in Wisconsin in less than 15 years. The aggressive nature of some rhizomatous invasive plant species, such as reed canarygrass and ribbongrass, can have permanent impacts on riparian native plants.
14-98	Re page 202 Which invasive are correlated to which herbicides?
Response	The DSEIS states that invasive species located on riparian soils "could receive the following herbicides: clopyralid (yellow star, Canada and bull thistles; spotted and diffuse knapweed; and tansy ragwort); picloram (leafy spurge., field bindweed and Dalmatian toadflax); metsulfuron methyl (St. John's-wort); chlorsulfuron (Kochia); and sulfometuron (medusahead)." (DSEIS, p. 202).

Table J-6. Response to comments – Treatment Areas, Early Detection Rapid Response

TREATMENT AREAS / EARLY DETECTION RAPID RESPONSE	
13-15	*We further ask that the DSEIS address the region's increasing populations of Ventenata dubia and Bromus tectorum. We also ask the Forest be proactive in addressing non-herbicide and other treatment methods of Phalaris arundinacea. Many of the listed methods are not effective because it is generally located in riparian areas.*
Response	*Bromus tectorum* (cheatgrass) is common and widespread throughout the two Forests and Grassland, and is usually scattered in low densities throughout grass-dominated habitats. This makes control efforts difficult regardless of treatment method. *Ventenata dubia* (North Africa grass) is currently nearly as widespread, but occupies somewhat different habitats. These species are included for treatment

	in the DSEIS (see Table 9) mostly under an EDRR strategy, for high priority populations that are small and more easily contained or controlled. The proposed action allows for effective treatment of reed canarygrass (*Phalaris arundinacea*) within wetlands, riparian areas and elsewhere. As discussed in the DSEIS (page 97), rhizomatous plant species, such as reed canarygrass and ribbongrass can be especially problematic to treat. Reed canarygrass is difficult to control due to its persistent rhizome system and its ability to reproduce vegetatively (DSEIS, p. 97, 324). We would be able to do some manual treatments each year, with the Metolius River ribbongrass being a high priority. Though many of the ribbongrass and reed canarygrass populations occur in large clumps or extensive patches, manual treatments would also target individual plants spaced out along river bank or lakeshores, plants on logs and plants on islands in the river. However, because manual treatments for these rhizomatous riparian species are time consuming and expensive, it is reasonable to assume that manual treatment would be limited in any one year. Therefore it is unlikely that we can keep up with the spread of these species and, under Alternative 3, ribbongrass and other rhizomatous riparian plant species are likely to continue spreading. The location and size of the infestation, species biology, environmental factors, management objectives, and treatment costs all factor into the choice treatment method(s) (USFS 2005a). Mazzu (2005) compiled information about treatment options for invasive plant species in the Forest Service's Pacific Northwest Region (Region 6). Mazzu's information was incorporated into Appendix B, which summarizes and discusses treatment options for those invasive species currently documented on the Forests and Grassland (DSEIS p. 97 and Appendix B).
14-89	*RE Table 34 This is in only 4 years yet there was an overall increase in invasive plants and FS demand for more herbicide use due to lack of prevention and early response.*
Response	Table 34 refers to specific sites where treatment effectiveness and reduction in herbicide use was monitored. This does not relate to the fact that **new** noxious weeds are introduced at a frequent rate, especially along the major roads and highways shown in the table. New invasive plant sites have continued to spread due to several factors: 1) the lengthy NEPA process, which allows invasive plants to increase in size making them more difficult to treat; 2) we have not had the ability to employ an Early Detection/Rapid Response strategy that allows rapid control of newly discovered sites; and 3) limited ability to use the most effective tools for each species and situation. Implementation of this EIS would allow us to treat inventoried existing sites, incorporate an Early Detection/Rapid Response strategy, and provide more options for effective treatment of different invasive plant species. Prevention strategies have been employed but prevention alone will not solve the existing invasive plant problem – more effective and efficient treatments will be necessary to eliminate existing invasive plant populations. Examples of our prevention efforts include setting up vehicle washing station for the B&B wildfire in 2003; requiring timber sale contractors to clean logging equipment before leaving roads, and requiring weed-free hay in wilderness areas. Appendix G provides more detail on the Forests and Grassland invasive plant prevention practices, and provides several examples of specific prevention activities.
13-9	*Treatments should not be utilized in areas where the root source of past and continuing introduction and spread of invasive plants has not been curtailed first.*
Response	The R6 2005 ROD standards address the causes of invasive plant spread and require Forest land managers to address prevention in all land uses. Several Forest Service policies emphasize prevention of invasive plant introduction, establishment and spread. Actions that may be

	taken to prevent the spread of invasive plants relative to specific land uses are not connected actions to this project. This project would be needed regardless of decisions made regarding access and travel management and other activities. As shown in Table 4 page 33 of the DSEIS, over 70% of the treatment units occur along roadsides, many miles of which are major thoroughfares such as State Highways 97, 58 and 26. Vehicles travelling through the Forests and vehicles used by forest visitors are a continuing vector of weed introduction and spread (often coming from private lands which can be miles away from Forest Service lands), which will not be curtailed. Education and weed prevention methods are used to reduce the incidence of introduction (see DSEIS Appendix G).

Table J-7. Response to comments – Treatment Method, Project Design Features

TREATMENT METHOD / PROJECT DESIGN FEATURES	
12-1	*My land is bordered on three sides by the Crooked River National Grasslands which have an extreme infestation of medusahead and morning glory that are encroaching on our land. I would like to request that the US Forest Service be able to control these weeds using chemical methods.*
Response	The land noted is adjacent to PAU #75-29 on the Crooked River National Grassland. This site contains spotted and diffuse knapweed, kochia, and Canada thistle along with the other two species indicated. This area is proposed for treatment in both Alternatives 2 and 3 (Appendix A page 40) using different techniques for each of the species. Chemical control is proposed for knapweed, kochia, morning glory and medusahead. Biocontrol is proposed for Canada thistle, see Appendix A.
14-22 14-103	*"Based on the first four target species, chemicals are included in the proposed treatments for 65 percent of the Project Area Units on the Deschutes National Forest and 82 percent of those on the Ochoco National Forest/CRNG." (DSEIS p.237) As less than 1 % of the area where herbicide application is currently permitted is being applied with herbicide currently due to the non-continuous nature of infestations and reductions in populations due to treatments, it is reasonable to conclude that acreages of herbicide need are overstated and that thus more could be controlled manually or mechanically as small and discontinuous populations. (See DSEIS p.237)*
Response	As explained in the DSEIS on pages 32-33, PAUs typically incorporate small weed sites with uninfested space in between sites, allowing for expected spread. The vast majority of treatment areas designated as such is roadways, where spread and introduction of weeds is constant and fluctuating. Delineating treatment areas in this fashion allows for analysis of a maximum treatment scenario. The Forest's integrated approach to weed treatment would not change; all methods of control would be used (see Appendix A). Control method is species and location dependant; see the DSEIS pages 41-43, 101-102, and Appendix B. If field review determines that a weed site can be cost effectively controlled with hand-pulling, it will be (see Appendix A and Appendix F).
14-32	*"Currently inventoried invasive plant sites, which is greater than what would be treated in any year, are only found in 1.6 percent of the total area within 100 feet of Class I-III streams and perennial lakes, reservoirs and ponds, and 0.9 percent of the total area within 100 feet of wetlands and springs." With such a low percentage of invasive plant populations within 100 feet of water, it is reasonable to insist that only manual or mechanical control be used within that needed buffer to avoid toxic chemical contamination of Oregon waters. Any broadcast spraying of herbicides should be at least 300 feet from water due to potential drift contamination of water.*
Response	The low percentage of invasive plants within 100 feet of water does not equate to a low need for treatment with effective methods. As

	discussed in the DSEIS in the Purpose and Need section of Chapter 1 and the Treatment Effectiveness section of Chapter 3, some invasive plants may not be effectively treated without the use of herbicides (including riparian species such as yellow iris and ribbongrass). There is no evidence that drift from ground based broadcast spraying is an issue 300 feet from surface water bodies based on monitoring results discussed throughout the DSEIS (for example, pages 55, 62, 251, 252, 263).
13-5 13-20 13-22	*The Forest Service must make a specific measurable commitment and clear prohibitions significantly reducing or eliminating the use of known and suspected toxic herbicides. Effective cultural / mechanical and biological treatments must be considered in all situations and utilized in preference to chemical treatments. Herbicides are a dubious and often dangerously toxic component of the DSEIS proposed integrated approach for control of invasive weeds. However, avoidance of known and suspected herbicide toxins, favoring biological control and manual / cultural treatments should be utilized, researched and developed in effectiveness, recognizing that the harmful impacts of toxic herbicides most often negate any potential initial control benefits they may be attributed. Herbicide spraying alone will not solve invasive plant problems, and without addressing prevention and natural control methods, long-term cumulative ecological harms and synergistic impacts will incrementally occur across the region, with as yet unforeseen consequences to the ecological integrity of natural ecosystems, native species biodiversity, and human community health and well-being*
Response	Cost-effective manual, cultural / mechanical and biological treatments will be considered in all situations and all alternatives (DSEIS p. 2, 5, 15, 81, 125, 421, 425). Herbicides would be prescribed where they are likely to increase the effectiveness of integrated treatment, within the limitations described in PDFs and buffers (DSEIS p. 67, 100-102).
13-13 14-42 14-144 14-261	*Ribbon grass in particular is considered difficult to remove and control with non-herbicide formulations. However, our organization participated in an all too brief demonstration project on manual removal of ribbon grass in the Metolius River. In only two brief actual working hours (as much of the time was spent in travel, discussion, and initial preparation) a significant portion of one island area of ribbon grass was cleared. If instead of harmful herbicide pollution of the Metolius (which is considered to be one of the most naturally pure water systems in the area), agency employees, state and county staff, and community volunteers joined in a long-term concerted effort, it is likely the Metolius River could be largely cleared of ribbon grass in a matter of two to three years. Of course this would also require regular monitoring and the removal of ribbon grass sources on the area's private lands. Absent such effort, even herbicide use would be repetitive, as root sources would continue to reintroduce the invasive plant into the water system. Cumulative repetitive use of herbicides would likely have unforeseen harmful consequences upon the natural purity, water quality, and fish populations of the Metolius, as well as upon the many human and animal visitors to this popular recreation Mecca. If private landowners may use a variety of techniques to control ribbon grass such as solarization, seed head clipping, and hand pulling/digging, it is reasonable to insist that the Forest Service rely on such manual techniques to avoid impairing water quality and aquatic ecosystems with toxic chemical contamination and to limit human and animal health hazards from toxic algae blooms. (See DSEIS p. 261, par. 6)*
Response	Internal and external concerns raised about the use of herbicides adjacent to aquatic resources provided the basis for developing Alternative 3 in the EIS (DSEIS, Chapter 2.3.3). The analysis of manual treatment effectiveness under Alternative 3 does not show a reasonably effective method for treatment on ribbongrass (*Phalaris sp.*) populations (DSEIS, p. 109). The DSEIS acknowledges that manual treatments can effectively remove ribbongrass without significant resource impacts when working on populations rooted entirely within

	water, but there are many populations on the floodplain or banks of the river on which manual treatments alone would incur excessive resource damage or be too costly. Although directed at the slightly more receptive populations rooted in water, the manual treatment in the demonstration pull project cited in this comment translates to more than a thousand person days of labor to just pull and dispose of the existing Metolius populations rooted entirely in water (Pajutee, 2008; DSEIS, pp. 109, 203). Populations rooted in the bank or flood plains of the river would require even more time and impact to the riverbank due to the massive excavation necessary to manually remove their entire root systems. In addition, the estimates of labor for pulling the populations rooted in water do not include the time for disposal and treatment of this material (solarization, burning) required to prevent the re-establishment of ribbongrass off-site. However, the analysis in the DSEIS is based on an integrated approach to invasive plant management and includes some level of manual treatment under both action alternatives when money or volunteer labor became available. As a result of these findings, the EIS under Alternative 2 recommends a combination of herbicide and manual treatments on *Phalaris* species along the Metolius and other wetland waterways to reduce costs and improve treatment effectiveness (DSEIS, Chapter 2.5, pp. 67, 69; Table 6; Chapter 3.3). Further support for the use of herbicides in consort with other control treatments comes from the Nature Conservancy, which recommends a full array of management options to effectively treat Ribbongrass populations (Tu, 2004). Monitoring of herbicide use by Oregon Department of Agriculture (2005) on existing invasive populations shows that less herbicide product is required for subsequent treatment applications of targeted populations (DSEIS, p. 105, 154-155), reducing the potential for effects to water quality, aquatic species and human health. The 80% herbicide treatment effectiveness used for this analysis also allows for the manual treatment of persistent individuals to occur in subsequent years with a reduced level of disturbance. In addition, the analysis of initial herbicide applications on *Phalaris* populations shows possible concentrations in adjacent water well below levels toxic to fish or capable of affecting water quality of the river. (DSEIS, Appendix H, Metolius GLEAMS run). Subsequent applications would be unlikely to incur toxic algae blooms capable of harming human or animal health.
13-23	*Among the effective management methods to remove already existent invasive plants are fire, seasonal strategic interruption of seeding, direct extraction, and maintaining healthy native soils, hydrology, vegetation, biodiversity, and natural ecological disturbance cycles and patterns.*
Response	An effective management method to remove invasive plants is species specific; the above list of methods is included in the DSEIS (see page 42 for a description of each method and Appendices A and B for specific proposals). Seasonal strategic interruption of seeding includes clipping seed heads, introduction of insects and pathogens, weed-whacking, hand-pulling, and mowing. Direct extraction includes hand-pulling, and root tilling. Prescribed fire is proposed on very dense houndstongue infestations (see page 43 and Appendix A) to reduce cover, reduce the seed bank, and stimulate germination. Wildfire can increase and encourage the presence of invasive plants due to exposing mineral soil which prepares a desirable seed bed (page 97). Maintaining a diverse and healthy ecosystem of soil, water and vegetation is an excellent prevention measure to discourage the spread of invasive plants.
14-99 14-118 14-264 14-218	*Use manual and mechanical control in areas where otherwise Picloram would be used. Re pg. 195 - Precautionary approach - Stop allowing the use of Picloram & Triclopyr and restrict use of Sulfometuron Methyl*

14-78 14-96 14-204	
Response	The DSEIS and the R6 2005 FEIS to which it is tiered provided exhaustive discussion about the potential risks associated with use of these herbicides and potential mitigation measures to reduce unwanted effects. The DSEIS acknowledged specific risks of using picloram, triclopyr and sulfometuron methyl. . No picloram or triclopyr BEE may be used within 50 feet of any wet or dry stream in Alternative 2 (DSEIS table 15), which minimizes potential for water contamination. Alternative 3 does not allow picloram and triclopyr near riparian areas.
14-100 14-101 14-136 14-34 14-111	*Switch the 724 acres within 100feet of water to manual control methods. The remaining acres for which risk of movement to stream channels is noted (30 acres). Switch the 320 acres of proposed herbicide use adjacent to hydrological connected road segments to manual or mechanical control. RE p. 303, 3rd Para. Use of herbicides in ditches leading to or near streams & intermittent or ephemeral stream channels is a bad idea due to potential runoff from storms and persistence in soils. Precipitation amounts, and timing is not controllable*
Response	While there is a slight risk of herbicide movement to water in these 724 acres of invasive plant areas within 100 feet of perennial water, the risk is very low. Herbicides may enter the water but in such low concentrations that effects to fish and aquatic biota would be negligible (DSEIS p. 318-321). PDFs (42-49 and 54, p 53-54), buffers and restrictive application methods with 100 ft of streams (Tables 14, 15 and 16, p. 60, 62, 63) are sufficient to minimize risks from herbicide treatment in riparian areas. The buffers also limit the type of herbicide and application methods within road segments that occur adjacent to waterbodies. SDEIS pages 303 and 304 discussed the potential for herbicides to enter water and reasoning for why effects would be negligible.
14-105 14-195	*RE Alt 1 pg 238 This seems ridiculously low I don't see how > 10 plants warrant herbicide use. Even large stubborn plants like Himalayan blackberry can be successfully pulled including roots at a rate of >10 plants per person per hour. Smaller plants w/ less extensive root systems can be handpulled by the hundreds per person per hour. A small crew can fill several dump trucks in just a few hours and this is a volunteer crew working at a leisurely pace! P. 366 Some of what the FS terms "moderated-sized infestations" are actually small enough to control with manual techniques given the will to do so, and proper allocation of funding to prioritize manual control, thus creating more jobs and better protecting the ecosystem*
Response	The description of using herbicide on more than 10 plants is from the Ochoco NF/Crooked River NG 1998 Noxious Weed Treatment EA that is currently in use. Ten plants was a number used in an attempt to limit the amount of herbicides used; the strategy at the time was that manual control of very small populations would be effective. The effectiveness of this strategy is species specific. It works well on some biennial species such as scotch thistle and bull thistle (see page 100-101). It does not often work well on annual and perennial species. Evidence of this is the spread of invasive plants since 1998, as described in Chapter 2 of the DSEIS, comparing the alternatives, and noting the vast increase in new weed sites. Sites approved for herbicide control in 1998 now have few plants and are often hand pulled, whereas those not approved for herbicide control have spread despite manual control efforts. In addition, new invasive sites introduced after 1998 that are being hand-pulled are growing substantially (examples include knapweed in the Metolius basin, houndstongue on the Paulina RD). In contrast, the proposed strategy, EDRR, in this EIS is to control new infestations using herbicide to prevent spread, and then follow up

	with manual methods as a maintenance treatment if necessary.
14-127 14-214 14-217 14-219 14-72 14-151	*Judging by the toxicity index for fish given in table 68, at a min. the following herbicides should not be used anywhere near fish habitat - Glyphosate ,Glyphosate with POEA Metsulfuron methyl, picloram, sethoxydim, sulfometuron methyl, triclopyr acid, triclopyr BEE, & NPE surfactants. Chlorsulfuron should also be avoided. P. 370. We are concerned by the neurotoxicity of napthalene and ask that Sethoxydim formulations with it such as "Poast" not be used. P. 371 No glyphosate formula should be used that might involve the use POEA surfactant ie roundup. P. 372 We remain greatly concerned by planned use of "aquatic" glyphosate and "aquatic" triclopyr-TEA in particular and all others except clopyralid and imazapic. P. 320, There doesn't seem to be anything inherently safe about "Aquatic approved" Imazapyr & glyphosate*
Response	The values in table 68 as well as the discussions in DSEIS (p. 370-372) are simply the results of laboratory toxicity testing and do not account for exposure, dose-response, or risk characterization from proposed use activities. All of these factors, as well as environmental conditions within the project area and extent of infestations are used to assess risk from the herbicides. Quantitative data in the risk assessments, along with the PDF's and buffers required indicate that use of herbicides, including surfactants and inert ingredients, as proposed is unlikely to result in substantial adverse effects. Information in DSEIS (p. 320, paragraph 3) indicates very low risk from use of aquatic glyphosate or aquatic imazapyr: "Most research done in field situations has shown that even when these herbicides are applied at rates several times higher than the highest amounts proposed for this project concentrations measured in streams would have little to no adverse aquatic ecosystem impacts (Michael 2004, Michael and Ruiz-Cordova 2006, Patten 2003, Michael 2000)." Absolute safety can never be proven and this is clearly stated on p. 90, paragraph 3. See minimum buffers (DSEIS Table 15, p. 62). Non aquatic glyphosate, picloram, and sethoxydim would not be sprayed within 100 feet of perennial water (fish habitat) and could be directly applied to plants with hand wick or wipe application within 50 feet of perennial water (fish habitat). POE or NPE surfactants are not allowed for use within 100 feet of water or roadside ditches that feed into streams (PDF 44 page 53). Triclopyr BEE is not allowed for use within 150' of surface waters (DSEIS PDF #49, p. 54). Metsulfuron methyl appears to have a very low potential to cause any adverse effects in aquatic animals. All of the hazard quotients for aquatic animals are extremely low, with a range in fish from 0.0000000003 (acute exposures in tolerant fish) to 0.00003 (longer-term exposures to sensitive fish). Thus, there is no basis for asserting that adverse effects on aquatic animals are likely (SERA 2004e). It is not anticipated that adverse effects in aquatic algae would result from exposure to metsulfuron methyl at application rates used by the Forest Service (SERA 2004e) (DSEIS p.293). Chlorsulfuron appears to have a very low potential to cause any adverse effects in aquatic animals. All of the hazard quotients for aquatic animals are extremely low, ranging from 0.00000008 (longer term exposures in tolerant invertebrates) to 0.001 (acute exposures to sensitive aquatic invertebrates) (SERA 2004a) (DSEIS p. 301-302). Data on metsulfuron methyl toxicity to fish and aquatic invertebrates were obtained in several species. Fish do not appear to be highly sensitive to sulfometuron toxicity (SERA 2004h). Thus, if sulfometuron methyl is applied in areas where transport to water containing aquatic macrophytes is likely, it would be plausible that detectable but transient damage could be observed. Aquatic algae do not appear to be as sensitive to sulfometuron methyl (SERA 2004h). The effects of sulfometuron methyl on three species of aquatic plants studied by

