Record of Decision

Bureau of Land Management

Vegetation Treatments Using Herbicides on BLM Lands in Oregon

BLM/OR/WA/PL-10/088+1792

BLM

Oregon State Office

October 2010

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

Cover: Southeast of Richland, Oregon along the Brownlee Reservoir (Snake River), a rancher views vast stands of medusahead (a noxious weed). The area is mixed BLM/private ownership (photographer: Matt Kniesel).

Because science cannot, in any practical sense, assure safety through any testing regime, pesticide use should be approached cautiously. (EPA scoping comment, July 28, 2008)

Our present technologies for countering invasive non-native weeds are rudimentary and few: control by biological agents, manual eradication, mechanized removal, fire, and herbicides. All have limitations; all are essential (Jake Sigg, California Native Plant Society 1999)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Oregon State Office
P.O. Box 2965
Portland, Oregon 97208

IN REPLY REFER TO:

9015 (OR932)

October 1, 2010

Dear Reader,

The Bureau of Land Management (BLM) administers 15.7 million acres of public lands in Oregon, or about 25 percent of the State. Using a variety of tools, the BLM manages vegetation on thousands of acres per year to meet various objectives. Because of a 1984 court injunction, herbicides have not been used for any of this management with the exception of the use of four herbicides to control noxious weeds.

In 2008, the BLM began work on an Environmental Impact Statement (EIS) examining a proposal to increase the number of herbicides available, and to expand on the types of management activities for which those herbicides could be used. That analysis, building upon a similar west-wide analysis conducted by the BLM in 2007 that includes detailed herbicide Risk Assessments prepared for the BLM and/or U.S. Forest Service, indicates that additional herbicide use, limited by BLM Standard Operating Procedures and a variety of mitigation measures, presents little risk to workers, the public, or the environment. Today I am selecting a slightly modified version of Alternative 4 from that EIS.

To the four herbicides already in use, my decision makes an additional 10 herbicides available to BLM districts in Oregon west of the Cascades, and 13 herbicides east of the Cascades. In most cases, these additional herbicides are newer, can be used in lower quantities, and are more target-specific than the four currently being used. My decision also broadens the management objectives for which these herbicides may be used, to include: the control of all invasive plants; the control of plants as necessary to control pests and diseases in State-identified control areas; the control of vegetation to meet safety and maintenance objectives within rights-of-way, administrative sites, and recreation sites; and, the treatment of vegetation to achieve specific habitat goals for Federally Listed and other Special Status species.

The decision does not permit aerial application of herbicides west of the Cascades, nor herbicide use specifically for livestock forage or timber production. The decision only makes the herbicides available for additional consideration; actual projects would take place only after site-specific analysis and decision-making at the district level, tiered to the Record of Decision and the Final EIS.

I wish to thank everyone who participated in preparation of the Final EIS and encourage your continued involvement in project-level planning at the district or project level.

Sincerely,

Edward W. Shepard
State Director
Oregon/Washington

Record of Decision

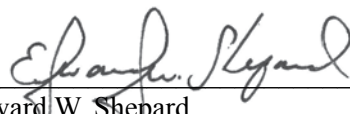
Vegetation Treatments Using Herbicides on BLM Lands in Oregon

USDI – Bureau of Land Management

Responsible Official:	Oregon/Washington Bureau of Land Management State Director
Information Contact:	Todd Thompson, Restoration Coordinator Bureau of Land Management PO Box 2965, Portland, OR 97208-2965 (503) 808-6326
Lead Agency:	Bureau of Land Management, Oregon/Washington
Cooperating Agencies:	None

Signature and Date

I am selecting a slightly modified version of Alternative 4 as described in the attached Record of Decision. This decision is based on the July 2010 *Final Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in Oregon* (Final EIS or FEIS). The Final EIS and this document are programmatic. Actual projects would take place only after site-specific analysis and decision-making at the district level, tiered to this Record of Decision and the Final EIS.



Edward W. Shepard
State Director, Oregon/Washington

10/1/10
Date

Appeal Period/Effective Date: This decision is subject to a 30-day appeal period, described at the end of this Record of Decision. This decision shall become effective at the end of the 30-day administrative appeal period if no appeals are received, or upon resolution of all appeals, whichever is later. Site-specific decisions will not be signed until after the effective date of this decision.

Copies of this document are available online at http://www.blm.gov/or/plans/vegtreatmentseis/. Printed copies and the CD version can be obtained by contacting the Vegetation Treatments EIS Team at Vegetation Treatments EIS Team, PO Box 2965, Portland, OR 97208-2965, or at orvegtreatments@blm.gov.

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Acronyms

BLM	Bureau of Land Management
CFR	Code of Federal Regulations
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FWS	U.S. Fish and Wildlife Service
IBLA	Interior Board of Land Appeals
IRAT	Individual Risk Assessment Tool
ISSSSP	Interagency Special Status / Sensitive Species Program
LASAR	Laboratory Analytical Storage and Retrieval
NMFS	National Marine Fisheries Service
NEPA	National Environmental Policy Act
$P.M._{2.5}$	Particulate Matter less than 2.5 microns diameter
PEIS	Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (2007)
RED	Reregistration Eligibility Decision
SHPO	State Historic Preservation Office
USDI	U.S. Department of the Interior
WQPMT	Water Quality Program Management Team

Summary

This Record of Decision selects a slightly modified version of Alternative 4 from the *Vegetation Management Using Herbicides on Bureau of Land Management Lands in Oregon* Final EIS (July 2010). The decision also selects additional mitigation and monitoring above those already prescribed by BLM policies and a 2007 west-wide programmatic EIS prepared by the BLM Washington Office, Rangeland Resources Division.

In addition to 2,4-D, dicamba, glyphosate, and picloram herbicides already being used by the BLM in Oregon for the control of noxious weeds, this decision makes an additional 10 herbicides available to BLM districts in Oregon west of the Cascades (clopyralid, dicamba + diflufenzopyr, diuron, fluridone, hexazinone, imazapic, imazapyr, metsulfuron methyl, sulfometuron methyl, and triclopyr), and 13 herbicides east of the Cascades (those listed for west of the Cascades plus bromacil, chlorsulfuron, and tebuthiuron). The decision also broadens the management objectives for which these herbicides may be used, to include: the control of all invasive plants; the control of plants as necessary to control pests and diseases in State-identified control areas; the control of vegetation to meet safety and maintenance objectives within rights-of-way, administrative sites, and recreation sites; and, the treatment of vegetation to achieve specific habitat goals for Federally Listed and other Special Status species.

The decision does not permit aerial application of herbicides west of the Cascades, nor herbicide use specifically for livestock forage or timber production. The decision only makes the herbicides available for additional consideration; actual projects would take place only after site-specific analysis and decision-making at the district level, tiered to the Record of Decision and the Final EIS.

Reasons for the decision are discussed under each of the eight *Purposes* in the *Management Considerations – Rationale for the Decision* section. Alternative 4 best meets the *Need* and all eight *Purposes*.

Preparation of the Final EIS began with a series of public scoping meetings held throughout Oregon in 2008. On October 2, 2009, a Draft EIS was released and public comments were accepted through January 6, 2010. Over one thousand public comment letters were received. The Final EIS, including responses to public comments, was issued on July 30, 2010.

Background

The BLM manages approximately 15.7 million acres in Oregon, or about 25 percent of the land in the State, under authority of the Federal Land and Policy Management Act and the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (FEIS:4). Following the mandates and authorities of these laws, the BLM and its cooperators[1] manage vegetation on thousands of acres per year to maintain or restore forests and rangelands; provide sustainable habitat for Special Status and other species of plants and animals; reduce the risk of wildland fire; provide for safe use and access to a variety of authorized developments; and, control noxious weeds and other invasive plants. For these objectives, a full range of non-herbicide treatment methods are described in existing management plans, have been analyzed in existing National Environmental Policy Act (NEPA) documents, and are currently in use to achieve vegetation management objectives (FEIS:6, 360). In the 16 other western states, the tools available for vegetation management include all or most of the 18 herbicides approved by the BLM nationally (FEIS:3).

[1]Cooperators: Leasees, permittees, and others with authorized uses or occupancy on BLM lands.

In 1984, the BLM was prohibited from using herbicides in Oregon by a U.S. District Court injunction issued in Northwest Coalition for Alternatives to Pesticides, et al. v. Block, et al. (Civ. No. 82-6273-E). The injunction stemmed from a court decision that the BLM had not conducted a worst-case analysis for the herbicides being used at that time. Following completion of an EIS addressing four herbicides to treat noxious weeds, the injunction was modified by the court in November 1987 (Civ. No. 82-6272-BU) to permit those limited uses (FEIS:3). Since 1987, herbicide use by the BLM and its cooperators has been limited to the control of Federal, State, or county-listed noxious weeds, and been limited to the herbicides 2,4-D, dicamba, glyphosate, and picloram. These herbicides are applied to about 12,000 acres of noxious weeds annually, mostly as spot treatments to individual plants (FEIS:469). However, 16 State-listed noxious weeds, and some other invasive plants like cheatgrass, are not reasonably controlled with these four herbicides or with non-herbicide treatments. Populations of these species continue to spread nearly unchecked on BLM lands (FEIS:136, 152).

Herbicide use by BLM districts in Oregon is set in the context of Integrated Vegetation Management. That approach, as described in Chapter 3 of the Final EIS, places primary weed control emphasis on prevention and education, early detection and rapid response, and using, on a case-by-case basis, the most appropriate vegetation treatment methods to accomplish the vegetation management objectives while protecting the environment. The BLM is required to "accomplish pest management through cost-effective means that pose the least risk to humans, natural and cultural resources, and the environment" and to "[e]stablish site management objectives and then choose the lowest risk, most effective approach that is feasible for each pest management project" (USDI 2007c) (FEIS:68).

Non-herbicide methods (such as chainsaws, grubbing, and prescribed fire) are used to control another 30,000 acres of invasive plants[2] annually (FEIS:78). In addition, native and other non-invasive vegetation management on BLM lands in Oregon generally exceeds 100,000 acres annually (FEIS:294). These treatments range from fuels reduction to roadside mowing of encroaching vegetation and management of competing vegetation within seed orchards. This work is conducted by BLM crews, contractors, and permit holders including power companies and public road departments (FEIS:6).

In 2007, the BLM Washington Office Rangeland Resources Division completed the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (PEIS) and related Record of Decision, making 18 herbicides available for a full range of vegetation treatments in 17 western states including Oregon[3] (FEIS:3). The 18 herbicides were selected by the BLM nationally, from hundreds available, as being effective for accomplishing BLM management objectives while having the least risk to humans and non-target resources (FEIS:58). The PEIS, and the individual herbicide Risk Assessments created or compiled in support of it, provided an opportunity for Oregon to respond to a *Need* for more effective vegetation control measures, and to analyze a proposal to increase the number of herbicides available in Oregon. The BLM in Oregon could have petitioned the District Court to lift the 1984 injunction using the PEIS. Instead, a decision was made to prepare an Oregon-specific programmatic EIS, tiered to the PEIS, primarily a) to address the U.S. District Court injunction in a single programmatic document, and b) because unlike the other western states, most of the herbicides proposed for use have not been used on Oregon BLM lands for more than 25 years, if at all (FEIS:4).