	Davies et al. (2003) indicated that at environmentally relevant concentrations and short exposure periods effects to aquatic plants are not expected (DSEIS p. 306).. The U.S. EPA/OPP (1993c) classified technical grade glyphosate (similar to the aquatic formulation) as non-toxic to practically non-toxic in freshwater fish (SERA 2003a). The use of less toxic formulations results in hazard quotients that do not approach a level of concern for any species (SERA 2003a). Various field studies have not noted any remarkable effects on aquatic invertebrates. At application rates of 1 L Rodeo/ha for the control of purple loosestrife, Gardner and Grue (1996) noted no adverse effects on aquatic invertebrates. At application rates of 0.94 or 1.48 kg a.i./ha as glyphosate IPA (Rodeo), Hagg (1986) found no indication of lethality in two water hyacinth weevils, *Neochetin eichhorniae* and *N. bruchi*. In a forest pond mesocosm, Hildebrand et al. (1980) found no differences in invertebrate survival over an 8 day period after application of 2.2 kg/ha, 22 kg/ha and 220 kg/ha (SERA 2003a). Imazapyr is relatively non-toxic to soil microorganisms, aquatic invertebrates, and fish and is not expected to bioaccumulate in the food chain (SERA 2004d). A number of standard bioassays are available on the toxicity of imazapyr to aquatic plants. The most sensitive species appears to be aquatic macrophytes and peak concentrations of imazapyr in surface water could be associated with adverse effects in some aquatic macrophytes (SERA 2004d) . Longer term concentrations of imazapyr, however, are substantially below the level of concern (SERA 2004d, DSEIS p. 292). Select application methods and rates near water will prevent adverse effects to fish through any detrimental effects that could occur to macrophytes (DSEIS Table 15, p. 62 and PDF #54, p. 54). The salt/acid formulation (Triclopyr TEA) will be used over the ester formulation (Triclopyr BEE) (DEIS PDF 14 page 52). Triclopyr BEE is not allowed for use within 150 ft of waterbodies (DEIS PDF 49 page 56). Triclopyr TEA has low potential to effect sensitive fish species and is only proposed as a first choice herbicide on small patches of Himalayan blackberry and scotch broom (See proposed treatment in DEIS appendix A). Triclopyr TEA is quickly degraded in water by hydrolosis with a ½ life of 2-6 hours (SERA 2003d). This herbicide will not be broadcast sprayed and only spot spray or hand select methods will be used. The use of PDFs and buffers and the research on effects to fish and fish habitat explained above leads us to believe that this project would not be using herbicides too near fish habitat that would result in the occurrence of unacceptable effects to fish or aquatic life. The scope of these effects would not lead to significant mortality of fish or damage to their habitat.
14-130	*Discussion of risk categories for aquatic organisms and fish on pg 293 indicates to us that any herbicide used near water (which we don't support) it should be only Clopyralid or Imazapic.*
Response	See response to comments 14-127, 214, 217, 219, 72, 151
14-189	*P. 364. The conclusion should be that the proposed action will not use mixtures of more than two active ingredients, and only those tested together for additive and synergistic effects!*
Response	Standard 16 of the Forest Plan (R6 2005 ROD) requires that the Hazard Index of tank mixtures add up to less than 1, which means that the potential for adverse effects is low to non-existent (see discussion about herbicide toxicology on pages 88-93 of the DSEIS). The standard regarding tank mixtures is based on ATSDR 2004, which involved EPA, National Academy of Sciences, National Research Council, and the Occupational Health and Safety Administration. Page 294 of the DSEIS explained the rationale for this approach. Tank mixtures and synergistic effects were also discussed on pages 338, 364, and 373 of the DSEIS.
14-194	*p. 365 - Creation of bare ground is completely counterproductive to reducing and controlling invasive plants. Once agin the FS seems to be on a holy crusade with a narrowly defined enemy (invasive plants, as with fire) and a steam roller approach, disregarding its impacts.*

Response	Bare ground is not presented in the DSEIS as a desirable or likely long-term outcome of the project. Removal of invasive plants may cause bare ground for a season or two. The intent is to restore treated areas with desirable, non-invasive vegetation. In most cases, passive restoration will be adequate to restore more desirable ground cover. As discussed on page 45-46 of the DSEIS, positive effects on site productivity would be expected as native vegetation is restored (see also Appendix E).
14-197 14-201 14-229 14-271	*P. 366 Larger duration of disturbance except with a few species, is less damaging than toxic chemical use.* P. *367 Movement of herbicides from application site to other areas through leaching, volatization, or adsorption can cause impact to unanticipated non-target wildlife species, humans, fish, and waterways for which the chemical formula used may be more dangerous than wildlife impacts analyzed, adding another reason to avoid the use of herbicides and prioritize other non-toxic focus of invasive plant control.*
Response	The scientific sources for PDFs were shown in section 2.4 of the DSEIS, and also in Desser 2008, which address concerns for chemical exposure; off site movement of herbicides; and noise, human presence and wildlife disturbance to wildlife. These sources indicate disturbance would be more likely to affect wildlife than herbicide use itself.
14-233	*p. 376. Loss of Oregon and Columbia spotted frogs themselves is predictable (and avoidable) if you spray their habitat with herbicides.*
Response	Page 376 described the potential effects on frogs from "lack of appropriate treatments." Effects on frogs from Alternatives 2 and 3 were described on pages 390-393. DSEIS pg. 393 concluded that this project "may impact, but are not likely to lead to a trend toward federal listing" of Oregon and Columbia spotted frogs.
14-253	*p. 425. The logic is clearly flawed – negative health impacts clearly impact the public more seriously than short-term disturbance by manual workers! It is unfair to contaminate all these sites with toxins leading to site avoidance or unintentional exposure.*
Response	Page 425 noted that manual treatments generally take longer than herbicide application and thus workers would remain working on recreation sites for a longer period of time. Negative health impacts are not predicted from herbicide use in this project (as discussed in the Human Health section of the DSEIS).
14-255	*p. 426 Public notification is not an adequate response to protect concerned members of the public from undesired contact with herbicides. There is no alternative offered to specifically better protect the public by avoiding toxic herbicide use in recreational areas.*
Response	Public notification is not the only means used to reduce the likelihood of public contact with herbicides. Many of the project design features (pages 50-62 of the DSEIS) are specifically calculated to reduce potential adverse impacts. In addition, Appendix F outlines the implementation plan, prescription format, and example scenarios that provide for public safety. Page 107 of the DSEIS describes the risk reduction framework to ensure the safe use of herbicide. Alternative A is a continuation of the 1998 EAs, where herbicide use in recreational areas is less than the other alternatives. Human health effects are summarized in the DSEIS, p. 337-338.
14-262 14-265	*P. 430, Para .2 We support manual methods of invasive plant control in wilderness areas, wild and scenic rivers, the Oregon Cascades Recreation Area, and roadless areas.*
Response	Manual methods are proposed for wilderness areas and the Oregon Cascades Recreation Area (DSEIS p. 427-428, 430). As shown on p. 430 and 437, all treatment methods are proposed for use in Wild and Scenic River corridors and inventoried roadless areas, depending on species and specific project area (see Appendix A). Treatment methods are often used in combination. As discussed on SDEIS page 60, certain invasive plant species such as ribbongrass, reed canarygrass, and yellow iris, are not likely to be controlled effectively with non-herbicide methods. The location and size of the infestation, species biology, environmental factors, management objectives, and treatment costs all factor into the choice treatment method(s) (USFS 2005a). Mazzu (2005) compiled information about treatment options for

	invasive plant species in the Forest Service's Pacific Northwest Region (Region 6). Mazzu's information was incorporated into Appendix B, which summarizes and discusses treatment options and common control measures for invasive plant species on Deschutes and Ochoco National Forests and the Crooked River National Grassland. PDFs 9-35, buffers, and Appendix F ensure redundant layers of caution to ameliorate potential adverse effects of using herbicides.
14-272 14-270	*P. 435, para 2. Ochoco Divide RNA- a larger timeframe for hand pulling is appropriate to avoid chemical impacts. Find more volunteers or hire more local people to hand pull if necessary. P. 434, Re Table 113: Use of toxic herbicides does not allow for continuation of natural processes.*
Response	Hand-pulling of houndstongue and spotted knapweed on five sites within and adjacent to the Ochoco Divide RNA has been done for four years, without control. Approximately 1,524 hours of labor, by YCC and Northwest Youth Corps crews and Forest Service personnel, has occurred with little reduction in density, and no containment. As described on page 435 of the DSEIS, herbicide control is proposed, and research scientists from the PNW Research Station are in agreement with specific conditions (see Appendix F and the letter dated May 12, 2009 in the record). Treatment of invasive plants within RNAs is considered necessary (p. 435) as these plants have the ability to disrupt natural processes. Manual control of medusahead is proposed for The Island RNA. See Appendix F for measures to ensure least effect on ecological processes when herbicide use in RNAs is proposed. Authority to control invasive plants is under the jurisdiction of the Forest Supervisor as outlined in Forest Service Manual 4063.04b part 4.
14-274	*Avoid chemical use in riparian areas, in the Newberry Monument for Canada thistle.*
Response	There are no project area units within riparian areas proposed for herbicide treatment within the Newberry National Volcanic Monument (table 115, page 437). Canada thistle is one of five species proposed for herbicide control along roadsides (see Appendix A.) See response to comments under the headings "Water Quality" and "Riparian Buffers" for responses to other riparian comments. Future treatments of Canada thistle in riparian areas may be proposed under EDRR. The proposal would be evaluated under the implementation plan found in Appendix F of the FSEIS. Appropriate PDFs would be applied based on location and other specifics of the site including soil conditions and distance from water.
13-6	*We support the prohibition of broadcast spraying of herbicides in riparian areas and strongly request this be extended to prohibit broadcast spraying anywhere. Herbicide should not be broadcast sprayed anywhere.*
Response	Rather than eliminate all broadcast spraying, Alternatives 2 and 3 use PDFs and buffers to make sure exposures are under a threshold of concern in specific habitats and locations. Broadcast spraying is proposed where the density and extent of infested plants is great enough to warrant continuous coverage. Most of the infestations are small and scattered and spot spraying would be adequate. However, in areas that are dense or larger, broadcast spray is most cost-effective. Broadcast spraying can reduce the size of large weed populations to a threshold size where manual treatments can be effectively used (DSEIS p. 105). The PDFs and buffers address specific situations where broadcasting involves potential risk to water quality, species of concern, or people (PDFs 12, 27, 29, 56, 57, 60, 66, 67, 75, 83, 89, DSEIS p. 51-61).
4-4	*I wish to comment on the ribbon grass and canary grass that is growing on the islands along the Metolius River. I have read the DSEIS and am concerned about the usage of herbicides. Manual pulling, mowing and weed whacking seems a good idea prior to the use of pesticides. [Do not use] a spray rig that covers and kills everything.*

Response	Infestations of ribbongrass growing along the Metolius River are proposed for chemical control in Alternative 2, which would allow spot spraying up to 10 feet of water, and hand application (wick/wipe) of individual invasive plants up to the water edge (see Table 15, page 64). Alternative 3 would not allow herbicide control of invasive plants within 10 feet of perennial water, including the Metolius River. No broadcast spraying using a spray rig is proposed in either alternative. The Forest Service would pursue the idea of weed-whacking ribbongrass foliage to determine if reducing the quantity of foliage considerably reduces the amount of herbicide needed, and if the same control effectiveness is obtained. Trials would be done on a small scale at varying levels of foliage removal, and the treatment strategy for ribbongrass would be adapted accordingly (see DSEIS p. 102).
14-198	*P. 366 We are still concerned by the use of introduced exotics (biological control agents) to control other exotics with largely unknown consequences.*
Response	Prevention Standard #14 of the R6 2005 ROD requires use of only APHIS and State-approved biocontrol agents that do not have direct negative impacts on non-target organisms. The main biocontrols proposed for use in this project are the stem gall fly and the root-crown weevil for control of Canada thistle. These insects were introduced to the US in 1977 and 1972 respectively. They are not known to affect native plants, and APHIS considers them mostly ineffective at controlling Canada thistle, however the Forests have had local success in using the two insects in conjunction. As stated in Table 10 of the DSEIS and Appendix B, several other biocontrols exist within Central Oregon, and are expected to move on their own.
14-54	*The proposed project design features (PDFs) are untested as to effectiveness*
Response	The PDFs listed on pages 50-62 of the DSEIS include a variety of measures that limit the extent and/or type of treatment so that risks of adverse effects are reduced. Most of the PDFs are common "best management" practices that have a scientific or practical basis. The IDT adopted some measures from NEPA documents for current invasive plant treatment projects on neighboring federal lands. PDFs include limitations on rate and application method to keep the potential exposure below the threshold of concern indicated in scientific SERA Risk Assessments. The buffers are based on field monitoring (Desser 2008). Many PDFs are reiterations of herbicide label requirements and material safety data sheets, both of which are subject to rigorous scrutiny and testing by the EPA. The PDFs make explicit those label requirements that minimize the potential for specific effects to occur. The PDFs and buffers add redundant layers of caution to make sure that the potential adverse effects of using herbicides are minimized as per Ochoco/Deschutes/CRNG Forest Plans invasive plant treatment standards 19 and 20. The PDFs and buffers are based on practical experience, published studies, field monitoring, scientific testing, and predictive modeling. For example the Marrs et al. (1998) study discussed on pages 139-140 determined overspray from **broadcast** application of most herbicides did not cause lethal effects beyond 7 feet. The PDFs proposed in this document are more conservative, adding the described layer of caution.
14-65 14-176	*There should be no deviation from the programmatic BA project design criteria restricting herbicide use in Oregon Spotted frog habitat.*
Response	Page 353 of the DSEIS discussed the programmatic BA, which stated, "Use of pesticides, herbicide, and similar potential contaminants are prohibited in and immediately adjacent to wetland habitat. Applications of these herbicides should be conservative when estimating drift to avoid any contamination." Page 353 explained that the application of this project design criteria from the programmatic BA must be qualified because effective invasive plant treatment is important to maintaining suitable frog habitat. Consultation with the US Fish and

	Wildlife Service biologists has occurred regarding this project and PDFs have been developed in cooperation with other local, state and federal agencies.
14-36	*We are also opposed to the use of herbicides in dry intermittent stream channels and on hydrologically connected road segments.*
Response	Mobilization of herbicides by rainfall shortly after application from dry stream channels and hydrologically connected road segments was identified as a concern by the ID Team with specific design elements incorporated in Alternative 3 (see PDF 58, Table 16, and description of Alternative 3 in Chapter 2 – 2.3.3). In Alternative 2, minimum broadcast spray buffers adjacent to perennial streams, intermittent streams, and lakes/wetlands would substantially reduce the potential of chemical application in dry channels within these buffers and reduce the amount of herbicide applied in connected road segments (see Table 15).
14-68	*Broadcast spraying and spot spraying of herbicides should be prohibited in areas adjacent to agricultural crops and bee-keeping given insufficient study of effects to bees and possible pesticide contribution to Colony Collapse Disorder.*
Response	Page 399 stated the herbicides proposed for use in Alternatives 2 and 3 have a low toxicity to honey bees and are not suspect in colony collapse disorder, based on Cox-Foster et al. 2007 and Winfree et al. 2007. Effects to bees are required prior to registration of these herbicides and have been found to be minimal with the herbicides proposed.
14-79	*Broadcast spraying should only be used as a last resort and only in large infestations of almost pure invasives.*
Response	Broadcast spraying would be used according to PDFs where it is most effective; e.g. the density of invasive plants exceeds approximately 70 percent and/or the extent of infested area is large. Broadcast spraying would not be allowed within 50 feet of perennial streams, wetlands, lakes or ponds in Alternative 2 and within 300 feet of streams in Alternative 3. As discussed on page 27 of the R6 2005 ROD, herbicides should be part of an integrated prescription aimed at achieving optimum results rather than as a tool of last resort.
14-80	*Herbicides [triclopyr, glyphosate, sulfometuron methyl, picloram] should not be used in mushroom gathering areas or in broadcast spraying, impacts to both soil & fungi. Not using triclopyr & glyphosate will also help protect bryophytes & lichens (see p 141 EIS.)*
Response	See response to comment 14-61 for a detailed discussion related to herbicide contamination of edible mushrooms. The habitat preference of the majority of edible mushrooms reduces the likelihood of their presence on the highly disturbed invasive plant sites proposed for treatment. In addition to little spatial overlap between treatment sites and mushroom sites, PDFs (*see pages 46-58, DSEIS*) would minimize off-site drift (e.g., PDFs 9 and 16) reducing potential inadvertent contamination of mushrooms. The soil analysis for this EIS concluded that overall effects to the soil resource would be minimized and soil productivity would be maintained by this project as a result of Project Design Features (PDFs) that limit the extent of physical disturbances and herbicide application rates. PDFs 9-17 and 45-47 minimize the effects of herbicides on the soil resources. PDFs 36-41 provide direction for special forest products, including popular berry and mushroom picking areas. Annually, an invasive plant assessment review team will be assembled to identify sites for potential treatment and will follow the steps outlined in the annual implementation plan (Appendix F). As part of this process, all appropriate PDFs will be selected for each treatment site and a plan will be developed for implementing applicable PDFs. The use of triclopyr is limited to selective application techniques only, such as spot spraying, wiping, basal bark, cut stump, and injection (Regional Standard 16, R6 2005 ROD). Glyphosate is non-selective and PDFs require careful application of herbicides, protection of non-target vegetation, and reduce potential for drift and runoff (e.g., PDFs 5, 12, 13, 15, 16, 17).
14-82	*Drop the qualification in PDF 48[not using picloram and/or sulfometuron methyl on high clay content soil…unless other methods are not*

	available or feasible]
Response	The suggestion to drop the qualifier resulted in a re-evaluation of our PDFs. As a result, PDFs 45 and 47 were clarified and re-worded. This covered the intent of PDF 48. Therefore, PDF 48 is no longer needed. PDF 45 now prohibits the use of picloram, clopyralid & metsulfuron methyl on high porosity soils, PDF 47 was changed to include picloram and sulfometuron methyl (along with clopyralid) on shallow, scabland, or high clay content soils to avoid herbicide runoff. The qualifier was dropped.
14-83	*PDF # 67 - Drop allowing spot spraying of Glyphosate[within sensitive plant locations]*
Response	Covering or shielding of sensitive plants is a feasible technique, depending on the density of the sensitive plant population. If covering or shielding sensitive plants was determined to not be feasible (PDFs 64 and 66), then spot spraying of glyphosate does not apply and would not occur.
14-84 14-86	*Selective application of the sulfonylurea herbicides (or none at all) is a good idea in general, not just after wildfire, due to their potency. Do not broadcast spray sulfonylurea herbicides*
Response	The preferred alternative (Alternative 2) does not allow broadcast spraying of sulfonylurea herbicides within 100 feet of perennial streams. This buffer distance has been demonstrated to effectively keep herbicide from entering waterways (see past monitoring results described in the DSEIS on pages 251 and 252). Alternative 3 does not allow broadcasting within 300 feet of streams. PDF 69 also limits broadcasting of these herbicides on bare or dry soil because they are very potent and drifting soil has been known to impact non-target vegetation off site. To address the concern raised in the comment, PDF 69 has been reworded for the FSEIS as follows: Use of sulfonylurea herbicides (chlorsulfuron, sulfometuron methyl, and metsulfuron methyl) will require soils, adjacent vegetation, and site conditions to be evaluated prior to treatment. Use selective herbicide applications (e.g., backpack, spot spray) of sulfonylurea herbicides for one to two years after a severe disturbance (e.g., wildfire) or longer until sufficient revegetation has occurred and soils are not prone to wind erosion. Avoid mid-summer conditions when soils are powdery and dry and rainfall events are likely to be high intensity thunderstorms. Broadcasting of these herbicides would be infrequent given the type of infestations known within the project area.
14-85	*Drop the qualifier in PDF 70 [do not use imazapic for 1-2 yrs after fire if reseeding is to take place]*
Response	The label for Plateau (a formulation of imazapic) cautions that when making new plantings of prairiegrass or wildflowers, carry-over from persistent herbicides such as sulfonylurea….applied the previous year may result in compounded injury or death of desirable vegetation when treated. Alternatives 2 and 3 require waiting at least 18 months as a more cautious, conservative requirement to ensure that newly revegetated areas previously treated with sulfonylurea herbicides would not be impacted (PDF #70, DSEIS p. 58).
14-91	*Re Table 35. All of these MIIHs could be turned into no impact either by buffering the sensitive plants, using only hand pulling within the buffer zone or with no use of herbicides in the area at all*
Response	Buffers are required if a Forest Service Botanist determines that buffers are needed (PDFs 66 and 67). Manual treatments of invasive plants within rare plant populations will be considered when incorporating PDF 64. PDFs 63-71 are designed to ensure protection of sensitive plants. PDF 64 requires that Forest Service Botanists identify the steps that need to be taken to protect sensitive plants. This may involve avoiding the plants or selecting manual treatments instead of herbicides. If herbicides are the preferred treatment, then PDFs 66 and 67 provide direction for buffering sensitive plants. Other layers of caution, such as Regional Invasive Plant Standards and herbicide label restrictions, would be incorporated into planning and implementing treatments.