The resultant July 2010 Oregon Final EIS tiers to the PEIS and incorporates it in its entirety as Appendix 1 (FEIS:455).

[2] Including noxious weeds.

[3] Where they are also registered for use in the state.

The Decision

Alternative 4 with Dicamba + Diflufenzopyr

My decision selects Alternative 4 as described in the July 2010 *Vegetation Treatments Using Herbicides on BLM Lands in Oregon Final Environmental Impact Statement* (FEIS:28-33), with the addition of dicamba + diflufenzopyr[4] (which was analyzed in the Final EIS as part of Alternative 5). This decision makes available 14 herbicides west of the Cascades (2,4-D, clopyralid, dicamba, dicamba + diflufenzopyr, diuron, fluridone, glyphosate, hexazinone, imazapic, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, and triclopyr) and 17 herbicides east of the Cascades (bromacil, chlorsulfuron, tebuthiuron, and the 14 herbicides available west of the Cascades):

- To treat noxious weeds and other invasive plants as necessary to meet Integrated Vegetation Management objectives.
- To treat any vegetation as needed to control pests and diseases in State-identified control areas, such as Sudden Oak Death in southwest Oregon.
- To treat any vegetation to meet safety and operation objectives in administrative sites, recreation sites, and rights-of-way.
- To treat any vegetation to achieve habitat goals specified in approved Recovery Plans or other plans specifically identified as part of recovery or delisting plans, Conservation Strategies, or Conservation Agreements (collectively referred to as Conservation Strategies) for Federally Listed,[5] proposed for listing, or Bureau Sensitive species (Special Status species).

No aerial application of herbicides is permitted west of the Cascades. This decision excludes herbicide use specifically for livestock forage or timber production.

This is a programmatic decision. Actual projects will take place only after site-specific analysis and decision-making at the field level, tiered to the Final EIS and this Record of Decision.

Administrative sites, recreation sites, and rights-of-way include:

- Linear utility transmission systems, including multi-purpose corridors;
- BLM and other authorized road or railroad rights-of-way;
- Oil and gas production or gas storage agreement areas and facilities;
- Geothermal, wind, or solar energy production areas and facilities;
- Pumped storage hydro-power production areas and facilities[6];
- BLM authorized common-material or rock quarries and storage areas (although most vegetation management at such sites is for invasive plant control);
- Federal, State, local or tribal designated fire suppression equipment sites and staging areas including helispots;
- Cell phone, microwave, and other transmission sites;
- Mines;
- BLM and Forest Service seed orchards and progeny test sites;

[4] Diflufenzopyr can only be used in formulation with dicamba on BLM lands.

[5] Federally Listed means designated as threatened or endangered under the Endangered Species Act.

[6] As of September 2010, there are no approved wind, solar, or pumped storage facilities on Oregon BLM lands, but such projects might be developed in the future. A proposed wind energy project is under consideration on the Baker Resource Area.

- Public purpose lease areas, including airstrips, schools, parks, etc.;
- Interagency special management areas (e.g., reservoirs, military training, etc.);
- Watchable Wildlife, Adventures in the Past, Wild Horse Herd Viewing, Outstanding Natural Areas and other BLM designated interpretive sites;
- BLM offices, fire stations, and other facilities;
- Developed campgrounds, picnic areas, trails, overlooks, off-highway vehicle staging or parking areas, hang-gliding areas and boat facilities; and,
- Other administrative and operational sites needed for wildfire suppression, law enforcement, search and rescue, inventory, research, resource monitoring or other authorized administrative uses.

Conservation Strategies and Conservation Agreements:
Current language at http://www.fs.fed.us/r6/sfpnw/issssp/ describes these two documents as shown here. This language could be updated, but the types of species included are not expected to change.

Conservation Strategies capture and condense all of the known information about the biology and ecology of a species including taxonomy, range, distribution, and habitat descriptions. They often identify important inventory, research, and monitoring information that may be relevant for further understanding of the species or for adaptive management purposes. They also provide information on how and when to manage a site. Strategies address how to manage the species and/or habitat to maintain viability or persistence of the species. They describe how individual sites/populations should be managed, and can also identify which sites/populations are needed to meet the viability, persistence, or conservation goal for the species. These documents typically cover either a significant portion or the entire range of the species, and may be created by one field unit, one agency, or be interagency in nature, but agreed upon by all administrative units the Strategy covers. Conservation Strategies should be coordinated with BLM State/Forest Service Regional Office planning and conservation leads.

Conservation Agreements outline procedural assurance necessary to reduce, eliminate, or mitigate specific threats. Agreements are usually Memorandums of Understanding agreed upon by Federal agencies (Forest Service, BLM, Fish and Wildlife Service (FWS), or National Marine Fisheries Service (NMFS)) and may include States and private entities. They are typically broad-scale, giving general guidance on how to manage for a species. The objective of Conservation Agreements is to identify management that will avoid a trend towards listing under the Endangered Species Act. Agreements are typically voluntary non-binding documents that may be cancelled at any time.

Herbicides Included in this Decision

The 17 selected herbicides, their typical and maximum annual application rates, types of BLM lands upon which each may be used, and whether or not aerial application is permitted east of the Cascades, are shown on Table 1 (FEIS:59-61).

Herbicides Not Included in this Decision

The selected alternative does not include diquat, an aquatic herbicide with a long half-life, short effectiveness time in water, and low to high risk categories to humans and many elements of the environment under many of the analyzed exposure scenarios. With the exception of giant salvinia, a noxious weed that does not currently exist in Oregon, one or more of the other five aquatic herbicides included in this decision will achieve effective control with less risk to the environment or human health.

The decision does not include bromacil and tebuthiuron west of the Cascades, in part because of limited need and their potential to move to nearby streams and adversely affect aquatic resources.

Table 1. The Herbicides, Application Rates, and Restrictions

Herbicide	East Side Only	Application Rate lbs/ac/yr		Types of Lands Where Use is Permitted						Aerial Spray Allowed East of Cascades[7]
		Typical	Maximum[1]	Range-land	Forest-land	Riparian/ Aquatic	Oil, gas, minerals	Rights-of-way	Recreation & Cultural	
2, 4-D		1	(1.9)	√	√	√	√	√	√	Yes
Bromacil	E	4	(12)				√	√	√	No
Chlorsulfuron	E	0.047	0.141	√			√	√	√	Restricted[2]
Clopyralid		0.35	0.5	√	√		√	√	√	Yes
Dicamba		0.3	3[8]	√			√	√	√	Yes
Diflufenzopyr + Dicamba		0.2625	0.4375	√			√	√	√	No
Diuron		6	(20)				√	√	√	No
Fluridone		0.15	(1.3)			√				Yes
Glyphosate		2	7[3]	√	√	√	√	√	√	Restricted[4]
Hexazinone		2	(4)	√	√		√	√	√	Restricted[4]
Imazapic		0.0313	0.1875	√	√		√	√	√	Yes
Imazapyr		0.45	1.25[8]	√	√	√	√	√	√	Yes
Metsulfuron methyl		0.03	0.15[8]	√	√		√	√	√	Restricted[2]
Picloram		0.35	1	√	√		√	√	√	Yes
Sulfometuron methyl		0.14	0.38		√		√	√	√	No
Tebuthiuron	E	0.5	(4)	√			√	√	√	Restricted[5]
Triclopyr		1	(10)	√	√	√	√	√	√	No[6]

[1] Parentheses denote herbicides that are limited, by PEIS Mitigation Measures, to typical application rates where feasible.

[2] Only allowed when no other means of application are possible.

[3] PEIS Mitigation Measures specify "Minimize potential risks to livestock by applying glyphosate at the typical application rate where feasible" and "Minimize potential risks to wild horses and burros by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible, in areas associated with wild horse and burro use."

[4] PEIS Mitigation Measures include "Where practical, limit glyphosate and hexazinone to spot applications in grazing land and wildlife habitat areas to avoid contamination of wildlife food items" and "Livestock/Wild Horses and Burros: Where feasible, limit glyphosate and hexazinone to spot applications in rangeland."

[5] Not allowed in traditional use areas.

[6] A Human Health and Safety mitigation measure selected by this Record of Decision says, "do not apply triclopyr by any broadcast method."

[7] Conservation Measures (see Attachment B) provide additional restrictions near Special Status species.

[8] Mitigation measures adopted by this Record of Decision state, "where there is a potential for herbivore [including wild horse and burro] consumption of treated vegetation, apply bromacil, dicamba, imazapyr, and metsulfuron methyl at the typical, rather than maximum, application rate to minimize risks."

Chlorsulfuron was not proposed for use west of the Cascades because most of its target weeds are found east of the Cascades. The Final EIS analysis contains no strong environmental or human health reason for its exclusion from the west side.

BLM List of Herbicide Formulations (Products) and Adjuvants

The BLM maintains a list nationally of the commercial products and formulations known to contain only active ingredients, inert ingredients, and adjuvants approved for use on BLM lands. The November 2009 list is included in the Final EIS (Appendix 9, Table A9-1) as an example (FEIS:609).

Similarly, the BLM maintains a list of nationally approved adjuvants that may be added to certain herbicides at the field level, according to herbicide label and other specifications. The November 2009 list of BLM nationally-approved adjuvants is shown in the Final EIS (Appendix 9, Table A9-3) as an example (FEIS:624).

Consistency with Labels, Laws, Regulations, and Oregon Registration

Federal, State, and local laws, BLM policy, resource management plans, and all herbicide label requirements will be adhered to. Herbicides may be used only for the objectives and type of vegetation for which they

are registered, as displayed on the herbicide label. In addition to being approved by the BLM nationally, the herbicides must be registered with the Environmental Protection Agency (EPA) and the State of Oregon. Although there are over 100 different herbicide active ingredients registered in Oregon under more than a thousand different trade names or formulations, the 17 herbicide active ingredients (herbicides) made available by this decision are limited to the formulations approved (listed for use) by the BLM Washington Office Rangeland Resources Division. Herbicides may be applied only by BLM and/or State certified pesticide applicators.[7] The BLM has a policy against using petroleum-based adjuvants (including surfactants) or other additives (FEIS:28).

Applicable Lands

This decision applies to herbicide application on public lands administered by the BLM in Oregon. It applies to the BLM and to permit holders, lessees, cooperators, or applicants for temporary or long-term use permits on these lands (FEIS:28).