	Potential impacts to sensitive plants are expected to be minimal (i.e., reduced to the lowest extent possible) or eliminated, and there would be no decrease in distribution or loss of habitat. Even with PDFs and all the layers of caution integrated into herbicide treatments, there is always the chance – though a minimal chance – that an individual sensitive plant(s) might be damaged in some way by herbicide contact. An effects determination of May Impact Individuals or Habitat was made in some situations (Appendix C of EIS) as a conservative professional judgment to ensure any potential effects are disclosed.
14-93	*Don't use herbicides in areas with mountain lady's slipper & choromyces alveolatus.*
Response	Botany PDFs 63-71 are designed to ensure protection of sensitive and other rare and uncommon plant species. Forest Service Botanists would be involved in designing appropriate treatments (PDF 64) and would consider manual as well as herbicide treatments. If herbicide treatments were used, Forest Service Botanists would work closely with herbicide applicators to ensure PDFs are implemented. Mountain lady's slipper (*Cypripedium montanum*) plants are easily identified and can easily be avoided from invasive plant treatments by implementing PDFs. The fungus, *Choiromyces alveolatus*, is a truffle and can be difficult to locate and determine the extent of the population. Since the DSEIS was written, we now have a national NRIS TESP-Invasives plant database that includes spatial site data about older surveys done by Forest Service Research for other rare and uncommon plants, such as *Choiromyces alveolatus*. We now know that the fungus site is not within mapped St. John's-wort populations as originally thought. The site is adjacent to (not within) Project Area Unit 15-05 (Highway 20). Spotted knapweed occasionally occurs (in a very scattered distribution) on disturbed road shoulders on Highway 20, but the habitat for the fungus is not within the disturbed road shoulders. *Choiromyces alveolatus* has a dependent mycorrhizal association with old-growth stands containing high elevation hemlocks (*Tsuga heterophylla* and *T. mertensiana*), Douglas-fir (*Pseudotsuga menziesii*), true firs (*Abies* spp.), lodgepole pine (*Pinus contorta*) and ponderosa pine (*Pinus ponderosa*) (Castellano and O'Dell 1997). In addition to minimal spatial overlap between treatment sites and the *Choiromyces alveolatus* site, PDFs would minimize off-site drift (e.g., PDFs 9, 15 and 16) reducing potential inadvertent effects to this fungus.
14-108	*Pg. 251 Any broadcast spraying should be at least 300 feet from water due to drift.*
Response	There is no evidence that drift from ground broadcast would reach water 300 feet from the application site in measurable concentrations. Literature cited in the DSEIS indicates that buffers of between 20 and 50 feet are extremely effective at preventing 85-100% of applied product from reaching water, thus a 300 foot buffer would provide no additional protection(see past monitoring results described in the DSEIS on pages 251 and 252).
14-202	*P. 367 Project design criteria should not be just used to reduce effects to listed and proposed species, but to reduce herbicide impacts in, and use in general.*
Response	Project Design Features address a wide array of concerns for environmental and public health protection, including coordination with adjacent landowners and municipalities, proper application procedures and application restrictions, public notification, protective measures for municipal watersheds, drinking water sources and recreation, forest product and food gathering sites. PDFs were listed in the DSEIS, p. 50-62. The PDFs reduce herbicide impacts in general, not just listed and proposed species which are the subject of the cited paragraph.
14-241	*P. 378 Any use of mechanical equipment or motorized hand tools should be kept outside of the [Northern spotted owl] reproductive season and fledgling vulnerability.*

Response	The limited operating periods and distance restrictions are sufficient to protect fledgling spotted owls, based on sources cited on pages 49-65 of the DSEIS (DSEIS, p. 377-380).
14-192	*P. 365. The more nuanced the necessary PDFs the more likely they are to fail. The goal with this proposed action seems to be to use toxic herbicides rather than to exercise sanity and caution when controlling invasives. This is a house of cards and its downfall is that of the ecosystem.*
Response	The PDFs are a reiteration of commonly accepted practices, label advisories, or only apply to specific herbicides or sites, often even using a more conservative approach than label requirements. See Appendix F for an example of how sites are characterized, and how the prescriptions are developed, implemented and monitored, all using PDFs. Using project design features to reduce impacts of the project is not a new concept, PDFs have been used for many years, as part of every project implemented on Forest System Lands.
14-200	*P. 366 Use of prescribed fire should not take place in the spring reproductive season. Prescribed fire has been used successfully in forest uses even before the end of spring snowmelt, prior to the reproductive season*
Response	The timing of prescribed fire ignition depends upon many factors, including smoke management considerations needed to protect human health. Potential effect to wildlife is one of the considerations in the planning of a prescribed fire.
14-249	*p. 418. There should be no herbicide use in cultural plant areas, and no other activities in these areas that may harm cultural plants without prior consultation with and approval by all affected Native groups. The timing is not the only factor for avoiding impacts.*
Response	DSEIS page 418 clearly states that "…treatments in the vicinity of tribal use plants will require consultation with the relevant tribal government and resource specialists." Further iteration is provided in PDF #41 which states annual consultation with American Indian Tribes is required before herbicides would be used in cultural plant areas.

Table J-8. Response to comments – Analysis Data

ANALYSIS / DATA	
9-1	*Chapter 3.6 Water Resources, page 231 –Groundwater and Geology- a reference in this section is missing.*
Response	The citation was indeed missing from the References section of the DSEIS, this has been corrected.
10-3 11-3	*For the record, I also want to state that the DSEIS does not reveal the full impact of these products (imazapyr and sethozydim) to the ecosystem. Therefore the public is not able to make a fully informed decision when choosing an alternative.*
Response	The best available science, including peer-reviewed literature, was used as part of the risk assessment and in the analysis for this DSEIS (DSEIS p. 88-89). We are not aware of any new information that would impact the characterization of risk for these two herbicides. SERA had access to some information (for instance about inert ingredients in herbicide formulations) that is not otherwise publically available.
14-37	*Beyond reassuring statements, the consequences of potential groundwater and surface water contamination to humans, plants, and wildlife should have been assessed in the DSEIS for site-specific examples of representative situations in the planning area. This would be quite possible to do, given that there is detailed information given as to the location and nature of invasive plant populations, including which herbicides are proposed for use, riparian area proximity, and soil types.*
Response	A site-specific analysis for treatment along the Metolius River was conducted using GLEAMS-Driver (project file) and cited in the DSEIS

	(p. 319). Results indicated extremely low water concentrations – hundreds or thousands times below a level of concern for aquatic organisms, wildlife, or humans.
14-38	*Are there monitoring studies with contrasting results to those presented in the DSEIS that indicate small delivery of herbicides to streams? The reassuring low detection studies stand in contrast to various warnings elsewhere in the text of the DSEIS which suggest that perhaps the full range of scientific controversy is not being disclosed. Either that, or the uncertainties involved with real world complex ecosystems, weather events, hydrologic connections, and delicate webs of life are such that such reassurances may be insufficient to ensure no harm to water quality and riparian-associated wildlife or aquatic native plants. For instance, the DSEIS warns: "There is a higher risk of measurable levels of the aquatic formulations of imazapyr and glyphosate when spot sprayed for treating reed canarygrass, ribbon grass, and yellow iris from drift and accidental overspray because they can be spot sprayed up to the edge of the water for emergent vegetation (see Table 16). In addition imazapyr and glyphosate are very highly soluble (Appendix D Water Solubility Chart). Since emergent vegetation has a shallow water table, there is a potential for herbicide to enter the stream or water body in ground water." (DSEIS p.253)*
Response	The findings of relevant monitoring studies were disclosed in the DSEIS (for instance, see page 62 for discussion on monitoring related to herbicide buffers, and pages 251-252 for a discussion on herbicides and water quality). While herbicides are not likely to enter surface waters or cause harm to aquatic organisms, there is a very low possibility that minimal amounts of herbicide may enter streams from treatments within the scope of this project (DSEIS table 18). This is because herbicides may be selectively used near streams, however spot spraying is not allowed within 10 ft of perennial streams, seasonal streams, lakes or wetlands when water is present (DSEIS table 15&16).
14-41	*Regarding cumulative effects to water pH, dissolved oxygen (DO), and chlorophyll A, the DSEIS cautions: "...however during algae blooms, there is a low to moderate risk of spot spray applications of glyphosate for emergent vegetation on pond, lakes and reservoirs, stimulating algal growth which would affect pH, DO, and chlorophyll a. Proposed treatments of emergent vegetation (reed canarygrass) on water bodies with identified algal bloom problems are: Lava Lake (PAU 11-39), Crane Prairie Reservoir (PAU 11-53 & 11-56), wickiup Reservoir (PAU 1124), and Paulina Lake (PAU 11-39). All of these water bodies have had Oregon Department of Human Services (ODHS) public health advisories for algal blooms. Lava Lake is also on the state 303(d) list for DO." (DSEIS p. 259) The DSEIS also states: "Because there is a low to moderate risk of spot spray applications of glyphosate for emergent vegetation on pond, lakes, and reservoirs, stimulating algal growth, there could be a cumulative increase in nutrients and carbon which could increase the size of an algal bloom or increase the length of time a water body was on a ODHS Public Health Advisory for toxic algal blooms." (DSEIS p. 259) Thus there should have been analysis in the DSEIS about the potential effect of cumulative increases in the size or time period of toxic algal blooms from glyphosate spot spraying of emergent aquatic plants for human health, pet health, riparian ecosystem functioning, resident fish, and riparian-associated wildlife.*
Response	The minimum spot spray application buffer for aquatic formulations of glyphosate and imazapyr is 10 feet from edge of water for emergent species (reed canarygrass, ribbongrass, and yellow iris) to prevent accidental overspray or drift of these chemicals into adjacent waters. The minimum spot spray application buffers for all other chemicals proposed for use in this EIS are greater than 10 feet from the edge of water. Based on implementation of proposed PDFs and buffers and intensity of treatments, potential herbicide delivery to surface water would be substantially reduced and should be below detection levels and would not result in any measurable change in algae growth.
14-43	*It is typical for the DSEIS to discuss the potential impacts of invasive plants in the absence of a parallel analysis of the impacts of toxic herbicide use to the same ecological receptors, even when the riparian ecosystem, Sensitive-listed wildlife, or other vulnerable receptors*

	would be equally or more greatly impaired or killed by toxic chemical use.
Response	Throughout Chapter 3 of the DSEIS, information on the effects of invasive plants as well as the effects of treatment was disclosed. The effects of invasive plants are often discussed in the affected environment sections of each resource area, and in the effects of No Action. The effects of herbicides on aquatic and riparian ecosystems and wildlife are detailed in the Soils, Water Resource, Wildlife and Fisheries sections of Chapter 3.
14-48	*6th field subwatershed seems too gross a scale by which to accurately predict impacts to fish and aquatic organisms, given unmapped seeps and tributaries, micro-climate plant association group changes, lack of adequate fish population (and wildlife) surveys, changes in soil types, etc. The DSEIS admits on p. 301 re: Table 69 Hazard Quotient conclusions for Threatened and Endangered fish species populations: "The model can not take into account the local slope, water volume, forest vegetation, buffer zones, application locations or application method. These factors could influence the amount of herbicide that reaches a waterbody, its concentration once in the waterbody and consequently its effects to fish or other aquatic biota." This is a huge information gap indicating the lack of true site-specific assessment and the high degree of uncertainty in consequent risk assessment.*
Response	The 6th field watershed scale was used to run SERA worksheet models with general information about soils and precipitation. However, Invasive plant site locations are mapped in great detail and when overlayed with waterbodies and streams most perennial and intermittent water features will be avoided according to buffers (Tables 14, 15 and 16 pages 60, 62, 63) for this proposed action. Ground checking treatment locations before treatment occurs will discover most other significant water features that are not mapped such as springs and seeps. While the SERA worksheets model does not take into account the local slope, water volume, forest vegetation, buffer zones, application locations or application method. It assumes the following (see Appendix Q of the R6 2005FEIS): · 0.25 acre pond, 1 meter deep, with a 0.01 sediment fraction. 10 acre square field (660' by 660') with a root zone of 60 inches and four soil layers. · Stream with base flow rate of 4,420,000 L/day with a flow velocity of 0.08 m/second (1.8 cfs) or 6912 meters/day. Stream width of two meters (about 6.6 feet') and depth of about 1 foot. With a 10 acre square field (660' by 660') adjacent to the stream. · Broadcast spray application on sparse grass vegetation cover on 10% slope, which assumes that there is no herbicide taken up by vegetation. · Broadcast application applied to 10 acres stretching along 1.5 miles of stream. · Worst combination of soil and rainfall (different for each herbicide), with rainfall timing of once every 10 days, with rain event beginning 24 hours after treatment. Local soil and rainfall conditions were used for each subwatershed analyzed in this EIS. · Assumes all herbicide reaches the water at one point. · The most sensitive no observable effect concentration value for the most sensitive species were used to derive the toxicity thresholds. · For estimates of exposures, we used the central exposure limits from the SERA risk assessment worksheets and assessed impacts at the typical application rates. · Steady delivery of herbicide into a stream over 90 days for fish and 21 days for invertebrates, algae, and aquatic plants. · The aggregate risks of exposure to TCP (a major metabolite; 3,5,6-trichloro-2-pyridinol) from the breakdown of both triclopyr and

	chlorpyrifos (an insecticide) are considered in SERA risk assessment for triclopyr due to toxicity to aquatic organisms. The most conservative estimate of exposure to TCP is reflected in the applications of triclopyr and chlorpyrifos, which are spaced in such a way as to result in the maximum possible concentrations of TCP in water (SERA 2003). These assumptions likely overestimate concentrations of herbicides that would enter streams from this project. Mostly due to increased buffers for broadcast spraying in this project and the fact that more vegetation and on the ground organics will be present to intercept runoff with herbicide residue. Also the majority of invasive plant sites in this project are smaller and more widely scattered on the landscape than the model (ten acres treated stretching 1.5 miles along a stream). The size of the pond (0.25 acres and the stream (1.8 cfs) are very small and accurately represent the smaller sized ponds and streams with the project area.
14-50 14-152 14-153	*We are very concerned by so many determinations of "Likely to Adversely Affect" for listed fish species--especially with aquatic herbicide effects discounted and lack of characterization (number, type) of future early detection (EDRR) sites. (See Table 77, DSEIS pp. 322-323) Almost all the affect determinations for Alt. 2 are for adverse effects to listed species and critical habitat--This is a huge impact when the extensive scope of planned herbicide use is considered.*
Response	The determinations of "Likely to Adversely Affect" are for the treatment of ribbon/reed canary grass and yellow iris along the Metolius River and this determination was made based on disturbance to fish while treatment took place and temporary loss of cover when the habitat provided by the ribbon/reed canary grass or iris is gone and before it is replaced by native sedges or other native plants. Actual effects of herbicides on fish or their habitats were determined to “Not Likely to Adversely Effect” and this was mainly due to the possible chance of localized effects on aquatic macrophytes in some locations. However these effects are not expected due to conservation measures and PDFs (pages 48-63) to protect fish and aquatic organisms. Future EDRR treatments would not exceed size or scope of those analyzed for existing infestations, without further NEPA analysis. This is why the determinations of "Likely to Adversely Affect" could occur in other areas besides the Metolius River under future similar sized treatments of invasive emergent species such as ribbon/reed canary grass or yellow iris (DSEIS pg. 318-325 and Appendix H).
14-74	*Re: p. 108 para.2. 30%? A little more labor might accomplish the same results as herbicide applications without the toxic side effects*
Response	Thirty percent additional plant elimination rate using herbicides is an average figure determined primarily by species. Some invasive species, such as biennials can be controlled at higher than 50% levels (see page 108) by manual methods with diligent twice per year treatments. However the most aggressive species such as Russian knapweed, Canada thistle, ribbongrass, and reed canarygrass cannot (see Appendix B). Manual control methods have been used for many years on large, dense weed sites with little change in weed density or perimeter. For example houndstongue, a biennial species, in the Roba area of the Paulina RD has been treated manually by Forest Service personnel, youth crews and volunteers for the past 9 years. For the Roba area alone, more than 17,842 person hours have been expended on manual control, at an approximate cost of $322,860 and the houndstongue population continues to expand.
14-81	*You can’t always offset the short term impacts with long term benefits i.e. if herbicides kill off last populations of rare or sensitive plants as a “short term impact”.*
Response	The objective in all alternatives when applying herbicides is always to minimize non-target plant species damage and to protect known populations of sensitive, rare and uncommon plants. PDFs are mandatory and require that a Forest Service Botanist be involved in

	evaluating and designing invasive plant treatments so that sensitive and other rare or uncommon plants are protected. Both Alternatives 2 and 3 would not result in a loss of viability or cause a significant trend toward listing for any sensitive plant species on the Forests and Grassland.
14-112	*Re Page 252- How far upstream were the sampling sites?*
Response	Jones et. al. (2000) report refers you to Figures 4-7 which show application of the different chemicals by active ingredient in three concentration ranges within the effected watersheds with sampling points indicated by a cross in a circle. Application ranged from within 1mile up to about 80 miles upstream of sampling sites. The report and figures can be seen at http://www.cdpr.ca.gov/docs/empm/pubs/tribal/reports.htm
14-138	*The EIS states "The potential for herbicide delivery to streams from roadside treatments would be reduced by limiting herbicide choice, application rate and method near intermittent streams…" Limited by how much?*
Response	The potential herbicide delivered to streams would be limited by use of PDFs and buffers which do not allow herbicide application if precipitation is forecast within 24 hours and by the use of buffer zones which restrict distances herbicides and can be applied to waterbodies (DSEIS pages 52, 64, 65). There is a likelihood that some herbicides would reach waterbodies from roadside ditches or other treatments but the concentrations experienced by fish would be below what would cause detrimental effects (USGS 2001, Giudice et al. 2008, Davies et al. 2003, Stehr et al. 2009), see DSEIS p. 306. There is more chance for indirect effects to fish habitat in the form of effects on aquatic plants (macrophytes) but these effects would likely be small, localized and of short duration. These effects would possibly occur at the location where runoff from a roadside ditch entered a waterbody but mixing and increased flows during such a runoff event would dilute herbicides and make effects downstream of this location highly unlikely (Davies et al. 2003, Giudice et al. 2008,). Research done in field situations has shown that even when these herbicides are applied at rates several times higher than the highest amounts in this proposed action concentrations measured in streams would have little to no adverse aquatic ecosystem impacts (Michael 2004, Michael and Ruiz-Cordova 2006, Patten 2003, Michael 2000), see DSEIS pg 319-320.
14-143	*[pulling of reed canarygrass alone is not effective, page 309] This is ridiculous to assume without really trying. Hand pulling takes commitment, over time.*
Response	Hand pulling of invasive plants has been ongoing with district technicians that devote their summer to manually pulling invasive plants. Inmate crews and Youth Conservation Corps crews are also used for weeks at a time to pull invasive plants. Several invasive plants such as reed canary grass, Himalayan blackberry and Dalmatian toadflax re-sprout from rhizomes making manual pulling ineffective as a long-term treatment option (DSEIS 100-102, 109, 113). Hand pulling is still the treatment choice for several invasive plant populations in this proposed action. The proposed invasive plant control techniques are based on an integrated approach which includes hand pulling, and in some cases no treatment (see Appendix A). Some invasive plant populations will also be treated with a combination of manual and herbicide treatments. A demonstration plot of reed canary/ribbon grass was pulled on the Metolius River and based on that day of pulling 60 ft^2 with 12 person hours it would take several years and cost $108,900 for an inmate crew or $114,824 for GS-4 laborers to pull the acre of reed canary/ribbon grass that is now present (Pajutee 2008). Resprouting of rhizomes after the initial pulling would require additional pulling for an unknown number of years increasing these costs.

14-263 14-266	*P. 430. Outstandingly remarkable values for Wild and Scenic rivers should include their high water quality, or purity, and protection from chemical pollutants, such as herbicides. P. 432, table 112: Of all the outstanding remarkable values for the wild and scenic river in question all except geology and fundamental hydrology could be negatively effected by toxic herbicide use – esp. ecology, vegetation, fisheries, fish habitat and human health, re: recreation.*
Response	Outstanding remarkable values are designations unique to each river eligible for consideration by the Act. Although the original Act (PL 90-541) primary emphasis is given to protecting the river's esthetic, scenic, historic, archaeological and scientific features, high water quality is recognized as being important to the goals of the Act. The Act as amended states "…prohibits federal support for actions such as the construction of dams or other instream activities that would harm the river's free-flowing condition, water quality, or outstanding resource values." The many layers of caution imbedded in the proposal to use herbicides on invasive plants is based on scientifically credible and peer reviewed risk assessments that have prepared for the herbicides proposed for use (DSEIS section 3.2). The risk assessments indicate that the formulations proposed for use would not be detrimental to people, drinking water, and /or flora and fauna. PDFs and the implementation plan ensure the project complies with laws and regulations to eliminate negative adverse impacts to water quality, non-target plants, animals and humans.
14-157	*These are optimistic, rather than precautionary assumptions [dilution of herbicide from combined runoff].*
Response	The SERA risk assessments and site-specific models use the GLEAMS model to simulate herbicide run off and concentrations in streams given worst case conditions in a forested environment. The risk assessments are not optimistic; rather they assume contiguous broadcast to the water's edge. The use of buffers and selective application methods near water is likely to greatly reduce the amount of herbicide reaching waterbodies compared to the estimated concentrations (DSEIS p. 300-302, 318-321). Research done in field situations has shown that even when these herbicides are applied at rates several times higher than the highest amounts in this proposed action concentrations measured in streams would have little to no adverse aquatic ecosystem impacts (Michael 2004, Michael and Ruiz-Cordova 2006, Patten 2003, Michael 2000).
14-166	*Re Page 338. Reasons for concern: re: public and worker health effects from herbicides. The FS works so hard to be able to hypothesize absolute safety of herbicide use - the effort is better spent on alternatives to herbicide use and greater prevention.*
Response	The analysis follows standard risk assessment methods for exposure to chemicals, which is the best available science (see DSEIS p. 89). "Absolute safety can never be proven" (p. 89). Under all alternatives, the Forest Service would continue to use non-herbicide methods where cost-effective, and prevention measures will be applied to land uses and activities according to forest plan standards (Chapter 2 and Appendix G).
14-187	*Re: p. 364 [No interaction was observed between chemical components when present at concentrations 1/10 or 1/3, or their respective LOAELs] – for which chemicals?*
Response	The Feron et al. (1995) paper, as cited in Choudhury et al.(2000), summarized the results of several studies of chemical mixtures involving arbitrary combinations of chemicals, including aspirin, cadmium chloride, loperamide, and formaldehyde, among others. Ferone et al. concluded, "…the most important practical lesson from this study is that in comparison with exposure to single chemicals, exposure to a combination of chemicals may not constitute an evidently increased hazard provided the exposure level of each individual chemical in the combination is similar to our (slightly) lower than its own NOAEL." (parentheses in original quote) This section has been clarified in the

	Final EIS.
14-135	*[Berg 2004 conclusion that 49' is effective to minimize pesticide residue in streams}. So why are there buffers less than 50 feet?*
Response	See response to 14-49 for why buffer strips are less than 50 ft and response to 14-143 as to why hand pulling is not effective on all species in all locations including within 50 ft of waterbodies.
14-106	*Re Pg 241 - Define wetlands seems like riparian area should be very specifically defined.*
Response	The Decision Notice for the Deschutes National Forest Noxious Weed Control EA (Deschutes NF, 1998) was signed and implemented over ten years ago and is what the Deschutes NF is currently operating under. Due to its context in that EA, riparian area is interpreted as wetland in application. Changing the 1998 EA is outside the scope of this analysis. Wetland is defined in the DSEIS Project Glossary.
14-185 14-188	*RE page 364 - How often are the ATSDR criteria met for a given herbicide mixture? Couldn't generalizations about dose addition downplay potential risks?*
Response	Under Forest Plan Standard 16, tank mixes would always meet these criteria (R6 2005 ROD). Herbicide formulations that use herbicide mixes would also meet ATSDR criteria because the PDFs are designed to avoid risk exposure scenarios based on models explained in SERA risk assessments, the R6 2005 FEIS and its Appendix W, and pages 362-364 of this DSEIS. Dose addition is a conservative method of risk assessment (SERA 2007).