Standard Operating Procedures, PEIS Mitigation Measures, and Conservation Measures

This decision adopts the Standard Operating Procedures and PEIS Mitigation Measures displayed in Appendix 2 of the Final EIS and included in this Record of Decision as Attachment A. These are default measures – site-specific analysis may indicate alternative ways to achieve the intended protections. This decision also adopts the Conservation Measures applicable to Federally Listed and other BLM Special Status species, as described in Appendix 5 of the Final EIS and included in this Record of Decision as Attachment B (FEIS:28-29). These do not apply where a No Effect determination can be made without them or where site-specific consultation identifies alternative ways to achieve appropriate protection.

Additional Mitigation Included in this Decision

The Oregon-specific analysis in the Final EIS allowed for the identification of mitigation measures in addition to those adopted by the PEIS. The following mitigation measures from the Final EIS, *with changes to the Final EIS text shown in italics*, are adopted by this decision. As with the PEIS Mitigation Measures, they are assumed to apply unless site-specific analysis determines they are not needed or that there are alternate ways to provide the intended protection.

Soil Resources

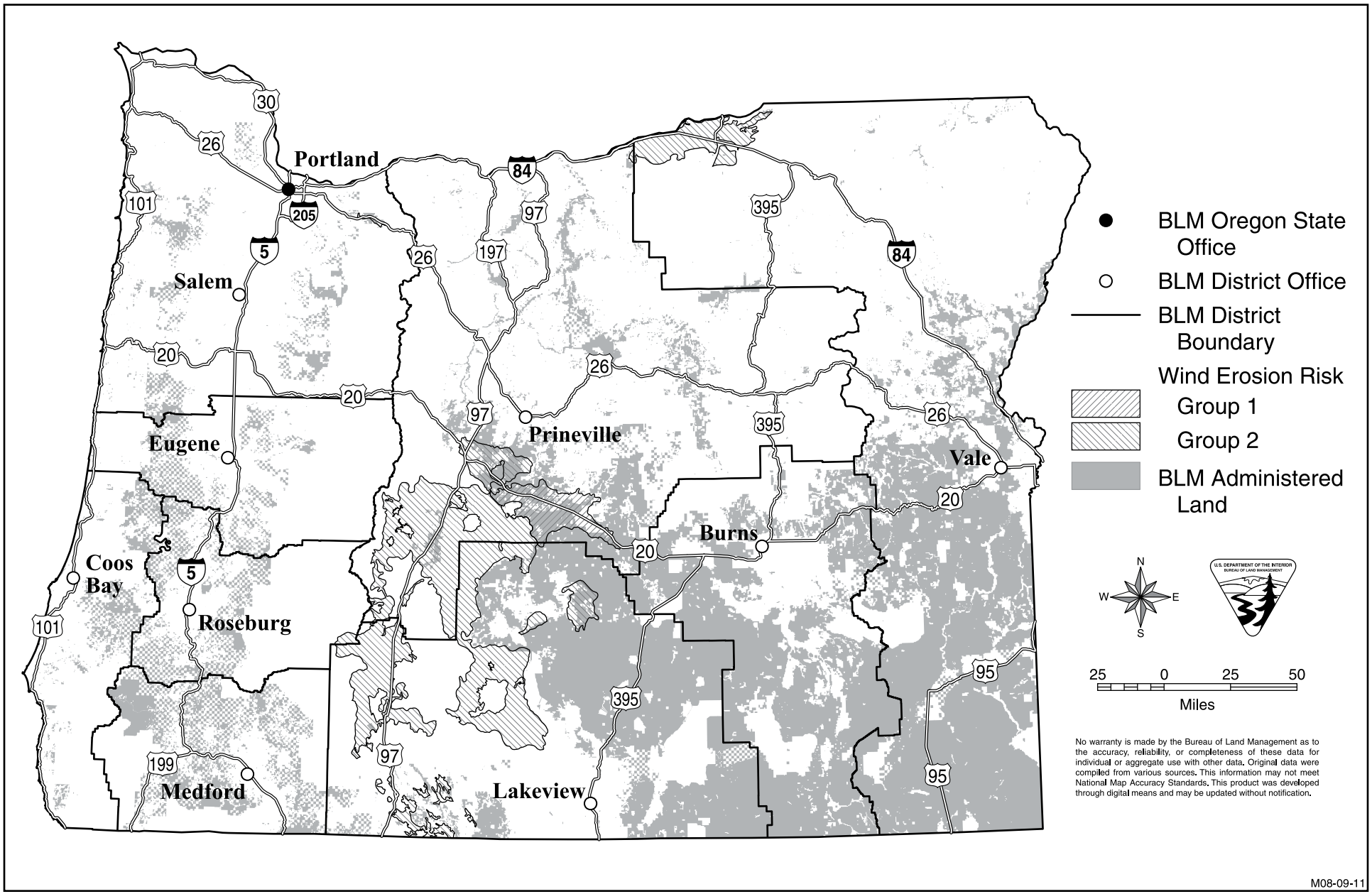
- To avoid the loss of finer-sized soil particles and avoid having herbicide-treated soils blown or washed off-site, avoid exposing large areas of wind-erosion group 1 or 2 soils (see Figure 1) *when a combination of dry soil and seasonal winds are expected*. Mitigation measures could include the use of selective herbicides to retain some vegetation on site; reseeding so cover is present before the windy season affects dry soils; staggering treatment of strips until stubble regrows enough to provide an acceptable filter strip; rescheduling treatments away from the windy season; or, other measures to prevent wind erosion on these soil groups.

Water Resources

- To protect domestic water sources, no herbicide treatments should occur within 100 feet of a well or 200 feet of a spring or known diversion used as a domestic water source unless a written waiver is granted by the user or owner.

[7] Non-motorized application of non-restricted herbicides may be done by uncertified personnel if they are working under the supervision of a certified applicator. For those maintaining their own permitted improvements, application certification requirements are governed by state law.

FIGURE 1 – WIND EROSION RISK GROUPS 1 AND 2



- Site-specific analyses for roadside treatments should specifically consider that drainage *ditches and* structures lead to streams and that normal buffer distances, herbicide selection, and treatment method selection may need to be changed accordingly, particularly where those ditches are connected to streams with Federally Listed or other Special Status species.
- Buffer intermittent stream channels when there is a prediction of rain (including thunderstorms) within 48 hours.
- Proposals to boom or aerially spray herbicides within 200 feet of streams that are within 1,000 feet upstream from a public water supply intake, or spot apply herbicides within 100 feet of streams that are within 500 feet upstream from a public water supply intake, will include coordination with the Oregon Department of Environmental Quality and the municipality to whom the intake belongs.

Fish

- Use of adjuvants with limited toxicity and low volumes is recommended for applications near aquatic habitats.

Wildlife Resources

- Impacts to wildlife from herbicide applications can be reduced by treating habitat during times when the animals are not present or are not breeding, migrating or confined to localized areas (such as crucial winter range).
- When treating native plants in areas where herbivores are likely to congregate, choose herbicides with lower risks due to ingestion. *This mitigation measure is applicable if large areas of the herbivores' feeding range would be treated, either because the treatment areas are large or the feeding area for an individual animal is small*.
- Where there is a potential for herbivore consumption of treated vegetation, apply bromacil, dicamba, imazapyr, and metsulfuron methyl at the typical, rather than maximum, application rate to minimize risks.
- Where possible, design native vegetation treatment areas to mimic natural disturbance mosaics. Patchiness is usually beneficial to most wildlife, and patchiness is usually tolerated by species that prefer contiguous habitat.
- Use of adjuvants with limited toxicity and low volumes is recommended for applications near aquatic habitats.

Livestock

- Where there is a potential for livestock consumption of treated vegetation, apply bromacil, dicamba, imazapyr, metsulfuron methyl, and tebuthiuron at the typical, rather than maximum, application rate to minimize risks to livestock.

Wild Horses and Burros

- Where there is a potential for wild horse or burro consumption of treated vegetation, apply bromacil, dicamba, imazapyr, and metsulfuron methyl at the typical, rather than maximum, application rate to minimize risks.
- Do not broadcast spray 2,4-D, clopyralid, diflufenzopyr + dicamba, diuron, glyphosate, hexazinone, picloram, or triclopyr where wild horses have unrestricted access to treated areas, or reduce risks to wild horses from these herbicides by herding wild horses out of treatment areas.
- To limit adverse effects to wild horses and burros, particularly through the contamination of food items, treatments should not exceed 15 percent of any Herd Management Area at any given time.

Social and Economic Values

- For herbicides with label-specified re-entry intervals, post information at access points to recreation sites or other designated public use or product collection areas notifying the public of planned herbicide treatments in languages known to be used by persons likely to be using the area to be treated. Posting should include the date(s) of treatment, the herbicide to be used, the date or time the posting expires, and a name and phone number of who to call for more information.
- Consider the potential for treatments to affect communities from herbicide-contaminated resources originating from the BLM, such as subsistence resources or water used downstream for human or agricultural uses.
- Coordinate with and/or notify neighboring landowners who may want to treat, or are already treating, adjacent lands.

Environmental Justice

- To the extent permitted by normal contracting authority, ensure materials safety data sheets and other informational or precautionary materials are available in languages spoken by the work crews implementing treatments. This includes but is not limited to material such as Occupational Safety and Health Administration standards along with agency, industry and manufacturers' recommendations and Human Health and Safety Standard Operating Procedures and mitigation measures or equivalent.

Human Health and Safety

- Consideration should be given to herbicides other than 2,4-D; use of 2,4-D should be limited to situations where other herbicides are ineffective or in situations in which the risks posed by 2,4-D can be mitigated.
- Do not apply triclopyr by any broadcast method.
- Do not apply bromacil, diuron, or tebuthiuron when there is a potential for picking sprayed fruit. Do not broadcast spray these herbicides onto vegetation more than a foot tall when and where public contact is likely, such as on tall grass or low brush around developed sites and other high use areas.

Mitigation Not Adopted

Of the *Potential Mitigation* listed in the Final EIS, the following measures are not adopted for the reasons stated:

Under *Water Resources*, the measure reading:

> "Where diquat applications would be used on vast enough areas that de-oxygenation from plant decomposition would cause unacceptable effects to aquatic fauna, either 1) remove treated vegetation or 2) the area would be treated in swaths over several months time to minimize de-oxygenation of the water due to plant decomposition" (FEIS:51)

is not adopted because it applies only to diquat, which is not a part of the selected alternative.