Table J-9. Response to comments – Analysis, Human Health

ANALYSIS – HUMAN HEALTH	
14-56 14-161	*Where is the site specific risk analysis for human health effects that is supposed to occur in this project level EIS?*
Response	Risks to human health are analyzed following standard and accepted risk assessment protocols. Exposure scenarios that are associated with risks to people are prevented in this site-specific project and no ill effects to people are predicted from the project. Page 337 of the DSEIS explained that both action alternatives "eliminate plausible scenarios of concern to people…no adverse effects to public drinking water supplies or health and safety are predicted." See the Human Health section of Chapter 3 DSEIS pages 331-339,
14-168	*Pg. 338. There's something wrong with your assessment modeling if that's all the HQ you get for that scenario for glyphosate. Less glyphosate exposure has resulted in anaphylactic shock.*
Response	The calculations used to determine the dose received from the exposures mentioned on p. 338 are standard methodology for assessing risk. The HQ is the estimated dose divided by the reference dose (RfD) and is not the calculated dose itself. An HQ much less than 1.0 means that no adverse effect is predicted (see page 332 of the SDEIS). The references do not indicate that anaphylactic shock would occur at low levels of glyphosate exposure and the commenter did not provide any new citations necessary to evaluate this statement.
14-169	*Pg. 338. How much would be metabolized between berries? Generally people also eat berries when they pick them*
Response	For acute exposures, the risk assessment calculation assumed no metabolism between berries, but rather assumes that all the berries are eaten immediately after spraying, which is a worst case scenario that is unlikely to actually occur. The analysis in the DSEIS includes worst case scenario – real situations would result in less potential exposure. Even given simultaneous additive exposure, no adverse health

	effects were predicted from this project (Human Health section of Chapter 3). PDFs require that treated areas be posted and the public notified when herbicide use is planned.
14-252	*P. 425 Description of overall effect on recreation resources being "expected to be minimal, short-term and localized" does not pass for adequate analysis - what effects to human health could happen? Worst case scenarios? Cumulative effects? Direct and indirect effects? Long-term herbicide residue effects?*
Response	The determination of effects being minimal, limited, localized and short-term is referring to the resource, meaning the scenic quality of the recreation areas (DSEIS page 424). The analysis goes on to explain the visual degradation the treatments may have and where revegetation may be necessary. The FSEIS has been revised to more adequately explain the terms minimal, limited and localized. Analysis of effects on human health is found in Section 3.8 of the DSEIS (and is referred to on page 424 of the Recreation and Scenery Section). The FSEIS has also been revised to strengthen the tie to the human health analysis and the SERA Risk Assessments. The R6 2005 ROD approved the use of new herbicides because they pose relatively low risk to people and the environment (USFS 2005b, p. 9). Layers of caution, including PDFs reduce the risks further. Direct, indirect, and cumulative effects on recreation and scenery are included on pages 420-426 in the DSEIS.
14-117	*Re page 259 Interesting that there is no mention in the EIS of the consequences of toxic algae blooms to human and animal health e.g. from skin rashes to liver damage to death of pets.*
Response	The FSEIS (see the *pH/DO/Chlorophyll a* sections under the alternatives) includes additional information about the effects of algae blooms. Not all algae blooms are harmful, but some, such as blue-green algae, can produce toxins. Skin irritation or rash is the most common health effect during blue-green algae blooms, but other symptoms can range from diarrhea, cramps and vomiting, to fainting, numbness, dizziness, tingling, and paralysis/death. The most serious reactions occur when large amounts of water are swallowed. Children and pets are at the greatest risk. To minimize the risk of herbicide stimulating algae growth, buffers restrict streamside treatments within 10 feet from the edge of water to selective treatments, which will prevent accidental overspray or drift into the adjacent waters. Based on implementation of proposed PDFs and buffers and intensity of treatments, potential herbicide delivery to surface water would be substantially reduced (Desser 2008).
14-58	*PDFs don't eliminate the backpack sprayer's risk because they still allow the use of Garlon 4. (See DSEIS p. 335) There is no compelling reason to use Triclopyr that outweighs its risks.*
Response	The estimated exposures for backpack applicators were calculated assuming the workers wore **no** protective clothing (R6 2005 FEIS Appendix Q). Proper protective equipment is required by law, so actual risk to backpack workers is substantially lower than indicated by the risk assessment calculations. As stated on pg. 334, PDFs eliminate the exposure scenarios of concern by favoring use of Garlon 3A, minimizing application rates of all triclopyr formulations, and following safe work practices and label advisories (DSEIS, PDF #12, p. 51, #14, p. 52; see also DSEIS p. 334). Triclopyr is the one herbicide proposed that works very well on woody invasive plants, so disallowing the use of triclopyr would eliminate the effective treatment option for woody invasives.

Table J-10. Response to comments – Analysis, Ecosystem

ANALYSIS - ECOSYSTEM	
14-4	*The DSEIS also fails to take into account the risk of wildlife habitat loss from herbicide impacts to native plants, water quality, soil fertility, and prey species, which are not adequately analyzed. There is no quantification or informative qualification of relative risk to native plants, wildlife species, fish species, water quality, soils, or human health and safety for different herbicides proposed for use or for herbicide use on a site-specific basis (eg. analyzing predictable effects on representative sites with specific soil types, slope, riparian areas, plant composition, wildlife species composition likely, given the particular chemical formula used, application rate, type of application, etc.) This Forest and Grassland-specific DSEIS is supposed to provide such site specific analysis necessary for informed decision-making. Without such site-specific analysis and quantification and qualification of consequences of different control methods and herbicide formulas used, the Purpose and Need rhetoric claiming the necessity and desirability of such pervasive herbicide use remains unsupported, as it is not clear what level of ecological damage proposed herbicide use implies, versus what ecological damage would result from other control methods being used in the same situation.*
Response	The analysis evaluated range of scenarios that encompass the soil types, weather conditions, and herbicides proposed for use. The higher risk situations based on treatment extent, location, method and herbicide ingredients were analyzed (see DSEIS pages 300-301). The effects of the different control methods and herbicide formulas are discussed at length in both the R6 2005 FEIS and the project FSEIS. Chapter 3 of the DSEIS also provided reasoning for why the risk of ecological damage from the invasives themselves is worse under No Action than action alternatives. The DSEIS did not predict widespread or intense ecological damage from any of the control methods that would be approved, nor would herbicide impacts to native plants, water quality, soils and prey species result in wildlife habitat loss. SFEIS Appendix F details how the Implementation Planning Process would be used to develop a site prescription within the range of those analyzed. The Rimrock Dam site was selected for this example because as explained on a public field trip, it is a high priority site requiring the use of herbicides to control the invasives, and is adjacent to surface water. The treatment prescription developed for the Rimrock Dam site followed the implementation planning process for the Proposed Action as described in Appendix F and the DSEIS p.47-48. Herbicide risk assessment quantification was done based on the specific prescription and environmental conditions at the Rimrock site. An exposure scenario was analyzed using an herbicide exposure computer modeling program using over 25 local variables, including local weather patterns and rainfall amounts, soil types, water depth, sand application rates and method. Appendix A describes the project area established for Rimrock Dam (PAU#75-20); current conditions at the site are similar to those analyzed with approximately 5 acres currently infested. The results of the analysis indicate that some herbicide may reach the pond adjacent to the dam, however peak and chronic water concentrations were very low; several orders of magnitude below the threshold of concern for human health, fish, amphibians, birds and wildlife. The Rimrock Dam example, along with other site-specific analysis in Chapter 3, provides evidence that the PDFs and Implementation Planning Process minimize the potential for adverse effects from the treatments that would be approved in the action alternatives. The site would be monitored following treatment and Integrated Weed Management concepts would be applied using a combination of herbicides and other treatments over time. There is no feasible way to predict the specific timing or prescription associated with follow up treatments; the treatment is influenced by unpredictable factors such as treatment effectiveness, the priority of this site compared to others

	at any point in time, funding, and workforce capacity. However, future treatments would not have unusual or unpredictable impacts because the Implementation Planning Process and PDFs would apply to the follow up treatments and thus ensure that impacts are within the scope of those described in the DSEIS.

Table J-11. Response to comments – Fish and Other Aquatic Resources

ANALYSIS – FISH AND OTHER AQUATIC RESOURCES	
14-128	*Sulfometuron methyl appears the "safest" [toxicity index for fish] but has not been tested on trout or salmon.*
Response	Acute toxicity studies have been done with trout but chronic toxicity studies have only been done on fathead minnows. The following quote is from SERA (2004h, page 4-6): "Standard toxicity bioassays to assess the effects of exposure of fish to sulfometuron methyl are summarized in Appendix 5. Acute toxicity studies have been conducted in fathead minnow (Muska and Driscoll 1982), rainbow trout (Brown 1994b, Muska and Trivits 1980b) and bluegill sunfish (Brown 1994a, Muska and Hall 1980) and chronic exposure was studied in fathead minnow (Muska and Driscoll)." Explanation as to why the fathead minnow was used a surrogate species (SERA 2004h , page 4-25): ***"4.3.3.1. Fish –*** As discussed in Section 4.1.3.1 and summarized in Appendix 6, fish do not appear to be highly sensitive to sulfometuron toxicity, although investigations of the acute LC50 have been hampered by the limited water solubility of sulfometuron methyl. Results of all acute exposure studies yield LC50 values at the highest concentration tested in each study - a range of >7.3 mg/L in fathead minnow (Muska and Driscoll 1982) to >150 mg/L in bluegill sunfish (Brown 1994a) and rainbow trout (Brown 1994b). For this risk assessment, the NOEC of 7.3mg/L in fathead minnow is used for the most sensitive species and the NOEC of 150 mg/L in bluegill sunfish and rainbow trout is used for the most tolerant species."
14-132	*This risk rating system seems to ignore that fish are dependant on aquatic macrophytes, invertebrates, and indirectly, potentially algae (as a surrogate for aquatic plants).*
Response	The risk rating system does look at aquatic plants, algae and invertebrates but only the high risk herbicides have the potential for direct risk to fish. Specific information for each herbicide proposed under this proposed action for effects to fish, macrophytes, algae and aquatic invertebrates can be found in the SERA (SERA 2001, SERA 2003a-d, SERA 2004a-e,h,) Risk Assessments.
14-133	*[Under specified conditions dose addition analysis as an estimate of cumulative toxicity of herbicide mixtures] What are the specified conditions?*
Response	The comment refers to the first words under the Herbicide Mixtures section of the fisheries analysis on page 292. The rest of the page and page 294 explain what the specified conditions are when the Hazard Index method of dose addition is used. This method has been adopted by the EPA for the approach to dose additivity. Dose addition analysis provides a reasonable estimate of the cumulative toxicity of chemical mixtures when doses of each component are below toxic levels (ATSDR 2004, Choudhury et al. 2000).
14-137 14-140	[*Re: glyphosate in road ditch runoff]. An independent assessment is immediately discounted despite great cause for concern even if overstated! Why are these results more accurate?*

Response	These results are not necessarily more accurate but reflect what is more likely to occur in a field situation. Reasons for why we believe the HQ values presented by NMFS (USDC 2008) were higher than what would be experienced by fish and aquatic organisms once ditch runoff reaches a stream is discussed in the DSEIS on pages 305 3rd paragraph to page 306 3rd paragraph. Project design features designed to protect aquatics will be followed and will help reduce potential for effects via ditch runoff (DSEIS pages 53-55).
14-139	*[The USGS (2001) sulfometuron theoretical concentrations slightly exceed effects threshold concentrations after one day but are under the effects threshold concentrations after one week.] -- Meeting the threshold at one point is enough to kill the fish.*
Response	This threshold is for aquatic plants and algae. See SERA (2004h) risk assessment for sulfometuron and the discussion of toxicity on aquatic plants on page 4-27. Potential effects, although unlikely would be to algae from ditch runoff as it relates to the use of sulfometuron. These are expected to be small and localized at the point that ditch runoff enters a waterbody. The effects of sulfometuron methyl on three species of aquatic plants studied by Davies et al. (2003) indicated that at environmentally relevant concentrations and short exposure periods effects to aquatic plants are not expected.
14-150	*How were adverse impacts detected and measured ? [comment refers to summarized conclusions of studies that determined herbicide applied at rates several times higher than proposed in this project had little to no adverse aquatic ecosystem impact].*
Response	The explanation of impacts and how they were evaluated and measured can be found in the following research papers (Michael 2004, Michael and Ruiz-Cordova 2006, Patten 2003, Michael 2000). In these studies higher application rates were used than is proposed in this DSEIS and amounts of herbicides detected in waterbodies from runoff were below levels of concern (DSEIS p. 320, and App. H page. 10).
14-155	*Re p. 326 Was there any monitoring of actual herbicide effects from either EA's implementation? This conclusion seems to be based on very few studies.*
Response	Monitoring for herbicide residues in streams and its effects under the 1998 EA's was not considered necessary because the amount of herbicide that could possibly enter streams was very low, so the cost and effort of water sampling was not warranted. Any herbicide application under this project would occur one year from those done under either the Deschutes or Ochoco EA's, reducing the likelihood of any persistence of herbicides is limited to picloram. Picloram applied at over 100 ft from water bodies at least one year prior is unlikely to be of concern because amounts and locations of herbicides used in forest service invasive plant programs is not thought to lead to adverse effects to aquatic organisms (SERA 2003) or fish survival and development (Stehr et al. 2009, Fairchild et al. 2008). See page 340 of the FSEIS. The potential effects from herbicides applied one year previous would be less than those applied under this proposed action. Under Alternatives 2 and 3 picloram is now restricted to application only once every two years (FSEIS PDF 46), limited to typical application rates where aquatic species may be a of concern (PDF 54) and is limited to treatment of only specific plant species or not allowed where certain listed fish populations are present (DSEIS Table 14, DSEIS Page 60).
14-156	*Why that determination [picloram unlikely to adversely effect aquatic species]? Basis? Picloram is very water soluble, persistent and toxic*
Response	Amounts of picloram used in forest service invasive plant programs is not thought to lead to adverse effects to aquatic organisms (SERA 2003) or fish survival and development (Stehr et al. 2009, Fairchild et al. 2008). Under this proposed action picloram is restricted to application only once every two years (PDF 46), limited to typical application rates where aquatic species may be of concern (PDF 54 Page 54) and is limited to treatment of only specific plant species or not allowed where certain listed fish populations are present (Table 14 Page

	60). Treatment areas where picloram is proposed as the 1st choice herbicide is because it is the most effective herbicide for a particular species. See Appendix A and B in the EIS for treatment recommendations.

Table J-12. Response to comments – Analysis, Wildlife

ANALYSIS - WILDLIFE	
14-63 14-209 14-234	*Many of the invasive plant impacts to wildlife discussed could also apply to herbicide use altering food webs or contaminating food sources. Yet the "affected environment" section only focuses on the risks and impacts of invasive plants, with no parallel section disclosing the negative effects of herbicide use to wildlife employing a similar research search and citations. Potential impacts to Canada lynx should have been analyzed as appropriate habitat exists in the Wilderness areas, in high elevation roadless areas, and dispersal habitat in between. Parts of the Ochoco and Deschutes National Forests have sufficient snowpack and suitable habitat. Blue Mountains Biodiversity Project volunteers positively identified a lynx in the Deep sale area of the Ochoco NF in 2005 or 2006.*
Response	Potential effects of herbicide use are discussed in "Environmental Consequences" section in Chapter 3.9.2 beginning on p. 362. Canada lynx were discussed in the Biological Evaluation for the EIS (project file). The best available science from the Lynx Conservation Assessment and Strategy (Reudiger et al. 2000) as well as more current reviews of available habitat on the Deschutes NF indicate that there is insufficient habitat to support a lynx population on the forest (DSEIS p. 342).
14-208	P. *368 Why are only Borrecco and Neisess cited? [concerning toxicity data and analysis of POEA surfactant used in Roundup]*.
Response	Borrecco and Neisess (1991) provided a relevant review of the effects of impurities found in Garlon 4 and Roundup formulations; no other specific studies were found (Page 368 DSEIS). Risk assessments include a review of all relevant literature (SERA 2007).
14-209	*P. 368. What are the "levels of concern" [worst-case exposures of fish to TCP did not exceed levels of concern when triclopyr is applied at the typical application rate]*
Response	Level of concern means that the Hazard Quotient is greater than 1 (DSEIS page 300). The HQ values for various wildlife species, assuming various herbicide ingredients, application rates and methods, are described in the Risk Assessments and throughout the R6 2005 FEIS and appendices, and were incorporated through reference in the DSEIS. For TCP, a metabolite of triclopyr, the acute toxicity index is 1.8 mg/kg (or ppm) from a study by Wan (1987) using Coho salmon. This level of exposure is theoretically possible at higher application rates, however these rates were are avoided under the PDFs.
14-224	*p. 373 This sounds like an evasion, a withholding of damming data [quantitative use of interaction data in risk assessments is infeasible]*.
Response	The DSEIS described the body of evidence related to herbicide toxicology and effects on wildlife, and described data gaps and unavailable information. Page 373 discussed results of studies related to synergistic effects such as the ATSDR 2004, and also mentioned studies that had different results. The PDFs are an appropriate response to uncertainties related to risk assessments that are beyond the scope of this project (R6 2005 ROD Standards 19 and 20 require design features to minimize exposure in part to provide a project-specific response to inherent uncertainties about chemical toxicology).
14-236	*p. 377 This statement defies belief. Since species are limited to riparian habitat – fish, frogs, water birds… - How are adverse effects from herbicides are NOT plausible based on all the forgoing discussion, uncertainties, and impacts admitted and bias towards herbicide use?*

Response	The risks from both herbicides and from disturbance are low for all alternatives (table 18 summarizes effects). In all alternatives, adverse effects from herbicide are unlikely to actually occur in the field for a variety of reasons, including the PDFs and buffers as discussed on DSEIS pages 377. Many PDFs in Chapter 2 are also intended to reduce noise disturbance (DSEIS pages 376-402).
14-238	*p. 377 Give me a break – mice, squirrels and voles have NO opportunity for exposure as plant eaters?*
Response	The owl's primary prey (northern flying squirrel), is arboreal, nocturnal, and does not feed on invasive plants, so it has almost no opportunity to become exposed to herbicides or NPE surfactants. However, the DSEIS effects analysis assumed that prey would be directly sprayed (p. 379, paragraph 3), which would result in greater exposure to the owl than if prey ate sprayed vegetation (details in quantitative project file herbicide toxicology worksheets).
14-244	*p. 380. Effects from manual/mechanical control & herbicide use are qualitatively different and probably quantitatively different, with herbicides much more difficult to prevent impacts or monitor effects.*
Response	This section of the DSEIS discussed the various effects of herbicide and non-herbicide treatment on wildlife. Disturbance to individual animals is more likely to occur under manual and mechanical methods because they tend to be noisier and take longer to implement than herbicide applications. Habitat impacts from herbicide and non-herbicide are indeed easier to observe and measure than physiological changes to a given organism, either from herbicide exposure or disturbance. The SERA Risk Assessments rely on physiological studies where internal organs of organisms are studied after various chemical exposures. Quantitative information is derived from these studies (SERA 2007). There are data gaps as described in this section of the DSEIS, however, several layers of caution were added to herbicide use/analysis in this project to ensure that effects will be minimized (Figure 5). Effects would be prevented or minimized by the PDFs that limit the potential for harmful herbicide exposure or disturbance to occur.
14-245	*p. 380 What about reproduction failure, cancer, and chronic toxicity effects?*
Response	The DSEIS and R6 2005 FEIS included effects analysis for herbicides included toxicity data on carcinogenicity, reproductive effects, acute and chronic effects, and other toxicity data. None of these effects are likely to be associated with treatments under this project; the R6 2005 ROD eliminated many scenarios of concern through the standards, and at the project level, remaining exposures of concern have been avoided via the PDFs. This is discussed throughout Chapter 3 of the DSEIS.
14-182 14-179 14-180 14-181	*P. 363. Does this mean the hazard for LD50 data is point 1? Yet LS50 is ½ of observed animals dead? p. 363. Paragraph 4. What does it mean "to take 0.1 of the LD50"? 0.1 % of the exposure level causing LD50? Or 0.1 multiplied by the LD50 to determine the hazard quotient? RE page 363 paragraph 2. From what is the toxicity index derived? Does use of the index and hazard quotient act to understate effects? P. 363 Para. 3. Doesn't use of the toxicity index and hazard quotient remove the justified precaution of using sub lethal effects to the most sensitive species named above?*
Response	The toxicity value in question is essentially the dose chosen to be the "threshold" dose for analysis purposes. Doses below this threshold indicate no likely negative effect, while doses above the threshold indicate a negative effect is possible. The dose that causes 50% mortality to the test population (LD_{50}) is not a suitable value to use in this analysis to determine risk of a negative effect, because effects other than mortality (e.g. sublethal, reproductive, etc.) can constitute negative effects to wildlife. Therefore, the analysis uses the no-observable-adverse-effect-level (NOAEL) when that data is available (DSEIS p. 363). The paragraph cited (DSEIS p. 363) described the process to determine a threshold dose when only the LD_{50} data is available. EPA protocol for terrestrial wildlife is to use one-tenth of the LD_{50} as the threshold dose. So, if the LD_{50} is 388 mg/kg, the "threshold" toxicity value used in this analysis is 38.8 mg/kg. The toxicity indices are

	derived from available toxicity data and are listed in the Biological Evaluation for the EIS (project file). For mammals and birds, NOAEL data is available and used for all toxicity indices except for acute exposure of birds to triclopyr. The methodology is standard for ecological risk assessment (SERA 2007). The Hazard Quotient is a ratio of the estimated exposure to the toxicity index (i.e. the threshold dose). Sublethal effects data is used in setting the toxicity index.
14-184	*P. 363. What is nearest hazard index being calculated at the project level to assess potential effects to species? Shouldn't it be at a site specific level?*
Response	No tank mixes are currently prescribed, so none were analyzed. In the future, if tank mixtures appear to be most effective, during implementation planning, the Forest Service would be required to ensure that unexpected additive toxicity will not occur. The approach is used or recommended by a number of agencies, including EPA, National Academy of Sciences, National Research Council, and Occupational Health and Safety Administration (ATSDR 2004) and is in Standard 16 of the R6 2005 ROD (amended Forest Plans). Requiring a hazard index less than 1.0 means that there would not likely be adverse effects to wildlife species from treatments (DSEIS page 363).
14-2	*Without population surveys and known viability thresholds for sensitive wildlife species, it can't be known that there will be no risk to their populations, especially rare and particularly vulnerable species such as Sage grouse, Pygmy rabbit, Oregon and Columbia Spotted frogs, and Crater Lake tightcoil snail. Bird species are also especially vulnerable due to their small body weight, insect prey, and diverse and aquatic habitat needs.*
Response	The results of the analysis indicated that negative effects to wildlife are unlikely (DSEIS table 18 and p. 376-402). There would be no measurable adverse impacts to individuals or populations, thus population surveys and viability thresholds are unnecessary. The vulnerability of birds due to their small body size and diet is accounted for in the analysis. Page 92 of the DSEIS noted that "The R6 2005 FEIS included an additional margin of safety by reducing the level of herbicide exposure considered to be of concern to Threatened and Endangered fish and wildlife" and "Project Design Features ensure herbicide exposures under the Proposed Action will not exceed conservative levels of concern for people and botanical, wildlife, and aquatic species of local interest."
14-228	*We find the conclusions that manual & mechanical control pose greater risks to wildlife than herbicide use farcical, biased, and inaccurate.*
Response	The mortality that can be caused by trampling, hand tools and mechanical equipment is well-documented and supported by expert opinion and experience (see sources in the PDFs in Chapter 2). In contrast, no direct mortality from herbicide use is likely based on extensive risk assessments (see Chapter 3, Wildlife DSEIS p. 376-402). The herbicides proposed are low toxicity and used as described have a low likelihood of exposing most wildlife species. The analysis for effects from herbicides follows standard ecological risk assessment methodology (DSEIS p. 362-363) and the findings are well-supported by studies published in peer-reviewed journals (SERA Risk Assessments include a literature search, additional references were listed in the DSEIS).

Table J-13. Response to comments – Effects to Fish and Other Aquatic Resources

EFFECTS TO FISH AND OTHER AQUATIC RESOURCES	
14-46 14-123 14-30 4-3 13-12 14-67 14-126	*We are also concerned by ripple effects of riparian herbicide use to amphibians, aquatic insects, riparian birds, and aquatic native plants- i.e. alteration and impairment of the structure and biological processes of both terrestrial and aquatic ecosystems by herbicides. (See DSEIS discussion of these effects and the consequences of sublethal effects to reproduction, survival through maturity, and health and fitness of a species (eg. to escape predation or cumulative effects of other stressors~ p. 290) For instance, without knowing the number of aquatic plants and algae that would be harmed. by herbicide use, the extent and severity of damage and consequent ripple effects through the food web, it is impossible to justify a conclusion of "no detectable impact" on fish survival. Additional reasons for concern regarding listed fish species survival and reproductive viability with planned herbicide use near or within their riparian zone habitat are the toxicity indices for fish in Table 68, DSEIS p. 291. (See our notes on the copied page.) Clearly not all herbicides planned for use are only "low" risk to fish survival and population viability. The herbicide risk categories given on DSEIS p. 293 seem to ignore that fish are dependent on aquatic macrophytes, invertebrates, and indirectly, algae that feeds their prey (as a surrogate for aquatic plants in general), so risk to aquatic macrophytes "only" is not necessarily a "low" risk to fish, nor is risk to algae or invertebrates necessarily only a "moderate" risk. Re p. 288 We are also concerned by ripple effects of riparian herbicides use to amphibians, insects, birds and native plants. "…herbicides could potentially kill or harm fish and aquatic plants as well as degrade or impair riparian ecological functioning in ways not analyzed in the DSEIS, such as by killing or contaminating insect and fish prey of riparian-associated birds (including Sensitive-listed species) and killing or bio-accumulating in amphibians, such as Sensitive-listed Oregon and Columbia Spotted frogs. The spraying will put fish and other wildlife in jeopardy. Herbicides should not be sprayed in aquatic and terrestrial amphibian habitat, or in any areas with habitat and/or presence of bio-diverse species of concern."The use of herbicides as proposed in the action alternatives will not contribute to amphibian decline and therefore this issue is not discussed further in this document." is outrageously unsubstantiated given the insufficient testing for herbicide effects to amphibians and the known impacts of herbicide exposure to amphibians, Roundup herbicide lethal effects, and planned widespread use of herbicides in riparian habitat. There should be no herbicide use in potential Oregon and Columbia frog habitat due to these known impacts and uncertainties.*
Response	Alternatives have been considered that limit the use of herbicides in riparian and other habitats. Restricting herbicide use in habitats for all species of concern is similar to No Action because such habitats are widespread and the terminology used here could include infested areas. The potential effect of herbicides to non-target wildlife and plants, including aquatic insects (DSEIS p.293), fish-eating birds (DSEIS p.381-382) and amphibians (P. 390-393) is discussed thoroughly in the DSEIS and the other information incorporated by reference. No mortality to any of these mentioned resources is expected based upon available data. The herbicides proposed for use in riparian or wetland areas do not bioaccumulate (DSEIS P. 338, 381, 383 and data contained in FS risk assessments (SERA 2001, 2003, 2004)). Amphibian decline is a global issue with several potential contributing factors. The lack of expected effects from the herbicides analyzed, the limited spatial scale of individual invasive plant treatments within amphibian habitat, and the PDFs (DSEIS P. 49-65) in comparison to the suspected causes of amphibian decline indicate the proposed project will not contribute to amphibian decline. Uncertainties and data limitations are clearly discussed in the document (DSEIS P. 294, 364). Considering the use of herbicide in spotted frog habitat is reasonable and involves weighing the short term risk of treatment against the long-term, and possibly permanent, loss of suitable habitat

	from invasive plant species. The exact number of aquatic plants and algae that could be impacted by herbicide use is unknown. By looking at scientific literature on effectiveness of buffer zones, and the short duration and low concentration of herbicides seen in waterbodies during field studies (Berg 2004, Michael and Neary 1993, Michael and Ruiz-Cordova 2006, Ganapathy 1997, Dibyendu et al. 1989, Giudice et al. 2008) and then comparing these results of acute and chronic toxicity of algae and macrophytes (SERA 2001, SERA 2003a-d, SERA 2004a-e,h,) leads us to believe that impacts will be minor in scope and this will not cause ripple effects through the food web. Buffers and PDFs have been designed for this proposed action to specifically lessen and protect against detrimental effects to fish, algae, macroinvertebrates and macrophytes. The risk rating system does look at aquatic plants, algae and invertebrates but only the high risk herbicides have the potential for direct risk to fish. Effects to algae or invertebrates are highly unlikely but macrophytes are included in the risk rating system because they are the most susceptible to harm with specific herbicides. For a scientific review of effects to fish, macrophytes, algae and aquatic invertebrates see specific information for each herbicide under this proposed action in the SERA (2001, 2002, 2003a, 2003b, 2003c, 2003d, 2004a, 2004b, 2004c, 2004d, 2004e) Risk Assessments.

Table J-14. Response to comments – Effects to Wildlife

EFFECTS TO WILDLIFE	
14-64 14-173 14-172 14-66 14-175 14-174 14-240 14-177 14-178	*There should be no toxic herbicide use within Northern Spotted owl habitat as Spotted owls are experiencing continued decline and could be negatively affected through prey exposure and reduced prey population or through bioaccumulation of toxins. Herbicide use should also be prohibited in the habitat of particularly vulnerable Sensitive-listed species, such as Pygmy rabbit, Homed and Red-necked Grebes, Bufflehead and Harlequin ducks, Yellow Rail, Greater Sage grouse, American Peregrine falcon, Tricolored Blackbird, Oregon and Columbia Spotted frog, and Crater Lake tightcoil snail. Neotropical songbirds in general need protection as most species are in sharp decline, With pesticides or herbicides being a suspected contributing factor. RE page 350,4th para. Plant and insect diversity important to rearing sage grouse chicks could be impaired with herbicide use. Amphibians are especially vulnerable to herbicide effects and there are other potential methods of invasive plant control, as discussed on DSEIS p. 352, last par. P. 353. Use other methods than herbicide in spotted frog habitat.*
Response	The analysis indicates that neither northern spotted owls nor their primary prey are likely to be exposed to herbicides used for invasive plant treatments (see DSEIS p. 379-380). Appropriate analysis was conducted for effects to Forest Service sensitive species and concludes that negative effects to any individuals are unlikely or limited and there will be no population-level effects. (ibid.) Neotropical bird species analyzed include those that are Forest Service Sensitive, Management Indicator Species, Birds of Conservation Concern and those in the various Landbird Strategies. The analysis indicates that negative effects are unlikely due to herbicides proposed, PDF's and the extent and distribution of the invasive plants (DSEIS p. 389, 390, 398, 399, 401-402). The effects of herbicides on sage grouse chicks and their food have been considered in the analysis and disclosed in the section on Sage Grouse (DSEIS p. 384-386, 401). While amphibians are susceptible to effects from pesticides, they are not at risk from the herbicides proposed in the alternatives (DSEIS page 360). None of herbicides proposed bioaccumulate because they are very soluble in water and are not stored in fatty tissues (DSEIS page 86).

14-191 14-193	*P. 364-365, In other words, the number and type of surrogate species tested is very limited and these surrogates can not even come close to reproducing the great diversity of species in the wild or their much more complex needs, interrelationships and living conditions, as well as not indicating effects to predator-prey relationships and survival in the wild. In general, the bottomline from this discussion is that herbicides remain poisons, testing is insufficient to validate risk assessment, and the diversity of wild species and complexity of wild ecological webs indicates a need not to use herbicides rather than use them more extensively, intensively than any other control method, as proposed. P. 365 6th full para. While your more conservative exposure assumptions and PDFs are laudable as incremental steps toward better agency understanding, they are not enough to adequately protect ecological values given uncertainties and known risks.*
Response	Surrogate species are used as indicators of risk and peer-reviewed publications (SERA 2007). The purpose of the analysis is to use the best available scientific information to disclose the risks from the management options considered. As stated on DSEIS page 365, "the variation of responses among species, and the uncertainty with regard to how accurately a surrogate species may represent other wildlife, the FS/SERA risk assessments use the most sensitive endpoint from the most sensitive species tested as the toxicity index for all wildlife." In addition, PDFs and buffers minimize potential for exposure compared to risk assessment scenarios (DSEIS Figure 5).
14-3 14-237 14-242 14-222 14-167 14-226 14-125 14-223 14-221 14-220	*The NPE family of surfactants planned for use and Hexachlorobenzene, a contaminant of both Picloram and Clopyralid, are known to bioaccumulate, thus putting higher order predators such as American Peregrine falcon, Northern Spotted owl, Bald eagle, and humans at risk through their predation or consumption of contaminated wild fish and meat. p. 377 2nd par. Yet NPE bioaccumulates, and is an endocrine disrupter, invalidating the "no harm" conclusions. RE page 373 Top. Because of endocrine disruption effects, use of herbicides with NP & NPE could push rare and listed species toward uplisting by decreasing reproductive success, as had been found with wildlife species as diverse as turtles, birds, trout and salmon ,alligators, mink, and Florida panthers, thus potentially affected peregrine falcons ,bald eagles, listed salmon, listed lynx, etc. Pg. 338. NP or NPE could bioaccumulate, right? p. 374 para. 1. With an endocrine-disrupting or carcinogenic chemical or one that bioaccumulates doses below the toxicity value may not mean "no likely adverse effects". We are concerned by the potential for herbicides with NP or NPE to be over sprayed or accidently spilled in pools or other amphibian habitat having amphibians such as Columbia and Oregon spotted frog. Re page 372 para 1. What are NP9E and NP8E types? Intermediate breakdown products? Causes for concern, re: use of herbicides with NP or NPE surfactants.*
Response	NP9E and NP8E are shorthand notations for component parts of the NPE compound. They are not intermediate breakdown products. This has been removed from the EIS for clarity. This is explained in detail in USDA 2003. The types of NPE compounds used in surfactants do not bioconcentrate (USDA FS 2003). They do not bioaccumulate in organisms because it is highly water soluble and is not stored in fatty tissues. More information on the chemistry of NP9E is in R6 2005 FEIS and Bakke 2004. The PDFs (PDF 12, 36) ensure that broadcast rates of NPE are below a threshold of concern for human health. The DSEIS states on p.368, "The amount of hexachlorobenzene released into the environment from Forest Service use of picloram and clopyralid is inconsequential in comparison to existing background levels and the annual release from manufacturing processes (SERA, 2003 Picloram)."
14-199	*P. 366 Mechanical and manual methods can avoid the spring reproductive season [for birds].*
Response	Nesting and reproductive seasons for birds and other wildlife species substantially overlap appropriate treatment seasons for invasive plants and it is unlikely that all disturbances to all species could be avoided while effectively treating the weeds. This conclusion is based

	on common control measures (effective treatment season) and the various bird seasons discussed in the PDFs in Chapter 2 (DSEIS PDF #77, 78, 81, 82, 84-87, 90, 94).
14-230	*P. 374 Herbicide use can alter native habitat structure and composition, especially for ground and shrub-using neotropical songbirds, which are mostly in decline, water birds are especially vulnerable to water quality changes and loss of fish, amphibian, and insect prey*
Response	The proposed treatments avoid most changes to native habitat structure and composition because native plants are substantially avoided through application methods, PDFs and buffers. No loss of fish, amphibians, or insect prey populations will occur from the treatments proposed in the alternatives (see DSEIS table 18, and p. 307, 393-393). This section of the FSEIS has been edited for clarity.
14-277	*Use manual methods of invasive plant control in occupied and known wild horse areas, as many herbicides in use have grazing restrictions and known impacts to grazing animals. Wild horses cannot be simply pulled from an area during herbicide spraying and thereafter to meet label requirements as cattle and sheep can. This also lessens impacts to grazing ungulates.*
Response	The DSEIS p. 59 item 76 refers to herbicide use restrictions (listed in Appendix D) that would apply to domestic livestock and would be followed on public ranges. These restrictions would also provide protection for wild horses and would be followed within the wild horse territory (which is also public range). Application of these restrictions is not expected to have an affect on either the treatment of invasive plants, nor on the wild horses as follows. The Plateau DG formulation of imazapic is not to be used within any grazing area (Grazing Restriction Table, Appendix D, and project design feature #76). The wild horse area falls within both the Canyon Creek and Reservoir sheep grazing allotments (DSEIS p. 413); therefore, this herbicide is not to be used there. The only other grazing restrictions are associated with removal times prior to slaughter which can not be applied to wild horses as this action is prohibited. The DSEIS p.416 clearly indicates that enabling the use of herbicides in Alternative 3 will result in a benefit to the wild horse territory and subsequently, to the wild horses themselves, by reducing the risk of habitat degradation that invasive species present.
14-231	*Re: pg 375 Reasons for doubt as to FS optimistic conclusions that there will be no significant impact to wildlife from proposed herbicide use.*
Response	The quantitative analysis done for the risk assessments and the EIS, as well as published literature support the conclusion that the project is not likely to adversely affect terrestrial wildlife. This conclusion is supported through information in DSEIS table 18 and throughout Chapter 3. Incomplete information and data limitations that influence the certainty of the conclusions are disclosed in the document (e.g. pages 364). However, Figure 5 displays the approach the Forest Service is taking to respond to uncertainties; e.g. adding "layers of caution" to herbicide use in the project to ensure adverse effects are indeed minimized or eliminated altogether.
14-232 14-124	*Re: page 376 This is a very arrogant and biased conclusion given all the uncertainties and known impacts of he of herbicides admitted in this EIS and the Region 6 FEIS – especially re: toxicity to fish, inadequate riparian protection, carcinogens, endocrine disruptors, etc.*
Response	See previous responses; Figure 5 displays the approach the Forest Service is taking to respond to uncertainties; e.g. adding "layers of caution" to herbicide use in the project to ensure adverse effects are indeed minimized or eliminated altogether. The Risk Assessments consider hazards associated with herbicide use along with scenarios to quantify how much exposure to herbicides could actually occur. At the low exposure levels associated with this project, adverse effects to wildlife are unlikely (DSEIS table 18 and eg. p. 367, 374-376).
14-45	*In our view, conservation recommendations from the Region 6 Biological Opinion are not protective enough to prevent harm leading to*

14-122	*possible uplisting of listed and uncommon fish species. (See our appeal of the Region 6 FEIS as part of these comments.)*
Response	Project level consultation is occurring for the Deschutes and Ochoco National Forests and Crooked River Grassland and includes an assessment about aquatic species. Sensitive aquatic species are also addressed in the DSEIS Fisheries section of Chapter 3.
14-196	*Re: p. 366. The areas posing the greatest risk to native wildlife with herbicide use should not have herbicides as a control method.*
Response	In the context of the paragraph cited, the risk to wildlife is from any treatment method, not just herbicides. The proposed treatments include non-herbicide methods.

Table J-15. Response to comments – Effects to Soils

EFFECTS TO SOILS	
14-90	*Avoid herbicide use on biological soil crust as they can take 100 years or more to form and may not come back, are important to soil structure and to exclusion of invasive plant seed. And effects of herbicides not known to these crusts. Also cumulative impacts many areas of biological soil crusts have already been lost to livestock use and recreation use etc.*
Response	The presence of biological crusts within the Deschutes, Ochoco and Crooked River National Grassland (CRNG) is variable, with little development on the younger ash soils derived from Mazama or Sand Mountain sources and variable presence on older residual soils located on the CRNG, scabland areas of the Ochoco and portions of the Deschutes. Many of the sites proposed for herbicide treatment contain little or no biological crusts as a result of mechanical disturbance or the soil type present. However, since the project proposes to treat invasive plants in favor of native species, conditions more conducive to the development of biological crusts are likely to occur on treated sites (DSEIS pp. 141-142). Although the function and value of biological crusts in arid soil environments has been documented by research ecologists (Belnap, et al., 2001), research on the direct effects of herbicides on biological crusts is limited. A study originally completed by The Nature Conservancy in cooperation with USGS, examining the effects of two glyphosate herbicides on microbiotic crust cover and species richness within a native bunchgrass community, found no negative effect on soil bryophyte cover or species richness from one year of glyphosate herbicide application (Youtie et al. 1999). Plots treated with herbicide in this experiment maintained existing cover of bryophytes and lichens compared to losses in the untreated plots, which were primarily attributed to an increase in litter cover of invasive annual grasses (medusahead) blocking the light needed for photosynthesis by the crust components. Other research cited by Youtie suggests the possibility of long-term physiological and ecological susceptibility of bryophytes and lichens to glyphosate and other herbicides (Youtie et al. 1999). Research in the Negev desert of Israel showed direct effects of the herbicide Simazine to the photosynthetic organisms of biological crusts, including reduction of polysaccharide concentrations, moss caulidia, and chlorophyll content (Zaady et al. 2004). However, Simazine is a photosynthetic inhibitor in the Triazine group, which is dissimilar to any of the herbicides proposed for use under this FSEIS.
14-97	*Re: pg 195 The risk assessments are limited on effects to soils. No real measurement or controlled study of productivity noted.*
Response	The productivity of a soil can be reflected in the continued presence of microbial populations and growth of vegetation on site. Research of tree growth response to herbicide treatments on ponderosa pine sites located at Pringle Falls on the Bend District of the Deschutes National

	Forest supports continued productivity of treated sites years after applications (Zhang et al. 2006). Seven year data from research plots treated with hexazinone to reduce grass and shrub competition with planted conifers on the Fort Rock District of the Deschutes National Forest indicates continued growth of conifers on these sites in excess of control plots or those treated with manual coverings (Fitzgerald, 2009). The DSEIS acknowledges that microbial health is a component of site productivity (DSEIS, p.195), but studies on the effects of herbicide applications to bacterial and fungal populations in field studies is limited. The short-term effects of triclopyr, imazapyr and sulfmeturon methyl on Ectomycorrhizal formations in soils treated with these herbicides included no alteration of the capabilities of mycorrhizal fungi to infect roots, even at concentrations detrimental to seedling growth (Busse, 2003). Applications of glyphosate for up to five years in succession showed negligible changes to microbial populations within the soil profile (Busse, 2001). The DSEIS acknowledges that herbicide residues can have direct effects on soil microbes (DSEIS, p. 195), which is supported by laboratory research showing direct toxicity of most herbicides to soil microbes when applied at increasingly higher concentrations in solution (Estok et al. 1989; Chakravarty, 1987; El-ghamry et al. 2000). However, the direct effects on growth rates of microbes do not appear to be significant until concentrations higher than those possible under allowable application rates (Estok, et al. 1989; Chakravarty, 1987). Changes to microbial and fungal populations from herbicides applied at rates proposed in the DSEIS are likely to be transitory (Roslycky, 1982; Tu, 1994), and do not appear to inhibit the long term health of microbial populations in the soil (Tu et al. 2001) or the productivity of treated sites (Ratcliff, 2006).
14-94	*Re. Table 38. The FONSI determination in advance of project implementation does not mean there is actually no significant impacts, there have been FONSIs for clearcutting, excessive livestock grazing which were later determined to be very destructive.*
Response	The DSEIS states that the FONSI in question was determined for the herbicides currently being applied on the Deschutes, Ochoco and Crooked River Grasslands under the respective NEPA documents completed by the Forest Service in 1995/1998 (DSEIS, p.189). Monitoring of sites treated under these documents includes anecdotal observations by Deschutes County herbicide applicator Dave Langland and USFS district botanists which support continued growth of non-target native species and decreases of targeted invasive species (DSEIS, p.187). Herbicide use data from the Oregon Department of Agriculture is also referenced that shows decreases in the amount of herbicide applied to the treated sites over a five year period (DSEIS, p.187). The DSEIS acknowledges that herbicide would continue to be applied to the existing sites under the No Action Alternative as needed (DSEIS, p.187), but does not propose to increase the use of herbicide on the sites covered by the existing NEPA documents under any of the Action Alternatives. The DSEIS does propose to treat invasive plants along currently treated road corridors that have become established outside the treatment areas originally identified in the documents currently allowing herbicide application. Treatment of these sites would result in a short term increase in herbicide application in the general area of the currently treated units, but not within the existing treatment units themselves.
14-95	*Re. Table 39 pg 193 What does low mean in practice re effects to soil integrity, productivity, fertility & living microorganisms?*
Response	The ‘Low’ rating displayed in Table 39 of the DSEIS is a qualitative rating specific to the toxicity of herbicide residues to soil microbes in the laboratory environment. Herbicides in the low category required concentrations higher than those possible under allowable application rates before adverse effects to soil microbes were observed and showed limited reductions of microbial growth at concentrations representative of application rates proposed in the DSEIS and (USDA, 2005a). The DSEIS acknowledges that microbial health is a

	component of site productivity (DSEIS, p.193) and the analysis uses a direct relationship between the relative toxicity of an herbicide to microbial populations and the potential effects to the productivity, integrity and fertility of the soil on sites proposed for treatment (DSEIS, p.193). Regardless of rating, the direct effects on microorganisms from all herbicides proposed for use is likely to be very low following the application of herbicides. Typical application rates of herbicides proposed for use under this decision have been measured to result in initial concentrations on the forest floor below those identified in research as causing significant reductions of growth in the laboratory environment (Estok et al. 1989; Chakravarty, 1987). Concentrations likely to "reach" microorganisms in the soil would be even less for soil activated herbicide residues due to further dilution in soil solution before mycelium were able to adsorb or absorb herbicide residues. As a result, the indirect effects on soil integrity, productivity, fertility, and living microorganisms are likely to be negligible.