Under *Wildlife Resources*, the measure reading:

> "Herptile (amphibian and reptile) and mollusk mortality due to vegetation management can be minimized by conducting activities during the winter hibernation or estivation period. If management is to occur in occupied habitat during the active season, the following approaches should be considered to minimize impacts:
> - Avoid control work when herptiles and mollusks are most active;
> - Leave some habitat untreated to provide refugia: untreated portions could be treated in subsequent seasons; and,
> - Avoid treatments that would curtail herptile spring and fall migrations to and from breeding or wintering habitats" (FEIS:52)

is not adopted because herbicides often must be applied during the growing season in the spring. They are also applied early in the morning when wind speeds are none-to-low and humidity is high – the same conditions conducive to some herptile activity. This measure is not being adopted in the decision because several of the less common (thus more at risk) herptiles are Special Status or Survey and Manage species and are thus subject to the protections of those programs.

Monitoring Included in this Decision

Appendix 3 of the Final EIS identifies *Potential Monitoring* (FEIS:474-475). The additional monitoring being added by this decision is primarily short-term and addresses the use of the additional herbicides added by this decision. *Changes to the Final EIS text are shown in italics*.

Implementation Monitoring

Monitoring for Concerns Identified in the EIS - For *at least* the first *three* years of EIS implementation, a subset of the year's herbicide application projects *will* be identified using parameters identified in the EIS as having the potential for adverse effects. *The parameters will include the use of the newly added herbicides; the use of ALS-inhibitors*[8]*; applications within riparian areas including those near intermittent streams; applications on native and other non-invasive plants such as roadside maintenance and habitat improvement; and, the use of diuron on the west side. The review team should also consider issues raised in district Environmental Assessments and related Endangered Species Act consultation. Other parameters may be used* by the monitoring team and might include aerial spray within a certain distance of population centers or Federally Listed *and other Special Status* species, treatments exceeding some number of acres with herbicides having a high risk of environmental damage to non-target species (other than non-Special Status plants), treatments where PEIS Mitigation Measure buffers around *Special Status* species were reduced by more than 50 percent, aquatic treatments, riparian treatments for streams with Federally Listed fish, use of known ground-water contaminants on the west side, projects that required formal consultation, sprays within riparian management zones, broadcast sprays of over 100 contiguous acres, roadside boom sprays on native plants, use of diuron, bromacil, tebuthiuron, or 2,4-D at higher than 50 percent of the typical rate for over 100 net acres in any one thousand acre area, and so forth.

From this "higher risk" subset, a representative sample (at least three) of State Office randomly selected projects *will* be identified. *East and west of the Cascades will* be represented by at least one selection *each,* assuming there are projects that qualify. For selected projects, the full set of planning and reporting documents *will* be reviewed, as well as field implementation records, monitoring, applicator licenses, adherence to Standard Operating Procedures and appropriate mitigations measures, and all other project requirements. A questionnaire listing these review elements *will* be prepared by the *BLM Team Leader*. The review *will* be conducted by a team that includes, *if possible*, at least one non-BLM person from a Resource Advisory Committee, County Weed Board, County Board of Supervisors, or Oregon Department of Agriculture Invasive Plant or Pesticide Enforcement Division and a line officer, District Weed Coordinator, or State Office Restoration Program lead from a different district or the State Office. *The BLM Team leader should be a person who can participate in all of one (or more) season's reviews.*

[8] The five ALS-inhibitors included in the selected alternative are chlorsulfuron, imazapic, imazapyr, metsulfuron methyl, and sulfometuron methyl. They are included here because of their ability to damage non-target plants at very low doses.

Implementation Monitoring on the Avoidance and Mitigation of Adverse Impacts to Non-target Resources is, as noted in Appendix 3, already required. It is mentioned here to help identify one monitoring criterion, but districts may identify monitoring needs wherever questions of safety or effects, or other considerations, may arise. For at least five years, aerial application of ALS-inhibitors conceivably affecting private lands or Special Status species shall be monitored for drift.

Effectiveness Monitoring

Restoration Monitoring – This decision makes imazapic available statewide. The Final EIS estimates its primary use would follow wildfire or prescribed burns in, or threatened by, medusahead or other invasive annual grasses. Imazapic was desired because it would leave more native forbs than glyphosate. Because large applications will be expensive and may not occur annually at least on any one district, a detailed examination of the first two large-scale uses*, with examination results documented and circulated to other Districts, should* help ensure this new tool achieves maximum effectiveness while protecting non-target vegetation and other resources. *This monitoring should occur approximately a year after herbicide application, when full records are available and effectiveness is evident. The State Office will coordinate the examination.*

State of Oregon Information Sharing

The Oregon Department of Environmental Quality has requested that the BLM coordinate with them when sending data electronically for potential entry into the Oregon Department of Environmental Quality's Laboratory Analytical Storage and Retrieval Database (LASAR). In addition, the Oregon Department of Environmental Quality has requested copies of any monitoring reports of herbicide effectiveness and impacts on water quality and ecological conditions.

Similarly, the State of Oregon encourages the BLM to share any water quality effectiveness monitoring data collected in support of the EIS with the State of Oregon's Water Quality Pesticide Management Team (WQPMT). The multi-agency WQPMT acts to review and respond to pesticide detections in Oregon's ground and surface water in support of Oregon's Pesticide Management Plan for Water Quality Protection.

Monitoring Not Adopted

The *Five-year Examination of Weed Spread* effectiveness monitoring (FEIS:475) found in Appendix 3, *Potential Monitoring*, is not adopted because it is unlikely that the quantification proposed by the monitoring would be possible after five years given that the spread rate reduction is projected to occur over 15 years. For more information see Appendix 10, Comment and Response #292 (FEIS:753).

Alternatives Considered in Detail

The July 2010 *Vegetation Treatments Using Herbicides on BLM Lands in Oregon Final EIS* analyzed a no-herbicide Reference Analysis, a No Action Alternative (Alternative 2), and three action alternatives that met the *Need* and variously met the eight *Purposes* (issues) identified during scoping. The action alternatives, Alternatives 3, 4, and 5, provided for various numbers of herbicides for various management objectives. They all comply with the PEIS-selected alternative (FEIS:38).

Alternative 3 would have made 12 and 13 herbicides available, west and east of the Cascades respectively, for use on noxious weeds and other invasive plants (such as cheatgrass). This alternative would also have made herbicides available to treat any (including native) vegetation as necessary to control pests and diseases in State-identified control areas, such as the Sudden Oak Death quarantine area in southwestern Oregon. It was estimated that average annual herbicide use would have increased from 16,700 acres predicted under the No Action Alternative (Alternative 2) to 30,300 acres under Alternative 3 (FEIS:xxii).

Alternative 4, the Proposed Action, would have made 13 and 16 herbicides available, west and east of the Cascades respectively. In addition to the uses and estimated acres described under Alternative 3, Alternative 4 would make these herbicides available for the control of native and other non-invasive vegetation in rights-of-way, administrative sites, and recreation sites (an estimated 9,300 acres annually); and the treatment of vegetation to achieve habitat goals specified in interagency Recovery Plans or other plans specifically identified as part of recovery or delisting plans, Conservation Strategies, or Conservation Agreements for Federally Listed and other Special Status species (an estimated 5,700 acres annually)(FEIS:xx).

Alternative 5 would have made the 18 PEIS-approved herbicides available for any vegetation management objective except livestock forage or timber production. The Final EIS analysis estimates that herbicide use under this alternative would have been 4,800 acres higher than Alternative 4, with most of the increase going to habitat improvement treatments east of the Cascades (FEIS:xxii).

All of the alternatives are programmatic. The Final EIS analysis considered the cumulative effects of all BLM herbicide use in Oregon at the statewide level (FEIS:117). For the analysis, an estimate was made of the annual acres that would be treated with each herbicide. General analysis assumptions were also made about application methods. These analysis assumptions are described in Chapter 3 of the Final EIS in sufficient detail for the analysis team to understand the nature of the annual proposed program (FEIS:57-85). Effects described in Chapter 4 and contrasted in Chapter 2 are based on the estimated annual program, the information presented in the Risk Assessments, relevant literature, and other information. Effects consider herbicide use as well as the potential for herbicide spills. The analysis considers various BLM resources including species listed as threatened or endangered under the Endangered Species Act, the potential effects on air quality and global climate change, social effects, effects to tribal and subsistence resource users, implementation costs, and public and worker health and safety. The Final EIS also examines the benefits of the various alternatives in terms of a) their ability to reduce the spread of noxious weeds, b) their ability to reduce reliance on those non-herbicide methods that are less effective or have their own adverse environmental effects, and c) implementation costs.

Management Considerations - Rationale for the Decision

The *Need* and *Purposes*

This decision is based on the degree to which the selected alternative meets the *Need* and *Purposes* (FEIS:12). All of the action alternatives meet the *Need*; they would provide more effective vegetation control measures. An examination of each of the alternatives in the context of each of the eight Final EIS *Purposes* (FEIS:8-12) finds as follows:

1. Control invasive plant species to protect native ecosystems and the flora and fauna that depend on them.

The Final EIS estimates noxious weed infestations are expanding at an annual rate of 12 percent, or 144,000 acres per year, on BLM lands in Oregon (FEIS:148). Noxious weeds and other invasive plants are displacing native ecosystem components and harming all resources from wildlife to water quality to soil productivity (FEIS:47). The analysis documented in the *Noxious Weeds and Other Invasive Plants* section Chapter 4, and its supporting material in Appendix 7, estimates the selected alternative would reduce the current noxious weed spread rate by as much as half, from 12 to 6 percent per year (FEIS:138). This is expected to reduce infested acres by 2.2 million acres in 15 years when compared to the No Action Alternative (FEIS:138).

The additional herbicides made available by this decision makes the entire set of control measures more efficient and reduces retreatment needs, thereby permitting more control to be accomplished with existing staffing and funding (FEIS:136). The ability to better work cooperatively with weed control boards and neighboring landowners using newer herbicides facilitates more geographically-logical control units (FEIS:118, 125, 136, 153). The addition of imazapic, that is effective on medusahead and other invasive annual grasses, will help protect sagebrush habitats and rangelands east of the Cascades, and Oak Savannah habitats west of the Cascades (FEIS:255). The additional herbicides will also benefit permit holders currently required to control State A and T-list weeds within their permit area (FEIS:316), improving weed control in these areas.

Roadside safety and maintenance treatments using herbicides conducted under Alternative 4 will, it is estimated, incidentally control undetected noxious weed populations. Using herbicides will reduce the amount of plant material being carried along roads or other rights-of-way by mowing and scraping equipment; ground disturbance will be reduced thus slowing disturbance-related reinvasion; and, undetected noxious weeds will be controlled where they are most susceptible to being transported to other locations by vehicles, recreation equipment, and other vectors (FEIS:136-137). The additional one percent reduction in weed spread attributed to these treatments will result in 300,000 fewer acres infested with noxious weeds in 15 years (when compared to the five percent reduction estimated for Alternative 3) and is one of the reasons for selecting Alternative 4 over Alternative 3.