Table J-16. Response to comments – Effects to Nontarget Plants

EFFECTS TO NON TARGET PLANTS	
4-1	*We have watched the grasses mentioned [ribbongrass and reed canarygrass] growing and encroaching on the Lupine and wild Blue Iris.*
Response	Yes, ribbongrass and reed canarygrass are encroaching on native plants. Lavergne and Molofsky (2004) cite that invasion of reed canarygrass can occur relatively quickly, and has been shown to occupy up to 40% of islands and shorelines of a river in Wisconsin in less than 15 years (DSEIS p. 136).
14-268	*Herbicides by definition kill plants including native plants, so stated effects to native plants and ecology and wildlife of invasives are also true of non-selective herbicides or herbicides that may still kill non-target plants.*
Response	Project Design Features are developed to protect non-target native vegetation for any type of invasive plant treatments (including herbicide and manual). Implementation planning and monitoring and adaptive management processes described in Chapter 2 and Appendix F ensure that effective treatments are completed according to PDFs, and undesired effects are minimized. This would protect native vegetation and help restore natural ecological processes, which in turn would benefit wildlife, as they are dependent on native vegetation.
14-27 14-109	*Elsewhere the DSEIS admits that some herbicides proposed for use, at application rates proposed for use, may harm aquatic plants. Glyphosate is toxic to fish; aquatic formula glyphosate is planned for use up to the edge of the water though the DSEIS admits that such application can contaminate the water and that the aquatic formulation is not particularly less toxic than other glyphosate formulations.*
Response	The DSEIS discloses that some herbicides can harm aquatic plants and goes on to state that PDFs and buffers should greatly reduce but not entirely eliminate the chance that some small amounts of herbicide will reach surface waters (p. 302). The DSEIS discloses that the risk assessment analysis showed that one site and one herbicide -- chlorsulfuron in the Odell/Davis watershed – had a Hazard Quotient of 4 for aquatic plants under normal weather conditions. However, the DSEIS explains that the estimated Hazard Quotients are likely overestimated because they assume broadcast spray within 50 feet of perennial water bodies, which is not allowed under any alternative. There is very little drift associated with hand application methods, such as wiping and wicking, which is the required application technique immediately adjacent to waterbodies for aquatic glyphosate. The Risk Assessments for Imazapic and Imazapyr (SERA 2004) show a potential risk to some species of aquatic plants from spraying

	Imazapic at the highest application rate and Imazapyr at typical application rates (DSEIS, P. 328). However, SERA Risk Assessments assume broadcast spraying adjacent to streams which will not occur in our project. Buffers and PDFs proposed in this DSEIS plus adherence to Regional Standards 16, 18, 19, and 20 further reduce the risks associated with herbicide treatments by eliminating or minimizing as much as possible the impacts to aquatic plants. The DSEIS (P. 251) states that "Only aquatic formulations of glyphosate and imazapyr (labeled for in water use) would be used for spot spraying reed canarygrass and ribbon grass up to the water's edge, where there is a higher risk of accidental overspray and drift directly into the water." Spot-spraying in Alternative 2 would not occur within 10 feet of the water's edge for both the aquatic formulation of glyphosate and the aquatic formulation of imazapyr. This no-spray buffer along with PDFs will reduce the risk of accidental overspray and drift (see p.140). Aquatic glyphosate and aquatic imazapyr can be applied using hand application techniques (such as wiping) to the water's edge in Alternative 2. Alternative 3 would not allow herbicide within 10 feet of water. Comment 14-109 refers to a statement in the DSEIS (p. 251): "Only aquatic formulations of glyphosate and imazapyr (labeled for in water use) would be used for spot spraying reed canarygrass and ribbon grass up to the water's edge, where there is a higher risk of accidental overspray and drift directly into the water." De Snoo & De Wit (1998) found a 3 meter (10 foot) no spray cropped buffer decreased drift by 85-95% and a 6 meter (20 foot) buffer 100% (DSEIS p.249). Because there is the possibility of overspray, we have moved the spot-spray buffer back from the water's edge to a buffer of 10 feet for both the aquatic formulation of glyphosate and the aquatic formulation of imazapyr. This spot-spray buffer along with PDFs will reduce the risk of accidental overspray and drift. Aquatic glyphosate and aquatic imazapyr can be applied using hand application techniques (such as wiping) to the water's edge. These techniques reduce the potential for herbicide to enter the water down to a drip from wicking apparatus, or a drip off a plant, which would be undetectable and below any level that approaches a threshold (DSEIS p.250). The aquatic formulation of glyphosate is less toxic (considered low) to aquatic species because it does not contain a surfactant. The regular formulations of glyphosate, which can contain POEA surfactant (as in the Roundup formulation), are toxic to aquatic species because of this surfactant.
14-248	*p. 418. How is it that applying herbicides is not thought to affect native cultural plants? ("Historic properties")*
Response	Historic properties are not cultural use plants. Historic properties include rock art, obsidian flakes, historic cans and bottles, etc. As far as cultural use plants, PDFs 36-41 provide direction for special forest products, including cultural use plants. Cultural use plants are addressed in several places in the FSEIS, under native vegetation, human health, and the cultural resources section was expanded to include more information on plants.
14-121	*Pg. 270. The majority of true riparian vegetation may be less than 100' out due to livestock pressure rather than this being the extent of the true riparian areas as defined above.*
Response	The analysis for fisheries and aquatic organisms takes a conservative approach by using a 100 ft. aquatic influence zone on each side of streams for analyzing effects of herbicides. As stated in this section, Level 2 Stream Survey data indicates that the majority of true riparian vegetation around major class 1 and 2 streams within the analysis area is less than 100 ft.; therefore, using a 100 ft. buffer is a reasonable and conservative area for the analysis (DSEIS p. 266). Riparian areas larger than 100 ft. would be identified during Implementation Planning (Appendix F) and appropriate Project Design Features would be applied.

	There are many reasons why riparian vegetation can be less than 100 ft. in width. For example, there are physical constraints to riparian width due to landform, such as steep V-shaped valleys within scab/stringer habitats on the east side of the Ochoco National Forest. In some cases, past management activities may have changed the historic width of riparian habitats, such as building roads in riparian drainages or over-grazing of riparian habitats. The Forest Service, in partnership with watershed councils, is working to restore riparian areas on a quicker timeline through planned and on-going riparian restoration projects. Cumulative effects have disclosed the effects of these overlapping Forest Service actions (see Cumulative Effects sections under Water Quality and Fisheries).
14-129 14-131	*p. 291 Sulfometuron, imazapyr, metsulfuron & chlorsulfuron are dangerous to aquatic plants.(see EIS pg 292) p. 293- Metsulfuron methyl exceeded the LOC for aquatic plants <see last paragraph pg 292 EIS.*
Response	The R6 2005 FEIS (p. 4-117) states that these four herbicides can affect aquatic plants at typical application rates (USFS 2005a). However, the R6 2005 FEIS (p. 4-119) concludes that using appropriate application rates, timing and application techniques of herbicides can have minimal impact on aquatic plant populations and that effects can be further avoided through adherence to Regional Standards 16, 18, 19, and 20. Buffers and PDFs proposed in this EIS further guide and restrict application rates, timing and techniques to minimize potential impacts to aquatic plants. The paragraph referenced by this comment had an error, which has been corrected. The sentence: "The R6 2005 FEIS (USFS 2005a) concluded that exposure of aquatic plants to chronic toxicity concentrations of these herbicides to be mathematically possible" has been corrected to be "…mathematically impossible". This was a finding from the National Marine Fisheries Service Biological Opinion, in which they calculated that it is not possible for us to put enough herbicide on our landscape to result in chronic exposure of concern (Bautista, 2009, *personal communication*). Low rainfall rates over most of the project area would make chronic effects very unlikely because transport of these herbicides to waterbodies in amounts high enough to reach chronic levels is unlikely.

Table J-17. Response to comments – Cumulative Effects

CUMULATIVE EFFECTS	
13-8 13-24	*Relying on the Region 6 plan, and the DSEIS's proposed use of harmful formulations, fails to comprehensively address forest-level invasive plant problems, their root causes, and substantial but as yet largely unaddressed cumulative and synergistic impact harms. The revised DSEIS must analyze the proposed Invasive Plant Treatments and the cumulative and synergistic effects of past, recent, current, known, and likely future federal and adjacent non-federal timber sales, livestock grazing, road use and management, recreation, mining, ORV systems and use patterns (authorized and unauthorized), and other non-federal weed control projects in the region that utilize herbicides and biocontrols (state, county, municipal, agriculture, railway, and private).*
Response	Cumulative effects are addressed throughout Chapter 3, however minimal effects are predicted because of the type of herbicides used and the buffers and PDFs limit the extent and duration of effects to such a degree that synergistic effects are implausible. The root causes of Forest level invasive plant problems are well understood, and the R6 2005 FEIS describes these in detail. Most of the treatment areas are roadsides, so it is clear that roads are a persistent vector for spread of invasive plants. Ground disturbance, wildland fires and human traffic

	all contribute to invasive plant spread, as well as biological and physical agents such as animals, wind and water. The R6 2005 ROD standards address the causes of invasive plant spread and require Forest land managers to address prevention in all land uses. Several Forest Service policies emphasize prevention of invasive plant introduction, establishment and spread. Actions that may be taken to prevent the spread of invasive plants relative to specific land uses are not connected actions to this project. This project would be needed regardless of decisions made regarding access and travel management and other activities.
13-25	*Similarly, as the agency is largely incapable of effectively enforcing ORV use regulations, the cumulative impacts from actual and predicted use levels and harms must be assessed. Similarly, BMP provisions for logging, thinning, and other management actions are at best only partially attained. Actual impacts, rather than speculative assumptions, must be ascertained, disclosed, and assessed in light of the full cumulative impacts and synergistic harms of the proposed treatments. The potential for real-life worst case scenario occurrences must be addressed, rather than unrealistic Polly-Anna assumptions that generally fail NEPA's expert advice, accuracy, and high quality analysis requirements.*
Response	The cumulative effects, where appropriate, are discussed throughout Chapter three. The Council on Environmental Quality (CEQ), in 1986, removed the NEPA requirement to do a worst-case analysis; instead they focused on the process for identifying and dealing with incomplete or unavailable information and identifying "reasonable foreseeable actions" (36CFR1502.22). In regard to the later, the analysis presented in Chapter three is supported by credible science, is not purely conjecture, and is within the rule of reason (CFR1502.22{b}).
14-257	*P. 426 last paragraph. Insufficient cumulative effects analysis-What does a "very low chance" of effects accumulation mean in real terms in the ground to affected humans, pets, wildlife, native plants, water quality, soils, etc. What effects exactly? Were? Under what circumstances? With which chemicals? Likely to affect who, when?*
Response	The DSEIS assumed that the R6 2005 ROD prevention standards will result in reduced rates of invasive plant spread over time. Effective treatment including EDRR will reduce existing and newly found invasive plant populations, which will eventually result in reduced need for herbicides (SDEIS page105).
14-258	*Cattle grazing is management within wilderness areas – cattle are acknowledged as a vector for invasives and may exacerbate the spread of knapweed within unit 71-57 and elsewhere.*
Response	Cattle grazing is one of several management activities that are authorized to occur within wilderness areas. Others include recreational hiking and horseback riding, trail construction and maintenance, dispersed camping, etc. Although the DSEIS p. 429 indicates that cattle may contribute to the spread of spotted knapweed associated with treatment unit 71-57 into the Mill Creek Wilderness Area, the locations of the existing infestations in the area (roadside and trails, DSEIS p.427 and Map 4) indicate that it is much more likely that motorists and recreationists who are using the roads and wilderness trails (where the infestations occur) have been, and are expected to continue to be the primary vectors for spotted knapweed spread. The DSEIS stated on page 414 that cattle are not considered a vector of spread of spotted knapweed. The range report for the DSEIS, and the FSEIS (Section 3.11) state that for the most part livestock are not considered to be a major contributor to the spread of invasive plants with the exception of hound's tongue . Houndstongue does not occur in unit 71-57, and is also not known to occur within the Mill Creek Wilderness.
14-260	*Manual treatment is not prevention, but control after the fact. It does not prevent further introduction of invasives.*

Response	The statement in question on page 429 of the DSEIS reads "The proposed manual treatment would prevent the spread of knapweed by cattle." The word prevent in this context is not meant to indicate the manual treatment is a prevention measure. The intent was to say that pulling the plants before they produce seed would eliminate the chance of seed being transported by cattle. The statement in the FSEIS is being re-written for clarification.
14-273	*P. 435 There is no analysis as to cumulative effects of herbicide use in the Ochoco Divide RNA.*
Response	The cumulative effects section for research natural areas on page 435 of the DSEIS stated that there are no cumulative effects as a result of invasive plant treatments in the Ochoco Divide RNA. The Council on Environmental Quality regulations for the implementation of NEPA define cumulative effects as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" 40 CFR 1508.7. RNAs are set aside for research and education; there are no activities in the reasonably foreseeable past, present or future within this RNA beyond the proposed invasive plant control, therefore there are no incremental impacts to constitute a cumulative effect.
14-247	*p. 380 There will be no reduction in herbicide use over time if these [vectors] aren't controlled.*
Response	The DSEIS assumes that the R6 2005 ROD prevention standards will result in reduced rates of invasive plant spread over time. Effective treatments including EDRR will reduce existing and newly found invasive plant populations, which will eventually result in reduced need for herbicides.

Table J-18. Response to comments – Revegetation/Restoration

REVEGETATION / RESTORATION	
13-7	*The restoration of treated sites is an essential part of invasive exotic plant control. Native plant species that belong to the local plant community should be used to re-occupy the site and reduce the risk of re-infestation by invasive exotics. Seed and other plant propagation materials should be native and collected as locally as possible. Species diversity is not only beneficial – but is essential. Native forbs as well as native grasses must be utilized, and non-native botanical species must not be employed. We ask that the Forest Service begin a proactive role in having a forb component in native seed mixtures to accurately reflect the plant communities on the Forest.*
Response	SDEIS Chapter 2 discussed the role of passive and active restoration as a part of this invasive plant treatment project. R6 2005 ROD Standard #13 requires native plant materials to be the first choice where active revegetation is necessary. The Forests and Grassland have been actively collecting and propagating seeds of native shrubs, grasses, and forbs and using these materials in revegetation projects. Seeds and seedlings of native plants are used in a variety of revegetation projects aimed to restore native plant habitats (see Appendix E).

Table J-19. Response to comments – Purpose and Need/Alternatives

PURPOSE AND NEED/ALTERNATIVES	
14-6	*This DSEIS has a grossly insufficient range of alternatives-all of the alternatives not considered in detail represent reasonable and*

14-11 14-18 14-53 14-275 14-227	*significant concerns by a concerned public that should have been integrated into a broader range of alternatives. Region 6 already limited the number of herbicides for use by wisely excluding use of 2,4-D and dicamba due to their greater toxicity, persistence, and mobility, so it is a bogus argument to imply that the purpose and need could not be met with the use of less herbicide formulas or less total herbicide use. (See DSEIS p.67, #1) Obviously the public has not been reassured by similar existing practices and restrictions affecting herbicide use; labeling, application restrictions, public posting, etc. already exist, yet the DSEIS and desire for alternatives that eliminate or greatly restrict herbicide use. This concern is reflected in the existing Ochoco National Forest LRMP requirements that other methods be demonstrated to be ineffective or impractical before resorting to herbicide use. Yet the proposed actions would scrap this precautionary approach. (See DSEIS p.68, #3) Re: the failure to analyze in detail alternatives that would restrict herbicide use across the planning area, see our comments and appeal of the Region 6 FEIS to which this DSEIS is tiered. The Regional Forester response that such a precautionary standard would deviate from integrated weed management principles that are part of Forest Service manual direction is to suggest that the Forest Service can never change its practices, which is not true (e.g. scrapping such existing Forest Plan direction to use herbicides only as a last resort is changing existing practices that would be part of Forest Service manual direction.) So the status quo is given as the basis for not considering other options, a circular argument that violates NEPA requirements to analyze a broad range of alternatives.*
Response	The R6 2005 ROD, which amended the land management plans for the Deschutes and Ochoco National Forests, discussed why 2,4-D and dicamba were not necessary to meeting the purpose and need for action (even though their inclusion increased the cost-effectiveness of Alternative D in the R6 2005 FEIS). The R6 2005 ROD found that the ten herbicides included in the selected alternative were considered necessary to treat the range of conditions throughout Region 6. DSEIS Table 9 (page 38) displayed the herbicides that are known to be effective on the target species found in the project area, with PDFs and buffers controlling what choices are available in any given site condition. Project design features add additional layers of caution to account for uncertainty. Issues raised by the public during project development have been addressed and primarily resolved through the PDFs. Alternative 3 was developed to provide an even more cautious approach to invasive plant treatment within riparian areas (DSEIS p.36-38). Thresholds of concern have been developed and help address herbicide risk and are based on peer reviewed toxicological studies, and are considered the best available science. The DSEIS considered the other alternatives listed in the comment (see DSEIS pp 67-71); however, they were not fully developed because they would not resolve issues any better than the other action alternatives, are not necessary to meet environmental standards, would substantially reduce the effectiveness of the project, and therefore do not meet the purpose and need. The reasons they were not analyzed in detail are discussed further in Chapter 2. The Forests have not abandoned their precautionary approach; however after fifteen years of implementation under previous Forest Plan direction, monitoring (DSEIS p.100-101, 105-107, 110-111) has indicated that non herbicide methods, at least initially in the treatment cycle, are not as effective as herbicides. The FSEIS considers the consequences of taking No Action. And although some of the invasive plant sites that have previously been authorized for treatment under earlier NEPA documents could continue to be controlled where necessary, the FSEIS shows that the majority of inventoried sites would go untreated. The R6 2005 Record of Decision (p.6) states that an alternative that *did* propose herbicides as a last resort was not chosen because it deviates from integrated weed management principles to select methods to achieve optimum management goals and objectives. Using herbicides as a last resort “is not the appropriate approach to

	invasive plant management because the cost is too high, especially given its lack of treatment effectiveness".
14-14	*Rejection of an alternative prohibiting herbicide use within riparian reserves or riparian habitat conservation areas (RHCAs): There is no substantiation for the claim that prohibiting herbicide use in riparian reserves or RHCAs would not meet the purpose and need Elsewhere in the DSEIS it is admitted that hand-pulling and digging for riparian invasive species, including Ribbongrass and Reed Canary grass, is feasible, just time-consuming and more difficult that other hand-pulling of invasives. The Forest Service specious argument that manual methods would have more impacts in riparian areas than herbicides.*
Response	The Forest Supervisor considered excluding all herbicide in riparian areas but did not develop this alternative for the reasons given in Chapter 2 p.69: Prohibiting the use of herbicides in Riparian Reserves or Riparian Habitat Conservation Areas (RR/RHCAs) would not meet the purpose and need for action. Certain plant species are invasive in the riparian areas, such as ribbongrass, reed canarygrass, and yellow iris. These invasive plants are not likely to be controlled effectively with non-herbicide methods. The proposed action and Alternative 3 (which provides a greater degree of caution than the proposed action) both address the issue of aquatic concerns, while allowing careful and appropriate application of herbicides where it is required to meet site objectives of eradicate, control, contain, or suppress. Refer to DSEIS sections 3.6 and 3.7 for expected impacts to the riparian areas and aquatic organisms; A comparison of effects of Alternatives 1, 2 and 3 is in table 18. Effects of no action throughout Chapter 3 assume no additional herbicide use beyond background.
14-17	*Yet release of exotic species to control exotic species has back-fired tragically in most cases before---such as with releasing Mongoose in Hawaii which ended up causing the extinction of many endemic Hawaiian bird species.*
Response	The small Indian mongoose was released in Hawaii in the late 1800s, long before APHIS began regulating the import of plants and animals to the US. Biological control agents undergo a rigorous testing procedure prior to being available for release (see Appendix B). The agency assumes that the agent will spread throughout the continent; therefore testing the effects to native plants can take up to 15 years. If the agent is found to feed on natives, it is not approved for use. For example, APHIS did not approve *Mogulones cruciger*, a root weevil that feeds on houndstongue because it fed on native Cynoglossum species. Only APHIS approved control agents are being proposed for use.
14-9	*Not using herbicides as an alternative is not similar to No Action, which uses herbicides. (See DSEIS pp. 67-68,# 2*
Response	Not using herbicides would not meet the purpose and need and therefore is not an alternative considered (DSEIS page 67-68). No action does not include any additional herbicide use beyond background levels and in that sense is similar to No Action (see table 18, 2,000 acres per year approved for treatment compared to 16,000 acres in the action alternatives). Current levels are relatively low (The intent of the project is to use integrated weed control techniques within the scope of the R6 2005 FEIS to more effectively treat invasive plants (See DSEIS purpose and need for more information). Not using herbicides would not meet this intent.
14-15	*If there are very few invasive plant sites in municipal watersheds, as admitted on DSEIS p.69, why should this alternative be considered infeasible or not worthy of full analysis?*
Response	DSEIS table 18 summarizes analysis that shows water quality would not be adversely affected, and drinking water standards would be met. The action alternatives may include non-herbicide or herbicide treatment, depending on the site conditions.
14-21 14-87	*The Forest Service should set a time schedule for herbicide use phase-out to respond to public concerns regarding herbicide use if it fails to prohibit herbicide use now. For instance a planned reduction of 50% less total herbicide use than the initial amount under the new plan*