With a reduction of weed spread from 12 to 7 percent, this *Purpose* would be partially met by Alternative 3. However, the additional noxious weed control that would be achieved by roadside maintenance treatments under Alternative 4 (and thus 5) would lower weed spread to 6 percent, meeting this *Purpose*.

2. Protect the safety and function of BLM and other authorized infrastructures by controlling encroaching native and other non-invasive vegetation.

The selection of Alternative 4 will help facilitate the difficult work of road departments and utility companies. County and State road departments, as well as utility companies, have spray equipment, herbicides, personnel, and training to maintain rights-of-way against vegetation encroaching onto improvements including pavement edges, creating a fire hazard next to the developments, or blocking road visibility and pullouts. They are using this equipment along rights-of-way on other ownerships (FEIS:313-314). East of the Cascades and in southern Oregon, long-term (persistent) treatments are important for keeping fire prone grasses out of developments to reduce damage from wildfires. West of the Cascades, woody vegetation encroaches on forest roads quickly. Herbicides can selectively control this vegetation while leaving grasses and other soil-protecting vegetation along the roadside (FEIS:316). Herbicides that pose little threat to water and fish are available for this purpose, and a mitigation measure included in this decision will ensure project planners consider and avoid roadside ditches that connect to streams. Making herbicides available for this work will improve efficiency and user safety.

Some level of herbicide use for noxious weed control already takes place in recreation and other developed sites because noxious weeds can be so easily spread from such sites (FEIS:306). The addition of herbicides to control pests like poison oak, or better control woody plants to protect buildings and other developments, would result in an increase in herbicide use in public use areas (FEIS:310), but closures, posting, and other label and Standard Operating Procedure requirements (as well as continued use of non-herbicide methods) would continue to protect site users from exposure (FEIS:305).

This *Purpose* is currently being met using non-herbicide methods and that would continue to be the case under Alternative 3. Alternatives 4 and 5 would meet this *Purpose* while decreasing costs (FEIS:342), freeing funds for additional maintenance or other purposes.

3. *Manage native vegetation to provide sustainable habitats for wildlife, fish, and native plants, particularly those included in the Special Status Species Program.*

Sagebrush steppe habitat has been identified as one of the most endangered habitats in the western United States. Major threats include invasive annual grasses, changed fire cycles, and encroaching juniper. Threatened habitats include sage grouse nesting areas (FEIS:125, 243). Greater sage grouse is a candidate species for Federal listing, and is a BLM Special Status species for which habitat protection and improvement is a high priority (FEIS:493). Similarly, western juniper has expanded more than three-fold from natural levels, significantly reducing stream flows and eliminating native vegetation (FEIS:125, 203). Control using herbicides usually focuses on very young trees, less than a few feet high. Such herbicide treatments are prohibited under Alternatives 2 and 3, because juniper is a native species.

Habitat improvement treatments of native and other non-invasive plants under Alternative 4 are limited to treatments identified in, or clearly in support of, Conservation Strategies for Special Status species. Conservation Strategies are defined on the Interagency Special Status and Sensitive Species Program (ISSSSP) website. These formal strategies, agreements, or delisting documents are normally developed by interagency teams of biologists and others, or in the case of de-listing documents, by the FWS or the NMFS. They indicate a pressing need and broad consensus about habitat improvement needs (FEIS:31-32).

While better control of invasive plants under Alternative 3 would help sustain habitats for Special Status species and partially meet this *Purpose*, this particular *Purpose* is only completely met with the ability to better manage native vegetation under Alternatives 4 and 5.

4. *Manage vegetation to reduce the risk that large-scale high-intensity fires will unacceptably damage resources and human developments.*

The inclusion of imazapic under all of the action alternatives provides the only significant fuel reduction opportunity identified in the analysis (FEIS:274, 277). Cheatgrass and other invasive annual grasses occupy more than 5 million acres in Oregon and encroach into the Wildland Urban Interface around certain communities like Medford and Burns. Frequent fires in these grasses are also the major threat to sensitive sagebrush habitats (FEIS:274). The ability to selectively spray these grasses near communities and in fuelbreak strips to slow wildfires will help achieve National Fire Plan objectives of protecting rural communities and listed species' habitats (FEIS:278).

No other major fuels condition was identified for which herbicides would be regularly employed in Oregon. Some noxious weeds like gorse are extremely fire prone, but many of these already could be reasonably controlled under the No Action Alternative. Alternative 3 meets this *Purpose*. Meeting this *Purpose* could be slightly

improved by the roadside treatments under Alternative 4, and only rarely improved by the opportunity to treat some future native fuels under Alternative 5 (FEIS:278).

5. Cooperatively control invasive plants so they do not infest or re-infest adjacent non-BLM lands.

During scoping, county governments and others expressed frustration with the BLM's inability to use newer herbicides and participate in joint weed control efforts. Seventy-one percent of Malheur County is administered by the BLM, with much of the remainder owned by ranchers. Medusahead, cheatgrass, and other noxious weeds and invasive plants have been spreading relatively uncontrolled onto private lands as a result of the BLM's lack of effective herbicide treatment methods, frustrating private land control efforts (FEIS:322). Full participation in geographically-logical control efforts has been frustrated by the BLM's current herbicide use limitations (FEIS:139).

This *Purpose* is met with Alternative 3, and thus 4 and 5 as well. Alternative 3 provides most of the herbicides currently used by cooperators for invasive plant control.[9]

6. Prevent herbicide control treatments from having unacceptable adverse effects to applicators and the public, to desirable flora and fauna, and to soil, air, and water.

The Final EIS analysis indicates there is little likelihood of significant adverse environmental or human health effects occurring from implementation of this decision (FEIS:41, 93, and others).

Much of the discussion in the Final EIS focuses on the *risk* categories identified in the BLM and Forest Service Risk Assessments. For example, the *Comparison of the Effects of the Alternatives* section in Chapter 2, Tables 2-5 and 2-6, compares the alternatives with respect to these *risk* parameters (FEIS:42-49). Risk categories quantify the likelihood of an adverse effect to an organism resulting from specific exposure scenarios (FEIS:86-91). However, the BLM has a long history with herbicides and, as a result, numerous handbooks and other policy materials have been developed governing the use of these herbicides. For the PEIS, direction from these policies was gathered and labeled as Standard Operating Procedures (see Attachment A to this Record of Decision). While the *risks* listed in Final EIS Tables 3-12 through 3-21 (and discussed in Chapter 4) are for exposure scenarios described in the Risk Assessments, *effects* conclusions for each resource described in the PEIS and the Oregon Final EIS are predicated on application of the Standard Operating Procedures (FEIS:93).

PEIS-identified adverse effects each resulted in the identification of one or more mitigation measures, all of which were adopted by the Record of Decision for the PEIS. Like the Standard Operating Procedures, the PEIS Mitigation Measures all apply to the selected alternative and are included in Attachment A of this Record of Decision. Since all adverse effects identified by the PEIS were mitigated where practicable, there should be few or no adverse effects expected from implementation of this decision. This is confirmed by the effects examination in Chapter 4 of the Final EIS. Most of the "effects" discussions in the Final EIS for the use of herbicides are, in reality, discussions of *risks* identified by the Risk Assessments before the Standard Operating Procedures and PEIS Mitigation Measures are applied (FEIS:93).

The *risks* associated with the use of herbicides are expressed as zero, low, moderate, and high *risk*. These are quantified terms, summarized on Final EIS Tables 3-12 through 3-21 (FEIS:94-104). Where Risk Assessment

[9] Cooperators have already indicated a frustration that the Final EIS, and thus the selected alternative, does not include aminopyralid (e.g. Milestone®). The EIS did not examine this herbicide because it was not included in the PEIS to which this Final EIS tiers, no Risk Assessment has been prepared, and it is not on the national list of BLM-approved herbicides. It is being considered for future BLM use under the process described in Appendix 4, but no assumption is made in this Record of Decision about the future use of this herbicide.

scenarios resulted in a moderate or high risk, that risk is reported in Chapter 4 as a *potential adverse effect*, or *risk*. The estimated acres to be treated with moderate and high risk herbicides are summarized for human health and for each resource on Final EIS Table 2-6. In every case except insects, the acres to be treated with moderate or high risk herbicides are lower under the selected alternative than under the No Action Alternative, in spite of a threefold increase in the total number of acres to be treated (FEIS:48-49).

It is important to understand, however, that such risks almost always generated corresponding PEIS Mitigation Measures during the PEIS process (if there were not already Standard Operating Procedures designed to avoid the adverse effects). Therefore, most or all of the *potential* for adverse effects (or *risks*) discussed in Chapter 4 of the Final EIS are followed by the conclusion that implementation of the Standard Operating Procedures, PEIS Mitigation Measures, and site-specific analysis (during which the Risk Assessments or Individual Risk Assessment Tools will be specifically consulted) should make the likelihood of actual adverse effects negligible, *de minimus*, or at worst "minimized." Additional Conservation Measures (see Attachment B) apply to Federally Listed and other Special Status species and critical habitat (FEIS:93).

Where the Oregon Final EIS identified a potential for adverse effects in spite of the Standard Operating Procedures and PEIS Mitigation Measures (because of additional detail about the proposed action and an examination of resource effects at a different scale than the PEIS), additional *Potential Mitigation* was identified (FEIS:51-53). This decision selects almost all of those additional measures.

The Final EIS analysis variously raises the potential for adverse effects, or risks. The two most prominently identified environmental risks are:

- The use of glyphosate with POEA is a hazard to fish and amphibians (FEIS:228, 246). A PEIS Mitigation Measure requires avoiding or minimizing POEA to protect amphibians (FEIS:461). Only low or non-POEA aquatic formulations are used near water (FEIS:46).
- The ALS-inhibitors can damage non-target plants at very low doses (FEIS:145, 156). Buffers of 900 to 1,500 feet are prescribed for boom and aerial sprays of ALS-inhibitors near Special Status plants (FEIS:466). One of the additional monitoring requirements added by this decision requires that for at least five years, aerial application of ALS-inhibitors conceivably affecting private lands or Special Status species would be monitored for drift.

One factor that will reduce risk is simply the number of additional herbicides available. Additional herbicides provide project planners with more options for selecting an herbicide that will accomplish the treatment objective while protecting the specific non-target resources at the site (FEIS:11, 41).

Adverse effects from weed spread are quantifiable and increasing (FEIS:133-134, 594-602). Virtually all of the resource effects sections conclude that slowing weed spread would prevent more adverse effects than would occur with the corresponding increase in herbicide use (FEIS:41).

Human Health

Table 4-36 in the Final EIS *Human Health and Safety* section displays and compares the Final EIS alternatives with respect to the acres of herbicides rated high, moderate, or low risk to public or worker health under any exposure scenario at typical application rate (FEIS:356). (The typical rate is used, because these particular herbicides have a PEIS Mitigation Measure requiring the use of typical rate where feasible (FEIS:59-61).) Except for the following six herbicides, herbicides included in the selected alternative are in the zero risk category for all public and worker exposure scenarios, including spill and other accidental exposure scenarios, at the typical rate (FEIS:102-103).

Diuron, bromacil, and tebuthiuron are rated in the Risk Assessments as having a high risk under numerous worker and public exposure scenarios (FEIS:356, 104). These herbicides would be used almost exclusively east of the Cascades, where most would be used as soil-applied pre-emergents along pavement edges; around power poles and pipelines; and within fenced, remote utility developments, such as around cell phone towers or transformers, where long-term vegetation control is needed to prevent wildfire damage (FEIS:62, 77-78). They are not usually applied to foliage where they might easily come in contact with the public, and a mitigation measure adopted as part of this decision further reduces the potential for public contact. Standard Operating Procedures and mitigation measures limit exposure (FEIS:460-465). Most applications would be conducted by the owners of pipelines, power lines, and roads owned and maintained by utility companies or county and State road departments and occupying BLM lands under permit east of the Cascades (FEIS:316-317). These herbicides are registered for these uses, they are being used throughout the State on other ownerships, and the analysis indicates that the likelihood of adverse effects to human health from these applications would be low (FEIS:289, 347-348, 351-352, etc.).

2,4-D is in the moderate risk category for the exposure scenarios of a) worker wearing contaminated gloves for an hour, and b) consumption of water from a pond contaminated with a spill. There is a low risk for subsistence consumption of contaminated fish, and all of the non-spill exposure scenarios involving the general public are rated zero (0) risk (FEIS:102-103). Worker risks can be mitigated by normal work practices (FEIS:347-348).

The inclusion of 2,4-D in this proposed action was specifically reconsidered at each step of the EIS process because of widespread public concern. Appendix 12 in the Final EIS summarizes much of the information considered in evaluating the risks and benefits associated with the use of 2,4-D (FEIS:783).

2,4-D is the second most commonly used herbicide in Oregon, and the BLM-proposed share under the selected alternative would be about 2/3 of 1 percent of the total used in Oregon (FEIS:119). As noted in Appendix 12, 2,4-D controls the widest range of target plants of any of the herbicides included in this decision, and it generally causes little or no damage to non-target grasses. In a tank mix, it extends the treatment season up close to seed-set because it provides a rapid burn-down – an important feature on BLM lands where flowers are often the readily visible distinguishing characteristic and limited numbers of control staff are expected to cover vast acreages before seed-set. As 2,4-D is commonly used by adjacent landowners and cooperators, its use by the BLM enhances cooperative weed control efforts. 2,4-D has the shortest half-life (10 days) of any of the herbicides included in the selected alternative (FEIS:783-786).

2,4-D would be used along some roadsides because it controls a wide range of encroaching vegetation while protecting most grasses. 2,4-D binds to foliage, which prevents it from being easily transported to nearby streams (FEIS:784, 194).

Use of 2,4-D under the selected alternative is projected to decrease about 37 percent when compared to the No Action Alternative (8,500 to 5,400 acres)(FEIS:77). A mitigation measure included in this decision may reduce use still further, that "consideration [will] be given to herbicides other than 2,4-D; use of 2,4-D should be limited to situations where other herbicides are ineffective or in situations in which the risks posed by 2,4-D can be mitigated." The decision to add diflufenzopyr + dicamba, and increasing experience with it and the other new herbicides being made available under this decision, may also lead to an overall reduction in 2,4-D use.

Triclopyr presents a low risk to women under two accidental public exposure scenarios at typical rates, direct spray on lower legs and dermal contact from contaminated vegetation (FEIS:103). PEIS Mitigation Measures (Attachment A) restrict application on large treatment areas where livestock or wild horse forage might be affected (FEIS:462). An additional mitigation measure included in this decision prohibits broadcast applications.

Dicamba was included on Final EIS Table 4-36 by mistake.[10] All typical rate exposure scenarios on the public and worker risk category tables, Final EIS Tables 3-18 and 19, are zero (FEIS:102-103). Nevertheless, dicamba use is estimated to decrease 60 percent when compared to the No Action Alternative (FEIS:77). The addition of diflufenzopyr + dicamba to the herbicides available under the selected alternative could reduce dicamba use still further (at least in terms of total pounds); the addition of diflufenzopyr to dicamba makes the dicamba effective at lower doses and thus reduces risks identified for dicamba. The typical and maximum rates for dicamba are 0.3 and 2 pounds per acre, while those for diflufenzopyr + dicamba are 0.2625 and 0.35 for rangeland (FEIS:59-61). (It is not used on forestland.) The Risk Assessments, and the Final EIS analysis for Alternative 5, which included this herbicide, identify little potential for significant adverse effects from its use.

This *Purpose* is best met by Alternative 3; the acres of moderate and high risk herbicides would decrease about 50 percent when compared to the No Action Alternative, even though acres treated would nearly double. Under Alternative 4, the number of acres treated with herbicides having a high or moderate risk to humans and the environment are slightly less than under the No Action Alternative, even though the total estimated treatment acres increases threefold. As noted above, however, these are comparisons of risk categories. Site-specific analysis and the implementation of mitigation measures and normal herbicide safety measures will prevent, or at least minimize, actual adverse effects. Thus, all of the action alternatives meet this *Purpose*.

7. *Control plant pests and diseases by removing their native plant hosts when necessary to meet Oregon Department of Agriculture-identified control objectives.*

This decision is programmatic. Site-specific analysis will determine if herbicides will actually be used for the control of diseases such as Sudden Oak Death, and under what conditions. Pests and diseases in State-identified control areas have the potential to cost the State and its businesses hundreds of millions of dollars. The BLM needs the ability to consider a wide range of herbicides for use on BLM lands, when and if State control objectives indicate they are needed. In the case of Sudden Oak Death, early study results and the expert opinion of specialists involved with the control efforts indicate herbicide treatment of host vegetation would likely be several times more effective at preventing reinfections than non-herbicide methods (FEIS:161). As in the treatment of noxious weeds, effective vigorous control at the outset of an infestation can help prevent widespread adverse effects later. Negative effects attributable to the level of herbicide use envisioned for Sudden Oak Death control are negligible at the programmatic scale of this decision (FEIS:160-162). All of the action alternatives fully meet this *Purpose*.

8. *Minimize treatment costs and improve treatment effectiveness, so resource and economic losses from invasive plants and other vegetation growth are reduced and more of the* Need *can be met within expected funding.*

The *Implementation Costs* portion of the analysis reveals two important cost savings from the selected alternative. First, the increased number of herbicides under all of the action alternatives increases the efficacy of noxious weed treatments from 60 to 80 percent when compared to the No Action Alternative. This alone lowers the cost per effectively treated acre (all methods) from $240 to $193 per acre (FEIS:340). These savings become available for additional treatments and thus contribute to the decrease in the weed spread rate predicted between the No Action

[10] As noted on the Changes page at the start of Chapter 3, certain ecological and human health risks for dicamba were changed between the Draft and Final EIS to reflect findings of the Forest Service Risk Assessment. During this process, a risk category was mistakenly added to Table 4-36.

and the action alternatives. The additional herbicides, particularly imazapic, will improve the BLM's ability to successfully restore sensitive fire-damaged Sagebrush Steppe habitat type and otherwise participate in cooperative weed control efforts across multiple ownerships, and thus increase the likelihood that the BLM and others will make additional investments in weed control. In these ways, the herbicides added by the action alternatives can be expected to significantly increase the number of acres of weeds that can ultimately be controlled and/or acres that can be restored (FEIS:340).

Second, the availability of herbicides to treat native and other non-invasive plants to meet safety and maintenance objectives around developments is estimated to reduce costs for these treatments, now being done with non-herbicide methods, by nearly $1 million per year. These savings will go to the development owners including the BLM and ultimately benefit the public in the form of reduced maintenance costs or better safety and maintenance work along these same developments (FEIS:341-343).

Alternative 3 partially meets this *Purpose*, but the ability to treat native and other non-invasive plants to meet safety and maintenance objectives under Alternatives 4 and 5 best meets this *Purpose*.

Summary

The conclusions under each of the Purpose discussions above are displayed on the table below. Alternatives 4 and 5 meet the *Need* and meet all *Purposes*. Alternative 4 is selected because Alternative 5 would increase the acres of herbicides having a high or moderate risk to the environment and humans by 12 and 27 percent respectively when compared to the No Action Alternative (FEIS:49). Alternative 5 would also cost more with little additional contribution to achievement of the EIS *Purposes*.

Purpose	**Alternative 3**	**Alternative 4**	**Alternative 5**
1. Control invasive plants	partially meets	meets	meets
2. Protect & maintain infrastructure	meets	meets	meets
3. Manage native habitats for Special Status species	partially meets	meets	meets
4. Reduce fire risk	meets	meets	meets
5. Cooperatively control weeds	meets	meets	meets
6. Prevent herbicide harm to humans & environment	best meets	meets	meets
7. Control pests and diseases (e.g. Sudden Oak Death)	meets	meets	meets
8. Lower costs and meet more of the *Need*	partially meets	meets	meets

Other Alternatives Considered in Detail and Reasons They Were Not Selected

Alternative 3 would meet the *Need* and many of the *Purposes*. It would not make herbicides available to manage native habitats for Special Status species (*Purpose* #3), and it would not control invasive plants (*Purpose* #1) or lower costs (*Purpose* #8) as well as Alternative 4. The *Comparison of the Effects of the Alternatives* section in Chapter 2, Table 2-6, *Purpose* #6, shows Alternative 3 to use 50 percent fewer moderate and high risk herbicides than any of the other alternatives, with Alternative 4 only slightly lower than Alternative 2 (FEIS:49). However, these are *risk* categories, and actual use, constrained by Standard Operating Procedures and mitigation measures including the ones adopted by this decision, will result in a low likelihood of Alternative 4 having adverse effects.

Alternative 5 would meet the *Need*, and meet all eight *Purposes* to varying degrees. Alternative 5 has the highest number of acres treated with moderate and high risk herbicides including the No Action Alternative. However, with the increased risk comes little difference toward meeting the *Purposes*.

The Environmentally Preferable Alternative

The Council of Environmental Quality's 40 Most Asked [NEPA] Questions, question #6a, defines the environmentally preferable alternative as the one "that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources." The Council goes on to note that "[t]hrough the identification of the environmentally preferable alternative, the decision-maker is clearly faced with a choice between that alternative and others, and must consider whether the decision accords with the Congressionally declared policies of the Act."

NEPA's Section 101 [42 USC § 4331], referenced above, includes in part: "…it is the continuing policy of the Federal Government…to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."