14-211 14-210 14-190	*within 5 years, 30% more reduction from that resulting amount at 8 years out, 10% more reduction from that resulting amount at 10 years out, and no more herbicide use by 12 to 15 years from now. Such a phased reduction over time would allow for fluctuating herbicide use in response to climatic changes and invasive plant population discoveries while giving definite benchmarks for accountability in moving toward no more toxic chemical use on public lands. Such phase-out benchmarks seem very reasonable in the light of herbicide use reduction on existing sites over only four years of 92%, 90%,86%, and 100% (see Table 34, DSEIS p. 155)*
Response	The Forest Service expects herbicide use to decline over time on individual treatment sites given effective treatments proposed in the DSEIS (see DSEIS page 85). Treatments will be followed by either active or passive restoration, and the restoration would be monitored over time (DSEIS page 48). The restoration is aimed at establishing native plant communities, which would reduce and eliminate the need to use herbicides over time. Treatment of invasive source populations and implementing the planned rapid response plan would also serve to reduce long-term herbicide use.
14-267	*P. 432 There is no analysis of the benefits of not using herbicides in the sections on consequences of No action – a very biased presentation failing to disclose the harmful effects of toxic chemical use.*
Response	Herbicides would be used according to integrated treatment practices and Project Design Features (PDFs) that limit the potential for harming organisms, developing herbicide resistance, or contamination of the environment. The PDFs are intended to show specifically how herbicide treatments will implement label advisories, comply with standards and guidelines, and protect sensitive resources. For example, a label may say, "do not contaminate water when cleaning equipment"; then our PDFs (see Chapter 2, section 2.4 of the FSEIS) show *how* we are avoiding contamination of water. This specificity is necessary for conducting effects analysis as required by NEPA. The consequences of taking no action are discussed throughout the EIS. The environmental harm that invasive plant species can cause in the long-term are discussed (e.g. loss of native plant habitats including Sensitive species p.136-137, 145; habitat losses for wildlife p.340-34, etc.). One purpose of implementation planning (see Appendix F) is to avoid confusion and ensure all appropriate measures are taken when it comes time to treat a site. Annual implementation planning will involve coordination with the applicators and completing form FS2100-2 (required by FSM 2150), as outlined in Appendix F. Alternatives 2 and 3 would follow Integrated weed management (IWM) principles. IWM strives to achieve optimum management goals and objectives in coordination with other resource management activities. Alternatives 2 and 3 apply this approach and our PDFs insure compliance with the standard that requires us to minimize or eliminate adverse effects to non-invasive plants, and animals. As a result, it is not expected that either of the action alternatives would have any substantive negative effects; and the No Action Alternative, except for those sites that can be treated under IWM, would result in not meeting the Purpose and Need, i.e.there are fewer positive benefits.
14-243	*P. 380. There is insufficient difference between Alt 2&3, re: effect determinations the same, no great limitation of herbicide use, and little difference in herbicides and formulas used.*
Response	This comment is a general statement made about the effects to northern spotted owl, which was determined to have no effect for all three alternatives, as analyzed on pages 377-380. Alternative 3 was designed to address issues surrounding the effects to aquatic organisms, as explained in Chapter 1, section 1.8 and Chapter 2 section 2.3.3. The effects determinations for fish are different between alternatives 2 & 3, as shown in Tables 77-86. Herbicides and formulations proposed in this FSEIS are based on those permitted for use under the R6 2005 FEIS. Herbicide use under Alternatives 2 and 3 was further restricted by project design features based on local conditions as is required by

	the R6 2005 FEIS.
14-5	*The Purpose and Need is too narrowly defined as being to use herbicides without even these common sense limitations, rather than to control invasive plants effectively in as safe a way as possible. This violates NEP A requirements not to bias or frame the Purpose and Need so narrowly as to only support the proposed action alternative(s). It also suggests that there is insufficient evidence to demonstrate that such pervasive herbicide use is the only effective or practical course of action to control invasive plants.*
Response	There is a need to reduce specific invasive plant infestations and provide a mechanism for quick detection and response to changing invasive plant infestations "in a cost-effective manner that complies with environmental policies" (DSEIS page 2). Consideration of treatment cost and potential to actually reduce infestations is an aspect of meeting the need (see Treatment Effectiveness section of Chapter 3), as is adhering to standards for herbicide use laid out in the Forest Plans requiring that adverse effects be minimized (DSEIS Figure 5, R6 2005 ROD,).
10-1 11-1	*I strongly urge the Forest Service to adopt: 3. an alternative designed with an emphasis on reducing the risk of herbicides entering the water.*
Response	Alternative 2 was identified as the Forest Service's preferred alternative in the DSEIS; identification of a preferred alternative(s) is a requirement of the Forest Service implementing regulation for NEPA (40CFR1502.14 (e). Both Alternatives 2 and 3 would follow IWM principles. IWM strives to achieve optimum management goals and objectives in coordination with other resource management activities. Alternatives 2 and 3 apply this approach and our PDFs insure compliance with the standard that requires us to minimize or eliminate adverse effects to non-invasive plants, and animals. As a result, it is not expected that either of the action alternatives would have any substantive negative effects. However, a final decision will be based on how each alternative meets the purpose and need and the manner in which the alternative responds to the issues and public responses received. The commenter's suggestion is noted.
14-269	*P. 433 As in Alt. 3, prohibit the use of picloram, triclopyr and sethoxydim within stream buffers.*
Response	Sethoxydim and picloram cannot be used within a 50 foot buffer in any alternative. NEPA requires the analysis of alternatives, which in this case included cautious use of these herbicides by different application methods within various distances of water. The commenter's suggestion is noted.
10-2 11-2	*I am against the Preferred Alternative because I am very concerned about the back up plan to use herbicides imazatyr and setozydim if the glyposate isn't effective. These products are known to be very toxic to humans and animals (especially fish).*
Response	Used in the manner proposed, glyphosate, imazapyr, and sethoxydim are not likely to result in adverse effects to the environment, although adverse effects to some individual organisms cannot be completely ruled out (see Chapter 3, ex. Herbicide Risk Categories Section 3.7.2, Summary of Potential Effects to Wildlife Section 3.9.2). The PDF's and buffers (SDEIS p. 49-65) provide appropriate measures to ensure that adverse effects to the environment are highly unlikely to occur.

Table J-20. Response to comments – Prevention/Education

PREVENTION/EDUCATION	
14-16	*Effectively stopping vectors of invasive plant introduction and dispersal could make invasives far easier to manage with less destructive*

14-20 14-88 13-2 13-16	*methods over time, yet this DSEIS fails to improve upon the limited prevention measures in the Region 6 FEIS, despite an entire public alternative presented as an appendix to the FEIS that elaborated upon the potential tightening and improvement of prevention measures offered, as well as discussing additional needed prevention measures in detail. More focus on education and prevention could be incorporated in an action alternative without failing to control invasive plants.*
Response	The R6 2005 FEIS discussed the role of education in preventing the spread of invasive plants and incorporated prevention standards to our Forest Plans, and are incorporated throughout the FSEIS (see Chapter 2, Chapter 3 section 3.1.3, and Appendix G). Actions that may be taken to prevent the spread of invasive plants, including education activities, are not connected actions to this project.
13-1	*It is legally and scientifically deficient that the Draft SEIS largely does not provide additional site-specific prevention measures other than those already included in Appendix E of the Regional Invasive Plant Program EIS and ROD. Yet prevention is perhaps the most important component in the control of invasive plants. The revised DSEIS should emphasize and expand upon measures that prevent invasive plants from entering and spreading on the National Forests and Grassland. Livestock grazing, and soil disturbance activities including logging, thinning, roads, ORVs, etc. must be addressed and curtailed, helping to effectively address invasive plants issues at their source of introduction and spread. Invasive plant concerns should be a priority during transportation planning on the Forest. All motorized travel should be limited to designated routes, cross-country motorized use must be eliminated, and unnecessary roads must be effectively closed. ORVs should be prohibited from interior wildlands and ecological areas of importance and/or concern. The failure to sufficiently address the effects of motorized vehicles, timber management, and livestock grazing on the introduction and spread of invasive plants within the DSEIS violates the expert, reasonableness, and scientific requirements of the NEPA, and if implemented would violate the NFMA, MBTA, and CWA. These activities degrade natural ecosystems and set the conditions for the introduction and spread of exotic invasive plants. This is well-documented in scientific literature. While the Guide to Noxious Weed Prevention Practices included in the regional EIS Appendix E, and Appendix G of the DSEIS provides selected prevention techniques, these rely largely on severely flawed Best Management Practices which clearly have failed more often than not (or there wouldn't be an exponentially growing invasive exotic plant problem). Additionally, the identified provisions inadequately address effective implementation and monitoring in the field. It is of utmost importance that weed prevention and treatment activities be effectively incorporated into individual projects and carried out under the regulation and guidance of these programs. Monitoring projects for effective prevention of invasive weeds is essential.*
Response	The R6 2005 ROD, which amended our Forest Plans, added standards to address the causes of invasive plant spread and requires Forest land managers to address prevention in all land uses. In addition, several Forest Service policies emphasize prevention of invasive plant introduction, establishment and spread. Actions that may be taken to prevent the spread of invasive plants relative to specific land uses are not connected actions to this project. This project would be needed regardless of decisions made regarding access and travel management and other activities. Access and Travel Management is being considered under a separate environmental analysis. Cumulative effects analysis disclosed overlapping Federal actions.
13-4	*The proposed management actions failures to effectively address and curtail the sources of introduction and spread of invasive plants will ensure that the use of harmful toxic herbicides is not only perpetual, but incrementally such use will increase over time.*
Response	There is no reason to believe that herbicide use will increase over time. Invasive plants are likely to continue to spread, although the rate

	of spread may be reduced through prevention measures (see FSEIS Chapter 2), and existing infestations can be contained, controlled, or eradicated through effective treatment and restoration. Early detection and rapid response is crucial to eradicating new infestations when they are small and most effectively treated. The Forest Service expects herbicide use at any given site to decline over time given effective treatments proposed in this EIS. Herbicide use at treated sites has declined because of successful control. For instance, spraying has been reduced from broadcast to spot application on Hwy 26 as a result of effective treatment. Treatments will be followed by either active or passive restoration, and the restoration would be monitored over time (see Appendices F and G). The restoration is aimed at establishing native plant communities, which would reduce and eliminate the need to use herbicides over time.
13-14	*Opportunities should be explored to engineer and provide washing stations to prevent the spread of exotic plants by vehicles. (For example, designs exist for in-road "cattle guard" style friction wash basins, with recoverable seed traps, at the entry points to public lands.)*
Response	Washing stations are outside the scope of this invasive plant treatment project because they are a prevention measure and do not address the purpose and need for the project. Prevention measures are discussed in the FSEIS in Chapter 2 and in Appendix G.
13-17	*Require that all feed for horses and livestock is certified as "weed free" throughout all National Forest lands and not just within wilderness areas.*
Response	The R6 2005 FEIS standards require weed free feed throughout National Forests and Grasslands in Region 6.

Table J-21. Response to comments – Adaptive Management/Monitoring

ADAPTIVE MANAGEMENT / MONITORING	
13-11	*Monitoring needs to be a priority. Small control study areas should be assessed prior to large scale treatments, to assure the effectiveness and assess the adverse impacts of proposed treatment methods.*
Response	Monitoring is described in Chapter 2 and Appendix F. Impacts of treatment methods have been assessed through detailed analysis of toxicological and other effects and past research and monitoring results. Small control study areas have been used to assess effectiveness and impacts of solarization, hand digging, the herbicide wiping method, and weed whacking to prevent seed production. Small trials of methods and herbicide choice would continue to be used to determine local conditions on effectiveness as a part of the project. Including a study suggested by the public to first cut some of the foliage of ribbongrass and reed canarygrass in order to reduce the amount of herbicide needed.
14-12	*Obviously flexibility and adaptive management could be built into this project that could honor the intent of the existing Ochoco Forest Plan standards to only use herbicides if other methods have been or would be ineffective or impractical (which is actua1ly a lot of latitude for discretion already.) The inclusion of additional project design features (PDFs) demonstrate that individual Forest plans can choose to deviate from the Region 6 Programmatic FEIS direction for greater ecological and human safety protection.*
Response	The Invasive Plant Control Project DSEIS is evidence that the Ochoco and Deschutes NFs feels it is necessary to use herbicides. This is because other methods *have* failed to meet the Forest Plan Desired Future Condition that states "Well-established infestations having 10 or

	more noxious weed plants will be contained and they will be fewer in number. New infestations (less than 10 plants) will be rare, and they will be detected and bought under control quickly. Most established noxious weed infestations will be confined to spotty locations along transportation corridors" (Ochoco LRMP #18, 1998). Integrated control methods including manual, biological and mechanical, have been used for the last 10 years on sites introduced since 1998. These methods in and by themselves have not proven effective to control or even contain the spread of noxious weeds. The 1998 LRMP Amendments underestimated the rate of new weed introductions, and the Forest Service's ability to control aggressive weeds using manual methods. Project design features incorporated as part of Alternatives 2 and 3 are not deviations from Region 6 Programmatic FEIS direction, they are expected as part of normal NEPA analysis. Site specific analysis is required by the 2005 R6 2005 FEIS ROD page 3. See also responses to comments 14-6, 14-11, 14-21.

Table J-22. Response to comments – Laws, Regulation and Policy and Social Economics

LAWS / REGULATIONS / POLICY	
13-19	*We recommend that the proposed IPT DSEIS project be revised to be consistent with the Administrative Procedures Act, Clean Water Act, Endangered Species Act, National Environmental Policy Act, National Forest Management Act, these statutes' implementing regulations, and the amended region's Forest Service Land and Resource Management Plans, as well as credible scientific research concerning invasive plants, and the known and potential adverse impacts resulting from the utilization of toxic herbicides and harmful biocontrols.*
Response	Relative to Herbicides: Alternatives 2 and 3 incorporate a risk reduction framework to ensure the safe and effective use of herbicides. First, label requirements, federal and state laws, and the EPA approval process provide an initial level of caution regarding herbicide use. Next, the SERA Risk Assessments (2001, 2003a, 2003b, 2003c, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f) disclosed hazards associated with worst-case herbicide conditions (maximum exposure allowed by the label). SERA risk assessments identify and evaluate incomplete and unavailable information that is potentially relevant to human health and ecological risks. Each risk assessment identifies and evaluates missing information for that particular herbicide and its relevance to risk estimate. Such missing information may involve any of the three elements needed for risk assessments: hazard, exposure, or dose-response relationships. A peer-review panel of subject matter experts reviewed the assumptions, methodologies and analysis of significance of any such missing information. SERA incorporates the findings of this peer review in its final herbicide risk assessment. The R6 2005 FEIS included an additional margin of safety by reducing the level of herbicide exposure considered to be of concern to Threatened and Endangered fish and wildlife. The R6 2005 ROD adopted standards to minimize or eliminate risks to people and the environment. This National Forest Site-Specific Invasive Plant Treatment Project is designed to comply with the R6 2005 ROD standards. Finally, the Project Design Features (PDF) further reduce the risks associated with herbicide treatments by eliminating or minimizing as much as possible the impacts to the environment (FEIS, Chapter 2.4). The implementation planning and monitoring and adaptive management processes described in Chapter 2 and Appendix F ensure that effective treatments are completed according to PDFs, and undesired effects are indeed minimized. Relative to biocontrols: The Animal and Health Inspection Service (APHIS) must approve the entry of all biological control agents into the United States (see Appendix J in the 2005 R6 2005 FEIS, USDA 2005b). Biological control agents under this project will be used primarily(but not limited to) on Canada thistle and St. John's-wort

	(see FSEIS Appendix B). Effects from biological agents are analyzed by APHIS before being approved for use. Only biological agents approved by APHIS and the state of Oregon, and that comply with standards in the Forest Plans, would be approved for use under this document. The completed Environmental Impact Statements are available at: http://www.aphis.usda.gov/ppq/enviro_docs/index.html.
14-60	*"The R6 2005 FEIS suggested that Hispanic forest workers and American Indians may be minority groups that could be disproportionately affected by herbicide use." (DSEIS p. 336) So what is the mitigation for this? The DSEIS does not adequately address the problem of disproportionate exposure or even analyze potential impacts on a site-specific basis. This makes a mockery of environmental justice requirements.*
Response	There is no evidence that Hispanic forest workers or American Indians will be exposed to harmful levels of herbicide in this project. The suggestion in the R6 2005 FEIS does not apply to this project area. DSEIS page 336 stated that county invasive plant control departments do not indicate that they employ any specific population group that could be disproportionately affected during invasive plant treatments and that effects to employees engaged in invasive plant control would be negligible due to personal protection equipment, PDFs including limits on application rates, and compliance with occupational health and safety standards.
14-19	*The proposed excessive use of herbicides--especially in riparian areas-does not seem to meet the Region 6 goal: "Implement invasive plant treatment strategies that protect sensitive ecosystem components, and maintain biological diversity and function within ecosystems. Reduce loss or degradation of native habitat from invasive plants while minimizing adverse effects from treatment projects." (USFS 2005b, p. Appendix 1-2) (DSEIS p.70) This is the case due to uncertainties and potential impacts disclosed in the DSEIS regarding herbicide use as well as potentially undisclosed information regarding additional uncertainties and impacts.*
Response	There is no evidence the use of herbicides proposed is excessive. The project is intended to meet the stated R6 2005 ROD goal.
SOCIAL ECONOMICS / COST	
14-1	*Herbicides are pushed as being the most cost effective control method, yet how is cost effectiveness determined? What about the externalized costs of herbicide damage to native fish, native plants, wildlife, humans, drinking water, soil fertility, etc. through toxic chemical poisoning?*
Response	There is no externalized cost because the actual impacts would be immeasurable (DSEIS Table 18). Cost-effectiveness is determined by average costs associated with different types of projects as shown in the economic analysis (DSEIS Chapter 3.10).
14-75	*Re: p. 108. 30%? A little more labor might accomplish the same results as herbicide applications without the toxic side effects, while providing more jobs for local communities.*
Response	The Forests currently uses many volunteer groups, including those from the school system, Girl and Boy Scouts, Youth Conservation Corps and AmeriCorps, and environmental and community service groups, to help in the effort to reduce the spread of noxious weeds through manual treatment methods (DSEIS, pages 67-68). The Forests also hire crews such as Correction Crews, Northwest Youth Corps, Central Oregon Interagency Council, AmeriCorps, YCC, and seasonal employees to manually control invasive plants. The Forests also have volunteer group such as The Sierra Club, Camp Sherman Weed Warriors, and individual citizens pull weeds. Since 2001, volunteers

	and crews have accomplished over 18,700 acres of noxious weed control. Use of volunteers and crews for manual control is expected to continue regardless of the decision. However, there are both treatment effectiveness and treatment cost issues associated with solely using manual control methods. Concerning treatment effectiveness, some invasive species, such as biennials can be controlled at higher than 50% levels (see SDEIS, page 108) by manual methods with diligent twice per year treatments. However, the most aggressive species such as Russian knapweed, Canada thistle, ribbongrass, and reed canarygrass cannot (see Appendix B). Manual control methods have been used for many years on large, dense weed sites with little change in weed density or perimeter. For example, Forest Service personnel, youth crews and volunteers for the past 9 years have treated houndstongue, a biennial species, in the Roba area of the Paulina RD manually. For the Roba area alone, more than 17,842 person hours have been expended on manual control, at an approximate cost of $322,860 and the houndstongue population continues to expand. Another example is the demonstration plot of reed canary/ribbon grass that was pulled on the Metolius River. Based on that day of pulling 60 ft^2 with 12 person hours it would take several years and cost $108,900 for an inmate crew or $114,824 for GS-4 laborers to pull the acre of reed canary/ribbon grass that is now present (Pajutee 2008). Resprouting of rhizomes after the initial pulling would require additional pulling for an unknown number of years increasing these costs. A third example is the hand pulling of houndstongue and spotted knapweed on five sites within and adjacent to the Ochoco Divide RNA that has been done for four years, without control. Approximately 1,524 hours of labor, by YCC and Northwest Youth Corps crews and Forest Service personnel, has occurred with little reduction in weed density, and no containment in the size of the sites. With the limited effectiveness of manual treatment for many weed species; and the high cost of manual treatment (DSEIS Chapter 3.10) and likely future budgets that may limit total annual treatment acres to 20% of what is actually needed (DSEIS Chapter 3.3), relying solely on manual treatment would result in existing weed populations to continue to expand and new populations to get established and expand.