Alternative 4 is identified as the Environmentally Preferable Alternative for the same reasons it is selected. Although the right-of-way treatments under Alternative 4 add herbicides having a high risk to human health under some exposure scenarios, these risks are mitigated with Standard Operating Procedures and mitigation measures (see discussion under *Purpose* number 6). Improved weed control and the opportunity for new habitat improvement treatments make Alternative 4 more environmentally preferable.

Public Involvement

Notice of Intent/Scoping

Preparation of the EIS upon which this decision is based officially began when the Notice of Intent to prepare an *Environmental Impact Statement (EIS) for Vegetation Treatments Using Herbicides on BLM Lands in Oregon* was published in the Federal Register (73[121]:35408–35409) on June 23, 2008. The Notice of Intent briefly described the proposed action and indicated that the BLM was seeking comments to help identify relevant issues and environmental concerns, identify possible alternatives, and help determine the scope of the EIS. The Notice of Intent was also posted to the project website at http://www.blm.gov/or/plans/vegtreatmentseis/, and a press release was mailed to print, radio, and broadcast media outlets across the State. At the same time, approximately 17,000 postcards were mailed to individuals, groups, government agencies, and tribes identified from Oregon BLM districts' and Oregon National Forests' "interested public" mailing lists as potentially interested in the EIS. These postcards, in addition to announcing the project and asking recipients if they wished to be on the project mailing list, noted there would be public meetings across the State in July 2008 to solicit ideas for issues (identified herein as *Purposes*) and alternatives to consider in the EIS (FEIS:12).

During July 2008, the BLM held 12 public scoping meetings in Oregon, one at or near each of the nine BLM District Offices and in Klamath Falls, Baker City, and Portland. Approximately 40 non-BLM persons attended these meetings and most contributed comments verbally. Eighty scoping "letters" were also received during or

shortly after the scoping period via letters, postcards, email, phone calls, and the comment page on the project website. These letters helped the BLM define the alternatives to be considered, as well as the eight *Purposes* to be addressed in the EIS and considered by the decision-maker (FEIS:13).

In addition to scoping comments, the BLM received postcards or emails from approximately 1,200 persons or groups asking to be on the project mailing list. Nine agencies, including the Oregon Department of Agriculture and the Bonneville Power Administration, received written and phone invitations to be formal cooperators with the BLM in the preparation of the EIS. Although they were supportive of the Proposed Action, all declined (FEIS:13).

The October 2009 Draft EIS

The public comment period for the *Draft Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in Oregon* (Draft EIS) started with a Federal Register notice (74[190]:50986–50987) on October 2, 2009, and ended on December 1, 2009. During the 60-day public comment period, 803 comment letters were received. The BLM continued to accept and process letters received between December 2, 2009, and the completion of public comment analysis on January 6, 2010. During this time, the BLM received and processed an additional 240 comment letters (FEIS:13).

Letters were received from a variety of interests including individuals, organizations (including watershed councils), businesses, and Federal, State, and local (including soil and water conservation districts) government agencies. Letters were received from ten states, as well as from India, but the majority of letters originated in Oregon. Substantive comments were identified, summarized, and combined into 312 unique comment statements. Responses were prepared, resultant new information was added to the EIS, and EIS language was clarified. Appendix 10 contains the comment statements and responses, organized to follow the order of the Final EIS. Responses to letters received from Federal, State, and local governments are included in Appendix 10, and their letters are displayed in their entirety in Appendix 11 (FEIS:13).

The July 2010 Final EIS

A Notice of Availability of the *Final Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in Ore*gon (Final EIS) was published in the Federal Register on July 30, 2010. Although the BLM's formal administrative appeal process precludes the need for any separation between issuance of the Final EIS and Record of Decision, the Notice indicated the signing of this Record of Decision would take place 30 to 90 days following issuance of the Final EIS. Four letters about the Final EIS were received by the BLM in the 31-day period that ended on August 31, 2010.[11] These letters were analyzed to determine if they contained substantive comments that were not already addressed in the responses to public comments received on the Draft EIS (see Appendix 10 in the Final EIS) or that addressed a change between the Draft and Final EIS. One such comment was received and is addressed below. The comment suggested that dioxins are a significant concern, and that a discussion of dioxins or a mitigation measure requiring their avoidance is not readily apparent in the Final EIS.

Dioxins were generally not discussed in the effects sections of the EIS because the Risk Assessments indicated that they do not represent a significant toxicological concern. Various dioxins can be formed during certain steps in the manufacture of various pesticides and other chemicals. Of the 18 herbicides discussed in the Final EIS, the EPA lists 2,4-D and dicamba as herbicides suspected of being contaminated with dioxins, and lists diuron

[11] The Record of Decision went for typesetting on the following day.

as having the potential to become contaminated with dioxins if synthesized under conditions favoring dioxin formation (EPA 2006).[12] The EPA has prohibited or severely regulated processes that can lead to dioxin formation in recent years, particularly those leading to the formation of 2,3,7,8-TCDD, the dioxin of greatest toxicity and concern and the one most implicated in adverse health effects from 2,4-5-T and Agent Orange. Dioxin emissions in the United States have been significantly reduced in recent years, and according to a 2006 EPA report, by 2000 the leading source of dioxin emissions in the United States was backyard burning (EPA 2006). Other leading sources are wildfires, waste treatment, and various manufacturing. The presence (or non-presence) of dioxins in 2,4-D is discussed in Appendix 10, Comment and Response numbers 271 and 274 (FEIS:746-747). Dioxins are discussed in detail in the 2,4-D Risk Assessment in Appendix 8, which indicates the dioxin TCDD, the potent dioxin previously associated with 2,4,5-T and Agent Orange, has been present in some recent samples of 2,4-D at concentrations slightly above 1 part per billion. Two other dioxins, PCDD and PCDF, are often present in detectable quantities. The EPA conducted a detailed risk assessment for PCDD/PCDF contamination of 2,4-D and concluded that risks associated with such contamination were likely inconsequential (FEIS Appendix 8, 2,4-D Risk Assessment). Any human health or environmental risk from dioxins is reflected in the risk categories shown on Final EIS Tables 3-12 through 3-21.

In addition, a letter was received from the EPA, which requested that the BLM adopt the potential monitoring discussed in Appendix 3 of the Final EIS, with the caveat that "if the EIS has not identified adverse impacts that would need or benefit from "potential monitoring", it should not be implemented. The likelihood of meaningful monitoring results should be such that a deferral of funds from direct weed control efforts is justified." They also noted that the edits to Appendix 3 in the Final EIS were responsive to their comments on the Draft EIS that called for an enhanced description of the minimum requirements for site-specific effectiveness monitoring.

No significant new information was presented in the four letters that would require reissuance of the Draft or Final EIS.

Consultation with Tribes

During initial scoping for the EIS in July 2008, 13 American Indian Tribes received letters explaining the project and the potential for effects to significant gathering areas and other resources, seeking their input and extending an invitation to initiate government-to-government consultation. Follow-up phone calls to these Tribal governments were made by the BLM districts reiterating these messages. No Tribe accepted the request for formal consultation at the programmatic level. The Bureau of Indian Affairs was also sent the Tribal scoping letter (FEIS:13, 14).

Required cultural resource reviews, inventories, and consultation with American Indian Tribes in areas likely to include cultural resources and traditional cultural values, is a required part of site-specific project planning that will reduce the potential for adverse effects to cultural resources. Pre-disturbance site identification methods, and avoidance or other protection methods, will reduce the chance that significant cultural resources would be impacted and would result in negligible cumulative impacts to cultural resources (FEIS:284, 285, 292).

For the PEIS, the BLM consulted with the affected State Historic Preservation Offices (SHPOs) as part of Section 106 consultation under the National Historic Preservation Act to determine how proposed vegetation treatment actions could affect cultural resources (PEIS:Appendix G). Formal consultations with the Oregon SHPO and potentially affected Indian Tribes also may be required during implementation of projects at the local level (FEIS:14).

[12] Environmental Protection Agency. 2006. An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the U.S. for the Years 1987, 1995, and 2000 (Final, Nov 2006)

Endangered Species Act Consultation

For the PEIS, the BLM consulted with the FWS and NMFS as required under Section 7 of the Endangered Species Act (PEIS:Chapter 5 and Appendix G). The BLM prepared a formal initiation package that included: 1) a description of the program, Federally Listed species, species proposed for Federal Listing, and critical habitats that may be affected by the program; and, 2) a *Biological Assessment for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States*. That Biological Assessment evaluated the likely impacts to the above species and habitats from the proposed use of herbicides and other treatment methods, and identified management practices (Conservation Measures) to minimize impacts to these species and habitats (FEIS:13-14).

The FWS issued a Letter of Concurrence on September 1, 2006 that concurred that the proposed action as described in the PEIS and Biological Assessment, with all Standard Operating Procedures and PEIS Mitigation Measures, would not likely adversely affect any Federally Listed species under the jurisdiction of the FWS. In addition, the FWS recognized that any future site-specific actions carried out under the PEIS would undergo additional consultation as appropriate (FEIS:14).

The Biological Opinion issued by the NMFS on June 26, 2007 concluded that the proposed action as described in the PEIS and Biological Assessment was not likely to jeopardize the continued existence of endangered and threatened salmon and trout, threatened green sturgeon and threatened southern resident killer whales. Since the PEIS does not authorize any site-specific actions, subsequent Section 7 review on proposed site-specific vegetation treatments will be required. There is no incidental take[13] identified or exempted by the Biological Opinion. If take is anticipated for site-specific treatments then the amount or extent of take will be identified during consultation for those proposed treatments (FEIS:14).

Like the PEIS, the Oregon programmatic Final EIS does not authorize site-specific actions or amend Resource Management Plans. In addition, the three action alternatives in the Final EIS are subsets of the selected alternative in the PEIS. Therefore, the Final EIS incorporated the PEIS Biological Assessment by reference (50 CFR 402.12(g)). Information from the PEIS Biological Assessment about Federally Listed species in Oregon, updated to include recently expanded bull trout critical habitat, the listing of Pacific Eulachon, and the 12-month findings for petitions to list the greater sage grouse, is included in Appendix 5 of the Final EIS. Informal consultation with the FWS (50 CFR 402.13) (Attachment C) and formal consultation with NMFS (50 CFR 402.14) (Attachment D) confirmed and applied the PEIS consultation results to the Oregon Final EIS. Specific treatment projects conducted under this decision remain subject to site-specific consultation as appropriate (FEIS:14). Conservation Measures from the PEIS Consultation and Conferencing added to Appendix 5 in the Final EIS, and clearly referenced in Appendix 2, are a part of this Record of Decision (see Attachment B).