Table J-23. Response to comments – Comments Outside the Scope of This Analysis

COMMENTS OUTSIDE THE SCOPE OF THIS ANALYSIS	
8-2	*I would like to offer the opinion that if individual property owners do not take responsibility for the noxious weeds on their property, it will not be possible to control these weeds (unless the plan calls for use of herbicides on personal property).*
Response	The Invasive Plant Treatments DSEIS addresses actions only on National Forest lands, and does not propose the use of herbicides for invasive plant treatment on private land.
14-8 14-246	*The spread of Houndstongue indicates failure to control vectors of invasive plant introduction and dispersal, not the compelling need for herbicide use. p. 380 What are you going to do to significantly reduce the introduction and spread of invasives along roads? (the majority of sites) re: vehicle, human, and livestock vectors.*
Response	Controlling the vectors of houndstongue spread (and other invasives), chiefly wildlife, vehicles, humans, and livestock, are out of the scope of this analysis. The R6 2005 ROD added a standard to Forest Plans that requires the consideration of invasive plants and their spread during project planning; so for example as the Forest Service implements the new travel management rule, road closures and invasive plants will be addressed. The ROD includes other prevention standards as well, and in addition, the Forests have adopted a list of

	prevention practices that will reduce the introduction, establishment and spread of invasives. These prevention practices are included in the DESIS in Appendix G. Prevention is an ongoing consideration in managing national forests, regardless of the decision resulting from this EIS.
14-92	*…or by allowing commercial extraction of St John's Wort which has medicinal value instead of herbicides.*
Response	Commercial extraction is not part of the current project and is outside the scope of this analysis. Most of the St. John's-wort (and other herbal-use plants) sites are found scattered along roadways. Herbalists have informed the Forest Service that they are not interested in the species that grow near roads because they are not pristine (Pajutee 2007). This project includes options for control of invasive plants using manual removal.
13-10	*Given that certain Forest Service projects are treated as categorical exclusions and not analyzed under environmental assessments or impact statements, we request that the DSEIS address invasive plant concerns for categorical exclusion projects as well as unauthorized activities and their impacts. Management activities proposed as categorical exclusion projects should be assessed in light of their effects upon invasive plant prevention.*
Response	The R6 2005 ROD standards address the causes of invasive plant spread and require Forest land managers to address prevention in all land uses. Several Forest Service policies emphasize prevention of invasive plant introduction, establishment and spread. Actions that may be taken to prevent the spread of invasive plants relative to specific land uses are not connected actions to this project. This project would be needed regardless of decisions made regarding access and travel management and other activities.
14-10	*The Forest Service has not really made a concerted effort to engage the public for a reliable long-term supply of volunteers for manual invasive plant control. This could be done through the school system, with Girl Scouts and Boy Scouts, through the Youth Conservation Corps and AmeriCorps, through environmental groups and community service groups, etc. but requires communication and commitment of staff and resources.*
Response	The DSEIS addresses volunteer labor as a means to control invasive plant populations on pages 67-68. The Forests currently use all of the named groups, and many others, to help in the effort to reduce the spread of noxious weeds. The Forests also hire crews such as Correction Crews, Northwest Youth Corps, Central Oregon Interagency Council, AmeriCorps, YCC, and seasonal employees to manually control invasive plants. Since 2001 volunteers and crews have accomplished over 18,700 acres of noxious weed control. The use of volunteers and youth crews is expected to continue regardless of the decision made on this EIS.
14-259	*p. 429 End livestock grazing within the Mill Creek and Bridge Creek Wilderness Areas as a preventative measure.*
Response	Congressional Grazing Guidelines specifically state, "There shall be no curtailments of grazing in wilderness areas simply because an area is, or has been designated as wilderness, nor should wilderness designations be used as an excuse by administrators to slowly 'phase out' grazing. …" (FSM2322.22) The comment proposing to end livestock grazing within the Mill Creek and Bridge Creek Wilderness Areas falls outside of the scope of analysis for this project. Grazing capability and suitability assessments will be conducted for the associated grazing allotments when NEPA analysis for reissuance of term grazing permits on these areas is conducted. These analyses are currently planned for 2010 and 2011. A list of invasive species within wilderness areas was listed on page 427, Table 110 in the DSEIS. Of the species listed, cattle are considered to be a vector of houndstongue. The houndstongue infestation occurs outside the Black Canyon

	Wilderness at the trailhead, where cattle are not a concern of spread. Houndstongue is included in the analysis because of the proximity to the wilderness. Also see the response to a similar comment, #14-258.

Table J-24. Response to Comments – General Comments, No Response Necessary

GENERAL STATEMENTS ABOUT THE DSEIS – NO RESPONSE NECESSARY	
2-1	I urge the Forest Service to adopt Alternative 3.
3-1	Jefferson county Public Works is in favor of the EIS for the Deschutes and Ochoco national forest
3-2	The new herbicide along with up to date chemistry will allow agencies and contractors to do a better job with less impact on environment.
7-2	We appreciate discussions on climate change (p. 98-99) and implication monitoring and planning (Appendix F) in the DSIS.
8-1	The U.S. Forest Service plan to confront noxious weeds in Central Oregon (as described by Kate Ramsayer in July 7,2009 Bend Bulletin, Section C, page 1) seems to concentrate on the targeted use of herbicides.
12-2	By not controlling the invasive medusahead and morning glory, or any other noxious weeds on public lands, I believe that poor stewardship of the land is being shown.
14-102	p. 206 We support the PDF's restricting use of herbicides by soil type.
14-160	Pg. 328, para 2 & 3. Imazapyr and Picloram - Sound the most benign for fish and aquatic algae.
3-3	It [the proposed action] will also allow early detection and rapid response so noxious weed infestations won't spread.
4-5	The community and lease cabin owners will be willing to volunteer for this work [pulling ribbongrass and reed canarygrass] along with some employed people. Perhaps some funds from trail maintenance can be used for this work.
7-1	The DSEIS includes new information and additional environmentally protective measures that further address our original water quality concerns (e.g; upper limits on maximum herbicide treatments in riparian areas and 10ft.buffers on perennial streams for spot spraying glyphosate and aquatic imazapyr).
8-3	The Deschutes National Forest Headquarters needs to press Deschutes County to bring this problem more acutely to the attention of county residents.
8-4	I hope the Deschutes National Forest Headquarters will do what is necessary to convince Deschutes County and the City of Bend to take these steps.
7-3	We agree that global climate change will more likely result in an increased prevalence of biological invaders, which reinforces the cause to ensure that the selected alternative is properly implemented and effective.

Government Agency Comment Letters

Letters from federal, state, and local government agencies are reproduced in this section per FSH 24.1.1(b). The letter from the Oregon Department of Agriculture was received after the comment period. The Forests responded to the letter (enclosed), but the comments were not included in the table above. The letter was supportive of the proposed treatments in Alternative 2 and the EDRR process, and did not result in additional analysis in the EIS. All comment letters are available in the project file in the Ochoco National Forest headquarters office, Prineville, Oregon.

Table J-25

Table J-25 that follows contains specific responses to comments and science brought forward by Richard Artley outside the comment period on May 31, 2009 and October 14, 2009.

Table J-25. Comments from Richard Artley received outside the comment period

17-1 5/31/2009	*I ask that you base your herbicide safety and toxicity conclusions on the Pesticide Action Netowrk of North America data. The PANNA publishes a list of their Dirty Dozen chemicals which include: aldicarb, toxaphene, chlordane and heptachlor, chlordimefo, chlorobenzilate, DBCP, DDT, the "drins" (aldrin, dieldrin and endrin), EDB, HCH and lindane, paraquat, parathion and methyl parathion, pentachlorophenol, and 2,4,5-T. Most of these Dirty Dozen pesticides qualify as persistent organic pollutants (POPs), which are notable in their longevity, toxicity to humans and animals, and their ability to be transported around the globe through the atmosphere. Please do not consider using ANY of the Dirty Dozen chemicals as part of your project.*
Response	None of these herbicides are considered for use in the project.
17-2 5/31/2009	*In addition to the Dirty Dozen pesticides, aminopyralid, glyphosate, atrazine, glufosinate, paraquat, nitrofen and imazapyr are banned for use in the 27 countries that make up the European Union. Do not use any of these herbicides. Website citations provided.*
Response	Of these, glyphosate and imazapyr were authorized for use in the R6 2005 ROD. The provided website: http://www.i-sis.org.uk/DMPGR.php relative to glyphosate was reviewed (Desser 2012, Mistretta 2011) and no new science that is not already in the SERA risk assessments and SEIS was found. The other website, http://www.beyondpesticides.org/dailynewsblog/?p=190, relative to imazapyr, was reviewed and found to be an opinion piece with no new science. The statements made under the glyphosate heading mix conclusions on "glyphosate" and the formulation "Roundup" as if they were the same thing. It is widely known and reported in independent academic studies that the toxicity of the surfactant in Roundup is much more toxic than the active ingredient glyphosate. The specific formulation, method of application, location, application rate, and other factors influence the actual potential for exposure and impacts. The R6 2005 FEIS discussed these and provided management direction for projects to minimize risk from herbicides. Glyphosate is the most widely used herbicide in Oregon (2007 PURS). Conditions and patterns of land use in Europe are very different from those here in the U.S. Europe does not have huge blocks of land, like our million plus acre forests and huge "industrial" farms, but rather has a much more fragmented land use where residences and farms and forests are closely interwoven. Hence, regulations appropriate for European land uses are not directly applicable here. Imazapyr is an important herbicide because it is labeled for aquatic use, poses low risk to aquatic organisms, and is effective on broad spectrum, non-selective pre and post-emergent annual and perennial grasses and broadleaved species. It poses low risk to wildlife and people. Across the region, project design criteria are in place to ensure that no harmful exposures to imazapyr (or other herbicides) occur.
17- 3 5/31/2009	*There are a few safe, nontoxic herbicides available. They are discussed below* *Repellex See: http://www.deerandcritterrepellent.com/page/weed* *Organic and Nature See: http://www.organicandnature.com/products/herbicide.pdf* *Bioganic, EcoEXEMPT HC, Matran EC, Scythe, WeedBAN See: http://www.biconet.com/catalog/lawn.pdf* *Corn Gluten See: http://www.cactusjungle.com/fertilizers.html* *BurnOut II See: http://www.dirtworks.net/BurnOut-Organic-Herbicide.html*
Response	The Forest Service can only use pesticides according to published labels registered with the EPA and other management direction.

	Chemicals such as vinegar were considered for use in 2005; however these products are not properly assessed or labeled for Forest Service use. Even “safe, non-toxic” chemicals may have adverse impacts to the environment. For example, one of the ingredients in BurnOut herbicide is vinegar, which can be toxic to fish and amphibians because of the very low pH. Another active ingredient listed is "sodium laurel sulfate" - which is shampoo. Also very harmful to aquatic organisms. There is no data cited to support that BurnOut is "safe" for soil microorganisms or that the soil pH will return to normal in 24 hours. Fertilizers and animal deterrents such as the products listed here would not be effective for invasive plant treatments.
17-4 5/31/2009	*My recommendation is to hand-pull these invasive plants using Handy-Man jacks for deep rooted species.*
Response	Handpulling (manual) and mechanical treatments are approved for use in R6 and this project. The R6 2005 ROD directed the Forests to use a combination of cost-effective approaches that minimize or eliminate risk. Handpulling and other non-herbicide methods are analyzed in the FSEIS.
18- 1 10/14/2009	*If herbicides must be used, I DEMAND that only Milestone® (aminopyralid), Ally® (metsulfuron methyl), and Escort® (metsulfuron methyl) be applied on your forest. Fact sheets for the ten herbicides approved for use in R6, plus aminopyralid and 2,4 D were attached.*
Response	The fact sheets provided by the commenter were considered in the SERA herbicide risk assessments and R6 2005 FEIS analysis. (Aminopyralid was not included in the 2005 ROD as an herbicide available for use because the risk analysis was not completed at that time; therefore was not included in the Ochoco/Deschutes Invasive Plant Treatments EIS. The risk assessment for aminopyralid was not complete until June of 2007, after consultation with US Fish and Wildlife Service and National Marine Fisheries Service had begun. Including aminopyralid would have required re-initiating consultation and therefore would have delayed completion of the FSEIS. Aminopyralid could be added later following a supplemental or separate NEPA document). This is not a case of opposing science; rather it is a misunderstanding of the appropriate use of certain types of research, and the relationships among exposure, dose, and toxicity. The fact sheets provided by the commenter fail to disclose the route of exposures and the doses that resulted in the stated effects. Many of the studies are based on unsubstantiated recollections of exposure, are designed to be coarse screening studies, or are otherwise not suitable for direct use in assessing risk from the proposed applications. The most appropriate studies in assessing risk to humans and natural resources are the dermal and dietary studies used in the risk assessments, which account for plausible routes of exposure, absorbed doses, and the likely dose-response for the applications proposed. This project does not propose using 2,4-D. The risk of using glyphosate and other herbicides depends on the mechanism and amount of exposure, whether to a person, fish or other organism. Our analysis includes worst case exposure scenarios. The environmental policies and standards that apply to herbicide use require rigorous risk assessment. The Forest Service understands that some people have heightened concerns about chemical exposure and that there are uncertainties about the environmental impacts of herbicide use. In response to public concern and in light of the rigorous analysis standards, the Pacific Northwest Regional Forester signed the R6 ROD in 2005. The standards in the 2005 ROD control selection of herbicide, emphasize safety, and require managers to minimize or eliminate risks. Chapter 2 of the Ochoco/Deschutes Invasive Plant Treatments DSEIS, including Project Design Features, treatment caps, riparian buffers (Tables 15 & 16), and Figure 5 described the layers of caution integrated into herbicide use in this project. The PDFs were developed to respond to specific risks inherent to use of herbicides (Desser 2008). For instance, glyphosate in the Roundup formulation may affect the aquatic environment (fish and other organisms) at low exposure levels, partly primarily because this

	formulation includes a particular surfactant (R6 FEIS). The PDFs and buffers were developed to ensure that this formulation (including the surfactant itself used with any other herbicide) is not used near streams or other riparian or aquatic habitats. Herbicides that pose higher risk to aquatic organisms have larger riparian buffers, and/or certain formulations, rates, application methods, etc. are prohibited near streams. Soil types are considered in the herbicide that would actually be used to prevent leaching and/or run off of herbicides.
18- 2 10/14/2009	*If the unwanted vegetation can be found and sprayed individually, it can certainly be killed in a safer way by hand pulling!* *If hand pulling is impossible, I expect the NEPA document to explain why.*
Response	*The reasons that herbicides are needed as part of the toolbox is explained in the R6 2005 FEIS and this FSEIS. A combination of treatment methods and repeated entries are often needed to effectively control invasive plants.*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

August 03, 2009

Deschutes National Forest Headquarters
1001 SW Emkay Drive
Bend, Oregon 97702

RE: U.S. Environmental Protection Agency (EPA) comments on the U.S. Forest Service (Forest) Invasive Plant Treatments Draft Supplemental Environmental Impact Statement (DSEIS). EPA Project Number: 07-002-AFS

Dear Mr. John Allen and Mr. Jeff Walter:

EPA has reviewed the DSEIS for the proposed **Invasive Plant Treatments** on Deschutes National Forest (CEQ No. 20090205) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Under our policies and procedures, we evaluate the environmental impact of the proposed action and the adequacy of the impact statement. We have assigned an LO (Lack of Objections) rating to the DSEIS. A copy of the EPA rating system is enclosed.

Our primary environmental concern with the February 2007 DEIS was the project's potential to impact water quality due to herbicide applications and sediment. In February 2008, we commented that the December 2007 Final EIS was responsive to our comments. The DSEIS includes new information and additional environmentally protective measures that further address our original water quality concerns (e.g., upper limits on maximum herbicide treatments in riparian areas and 10 foot buffers on perennial streams for spot spraying glyphosate and aquatic imazapyr).

We appreciate discussions on climate change (p. 98-99) and implementation monitoring and planning (Appendix F) in the DSEIS. We agree that global climate change will more likely result in an increased prevalence of biological invaders, which reinforces the cause to ensure that the selected alternative is properly implemented and effective. We support your efforts to protect native ecosystem processes.

If you have any questions or concerns about our comments, please contact Erik Peterson of my staff at (206) 553-6382 or by electronic mail at peterson.erik@epa.gov.

Sincerely,

for

Christine Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosures
EPA Rating System for EISs

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United States Department of the Interior

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August 10, 2009

John Allen
Forest Supervisor
Deschutes National Forest
1001 SW Emkay Drive
Bend, Oregon 97702

Dear Mr. Allen:

The U.S. Department of the Interior has reviewed the Draft Supplemental Environmental Impact Statement (DSEIS) for the Invasive Plant Treatments for the Deschutes and Ochoco National Forests and the Crooked River National Grassland in Deschutes, Jefferson, Klamath, Lake, Crook, Wheeler, and Grant Counties, Oregon. The Department offers the following comments for use in developing the Final Environmental Impact Statement for the project.

Chapter 3.6 Water Resources, page 231, unnumbered subsection Groundwater and Geology

Gannett and others (2001) is not included in the list of references. The citation is:

Gannett, M.W., Lite, Jr., K.E., Morgan, D.S., and Collins, C.A., 2001, Ground-water hydrology of the upper Deschutes Basin, Oregon: U.S. Geological Survey Water-Resources Investigations Report 00-4162, 74 p. Also available on the Internet at: http://pubs.er.usgs.gov/usgspubs/wri/wri20004162

Thank you for the opportunity to review and comment on this DSEIS. If you have any questions concerning our comments, please contact Lloyd Woosley, Chief of the USGS Environmental Affairs Program, at (703) 350-8797 or at lwoosley@usgs.gov. If you have any other questions, please contact me at (503) 326-2489.

Sincerely,

Preston A. Sleeger
Regional Environmental Officer

Oregon
Theodore R. Kulongoski, Governor

Department of Agriculture
635 Capitol Street NE
Salem, OR 97301-2532

September 30, 2009

Mary Wagner
Regional Forester
USDA Forest Service
Pacific Northwest Region
PO Box 312
Portland, OR 97208

Dear Ms. Wagner:

RE: Deschutes-Ochoco National Forest Invasive Plant DEIS

As chair of the Oregon State Weed Board and writing on behalf of the board to support expediting the implementation of the Deschutes-Ochoco National Forest Invasive Plant DEIS.

At the September 10, 2009, State Weed Board Meeting, we discussed an invasive plant issue that is threatening riparian areas along the pristine Metolius River.

There are two invasive plant species of primary concern: yellow flag iris, *Iris pseudacorus* and ribbon grass, *Phalaris arundinacea*. Both of these invasive plants can still be controlled if aggressive action is taken, using an integrated approach including herbicides. This issue should not be viewed any differently than a wildfire burning in the area, where response time is critical in preventing further spread and environmental impacts. One key Forest Service invasive plant policy is implementation of Early Detection Rapid Response (EDRR) programs to effectively control small infestations before they gain a foothold, causing severe negative impacts to our natural resources and environment. Unfortunately, other federal polices often prevent effective implementation of EDRR.

The wild and scenic Metolius River has crystal clear waters and native plant and fish populations that are essential resources to protect for future generations. We realize that the Forest Service has received opposition to the use of herbicides. Potential risk to the environment from a small amount of herbicide is far exceeded by compounded impacts that the invasive plants will have on the ecosystem for years to come if not treated effectively.

Mary Wagner
September 30, 2009
Page 2

Thank you for the opportunity to provide our comments and if there is anything we can do to assist in this process or if you have any questions please contact me, at 541 276-7111 or Tim Butler, Manager, ODA Noxious Weed Control Program at 503 986-4621.

Sincerely,

Bill Hansell

Bill Hansell, Chair
Oregon State Weed Board
541 276-7111 Ext. 201

Cc: John Allen, Deschutes NF Supervisor
Jeff Walker, Ochoco NF Supervisor
Jim Harris, Oregon State Weed Board Member
Mark Krautman, Oregon State Weed Board Member
Patti Milne, Oregon State Weed Board Member
Amy Peters, Oregon State Weed Board Member
Jerry Erstrom, Oregon State Weed Board Member
Dan Hilburn, Oregon State Weed Board Member
Tim Butler, ODA Noxious Weed Control Program

USDA United States Department of Agriculture | Forest Service | Pacific Northwest Region | 333 SW First Avenue (97204) PO Box 3623 Portland, OR 97208-3623 503-808-2468

File Code: 2080
Date: November 23, 2009

Bill Hansell, Chair
Oregon State Weed Board
635 Capitol Street NE
Salem, OR 97301-2532

Dear Mr. Hansell:

Thank you for your letter regarding the Invasive Plant Treatment Draft Supplemental Environmental Impact Statement for the Deschutes and Ochoco National Forests (DSEIS). We appreciate your concern regarding the infestations of yellow flag iris and ribbon grass along the Metolius River.

These invasive plants do indeed pose a serious threat to the ecosystem along the Metolius River, including native plant diversity on the islands within the river. For that reason, treatment options for these invasive plants are included in the DSEIS. Alternative 2 allows the use of specific herbicides with specific application methods along the river banks and on the islands. Alternative 3 allows the use of specific herbicides with specific application methods up to ten feet from the river. Along the banks and on the islands, manual or cultural methods are required in this alternative.

As you mentioned in your letter, early detection and rapid response (EDRR) is a crucial aspect of effective management for invasive species. Both action alternatives in the DSEIS contain an EDRR component that should allow the Forests to efficiently control new infestations.

The proposed action has been given to the National Marine Fisheries Service and the U.S. Fish and Wildlife Service and they are proceeding with the consultation process. We expect the Final Environmental Impact Statement and a Record of Decision by late spring 2010.

If you have any further questions or concerns, please contact Debra Mafera, Interdisciplinary Team Leader, at 541-416-6588 or Shawna Bautista, Regional Invasive Plant Program Manager, at 503-808-2697.

Sincerely,

/s/ Calvin N. Joyner (for):

MARY WAGNER
Regional Forester

cc: John Allen, Deschutes NF Supervisor, Jeff Walker, Ochoco NF Supervisor, Jim Harris, Oregon State Weed Board Member, Mark Krautman, Oregon State Weed Board Member, Patti Milne, Oregon State Weed Board Member, Amy Peters, Oregon State Weed Board Member, Jerry Erstrom, Oregon State Weed Board Member, Dan Hilburn, Oregon State Weed Board Member, Tim Butler, ODA Noxious Weed Control Program, Doug Daoust, FS, Shawna Bautista, FS, Debra Mafera, FS

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