Findings Required by Other Laws and Regulations

No Supplement to the Draft EIS is Needed

The Final EIS, particularly the public comment and responses to the Draft EIS displayed in Appendix 10, the *Changes Between Draft and Final EIS* pages at the front of each chapter, and the letters received in the 30 days following publication of the Final EIS have been carefully reviewed. Although the analysis in the Final EIS was improved as a result of public review and comment, the Final EIS does not make substantial changes in the proposed action that are relevant to environmental concerns nor are there significant new circumstances or

[13] "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

information relevant to environmental concerns and bearing on the proposed action or its impacts. Therefore, no reissuance of a Draft EIS is required under 40 CFR 1502.9.

Implementation of the Decision

Existing Environmental Assessments Remain in Effect, Constrained by Elements of the Selected Alternative

Each district currently has one or more Environmental Assessment documents describing their noxious weed control program. These documents are generally tiered to the 1985 *Northwest Area Noxious Weed Control Program Final EIS* and its 1987 Supplement (USDI 1985a, 1987), either directly or indirectly through their respective Resource Management Plans. The existing Environmental Assessments for Prineville, Lakeview, and Burns also specifically tier to the 1991 *Vegetation Treatment on BLM Lands in Thirteen Western States Final EIS*. Environmental Assessment treatment plans are periodically updated to reflect the shifting nature of noxious weed populations and the control efforts needed to contain them (FEIS:16).

The July 2010 *Vegetation Treatments Using Herbicides on BLM Land in Oregon Final EIS* addresses the use of herbicides as part of the vegetation management program on public lands administered by the BLM in Oregon and is intended to be applicable for approximately 10 to 20 years. However, this decision, and the Final EIS upon which it is based, does not set weed treatment priorities or approve projects. Prior to the use of herbicides other than 2,4-D, dicamba, glyphosate, or picloram for the control of noxious weeds, new site-specific analyses will be conducted with the opportunity for public comment (see *Exceptions* below). These site-specific analyses will identify the potential effects of specific herbicide treatments. Until new site-specific assessments are completed and in use, the use of 2,4-D, dicamba, glyphosate, or picloram for noxious weed control will be governed by existing NEPA documents, constrained by the Standard Operating Procedures and other elements of this decision (FEIS:16).

Exceptions: Existing NEPA documents affected by this decision include the 2005 and 2006 Final EISs and Records of Decision for the Tyrrell, Horning, Provolt, and Sprague Seed Orchards. These documents thoroughly examine the use of certain herbicides, and include an appropriate consideration of risk (FEIS:313, 318). Similarly, a 1995 Forest Service Environmental Assessment for the Dorena Tree Improvement Center addresses the use of glyphosate at the Center (FEIS:313, 318). Finally, a 2010 Environmental Assessment on the Coos Bay District addresses the use of glyphosate for the control of tanoak sprouting in Sudden Oak Death control units (FEIS:161).

The herbicide use described in these documents was included in the estimates of herbicide use examined in the Final EIS (FEIS:16). Other than constraining herbicide uses by the Standard Operating Procedures and other elements of this decision, this decision assumes the herbicide uses described in those existing NEPA documents will proceed. However, this decision makes no finding regarding whether these documents need to be updated.

Use of Individual Risk Assessment Tools During Implementation

As noted in the PEIS Mitigation Measures in Attachment A, site-specific analysis and/or the use of Individual Risk Assessment Tools (IRATs) can be used to identify alternative ways to achieve the expected protections. The Risk Assessments themselves include the information necessary to determine risk categories for specific situations and proposals; the IRATs are one tool to assist in translating this information to project design parameters. The IRATs are currently being developed for the BLM Risk Assessments, are scheduled for completion in 2012, and are intended to make risk assessment calculations easier to understand and review, allowing for more project specific mitigation measures to be developed (FEIS:92).

Legal, Policy, and Resource Management Plan Requirements

Nothing in this decision allows departure from State and Federal laws regarding herbicide use. Use is constrained by registration and labeling requirements. Similarly, BLM policies such as those for Special Status species continue to apply. This decision does not amend Resource Management Plans; herbicide use, like the use of other vegetation management tools, must be consistent with applicable plans.

Update on Non-BLM Actions Potentially Affecting the Use of Herbicides on BLM Lands in Oregon

Updates on Actions Described in the Final EIS

The BLM will comply with future changes in label or application requirements made by appropriate agencies. Nevertheless, several actions are described in Chapter 1 of the Final EIS whose status is ongoing or pending. The status of each of these was examined at the time of signing this decision. Results are described below; see Chapter 1, FEIS:17-21, for additional detail.

The following actions remain as described in the Final EIS:

- Potential Consultation Lawsuit Regarding 394 Pesticides;
- Petition to Cancel all Registrations of 2,4-D;
- Sulfometuron Methyl Reregistration Eligibility Decision (RED);
- Rulemaking to Require Disclosure of All Pesticide Ingredients;
- Pending EPA Action to Address Pesticide Drift; and,
- Air Quality Non-Attainment Areas for $PM_{2.5}$

2004 Court-Ordered Buffer Around Salmon-bearing Streams and the Settlement Agreement to Complete Consultation on 37 Pesticides

A 2008 settlement requires the NMFS to complete consultation on the 37 pesticides, including three evaluated in the EIS (2,4-D, diuron, and triclopyr BEE), and to design measures that will minimize adverse impacts. Consultation for six of these pesticides has been completed and is in progress for an additional twelve. However, consultation for the three herbicides included in this decision has not yet begun.

Actions Occurring Since the Issuance of the Final EIS

FIFRA Amendment to Exempt Pesticide Applications from Pollutant Discharge Elimination System Permits

In 2006, the EPA defined label-specified herbicide applications as not constituting a discharge of pollutants under the Clean Water Act. However, this decision was overturned by the US Court of Appeals for the Sixth Circuit, and the EPA was given until April 2011 to prepare a general National Pollutant Discharge Elimination System permit. In response to this, a bill was introduced in both the U.S. Senate and House of Representatives in August

2010 that amends the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) to state that "no permit shall be required for the use of a pesticide that is registered or otherwise authorized for use under this Act, if that use is in accordance with this Act." As of August 2010, this bill was still in committee in both the House and the Senate.

Administrative Appeal Procedures

This decision may be appealed to the Interior Board of Land Appeals (IBLA), Office of the Secretary, in accordance with regulations contained in 43 Code of Federal Regulations (CFR), Part 4 and Form 1842-1. If an appeal is filed, your notice of appeal should be mailed to the Oregon/Washington BLM State Director, P.O. Box 2965, Portland, Oregon 97208-2965, and be postmarked within 30 days of the publication of the Notice of Availability for this decision in the Federal Register. For example, if the Notice of Availability were published in the Federal Register on October 1, 2010, appeals would need to be postmarked no later than Monday, November 1, 2010. The appellant has the burden of showing the decision appealed is in error.

A copy of the appeal, statement of reasons, and all other supporting documents must also be sent to the Regional Solicitor, Pacific Northwest Region, U.S. Department of the Interior, 805 SW Broadway #600, Portland, Oregon 97205-3346. If the notice of appeal does not include a statement of reasons for the appeal, it must be sent to the Interior Board of Land Appeals, Office of Hearings and Appeals, 801 North Quincy Street, Arlington, Virginia 22203 within 30 days of filing the notice of appeal (43 CFR 4.412). It is suggested that appeals be sent certified mail, return receipt requested.

Requests for Stay: Should you wish to file a motion for stay pending the outcome of an appeal of this decision, you must show sufficient justification based on the following standards under 43 CFR 4.21:

- The relative harm to the parties if the stay is granted or denied.
- The likelihood of the appellant's success on the merits.
- The likelihood of immediate and irreparable harm if the stay is not granted.
- Whether or not the public interest favors granting the stay.

As with an appeal, the motion for stay must be filed with the Oregon/Washington BLM State Director and the Regional Solicitor.

References

All references cited in this Record of Decision can be found in the *References* section of the Final EIS (FEIS:391-420).

Enclosures

Attachment A – Standard Operating Procedures and PEIS Mitigation Measures
Attachment B – Conservation Measures for Special Status Species
Attachment C – U.S. Fish and Wildlife Service Consultation Letter
Attachment D – National Marine Fisheries Service Consultation Letter

Attachment A - Standard Operating Procedures and Mitigation Measures from the PEIS

Introduction

The following Standard Operating Procedures and Mitigation Measures have been adopted from the Record of Decision for the PEIS. Minor edits have been made to some Standard Operating Procedures and Mitigation Measures to clarify intent.

Standard Operating Procedures (identified below with SOP) have been identified to reduce adverse effects to environmental and human resources from vegetation treatment activities based on guidance in BLM manuals and handbooks, regulations, and standard BLM and industry practices.[1] The list is not all encompassing, but is designed to give an overview of practices that would be considered when designing and implementing a vegetation treatment project on public lands (PER:2-29)[2]. Effects described in the EIS are predicated on application of the Standard Operating Procedures, that a site-specific determination is made that their application is unnecessary to achieve their intended purpose or protection, or that if the parent handbook or policy direction evolves, the new direction would continue to provide the appropriate environmental protections.

For example, the Standard Operating Procedure to "complete vegetation treatments seasonally before pollinator foraging plants bloom" would not be applied to treatments not likely to have a significant effect on pollinators.

PEIS Mitigation Measures (identified below with MM) were identified for all potential adverse effects identified in the PEIS. They are included in, and adopted by, the Record of Decision for the PEIS. Like the SOPs, application of the mitigation measures is assumed in this EIS. However, for PEIS Mitigation Measures, site-specific analysis and/or the use of Individual Risk Assessments Tools (see Chapter 3), or evolution of the PEIS Mitigation Measures into handbook direction at the national level, would be permitted to identify alternative ways to achieve the expected protections (PEIS:4-4).

Although not displayed here, Standard Operating Procedures for non-herbicide treatments (from regulation, BLM policy, and BLM Handbook direction) also apply (PER:2-31 to 44).

Standard Operating Procedures and Mitigation Measures for Applying Herbicides

Guidance Documents

BLM Handbook H-9011-1 (*Chemical Pest Control*); and manuals 1112 (*Safety*), 9011 (*Chemical Pest Control*), 9012 (*Expenditure of Rangeland Insect Pest Control Funds*), 9015 (*Integrated Weed Management)*, and 9220 (*Integrated Pest Management*).

General

- Prepare an operational and spill contingency plan in advance of treatment. *(SOP)*
- Conduct a pretreatment survey before applying herbicides. *(SOP)*

[1] Manual-directed standard operating procedures and other standing direction may be referred to as best management practices in resource management and other plans, particularly when they apply to water.

[2] The PER includes Standard Operating Procedures for the full range of vegetation treatment methods. Only those applicable to herbicide application are included in this appendix.

- Select the herbicide that is least damaging to the environment while providing the desired results. *(SOP)*
- Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, other ingredients, and tank mixtures. *(SOP)*
- Apply the least amount of herbicide needed to achieve the desired result. *(SOP)*
- Follow herbicide product label for use and storage. *(SOP)*
- Have licensed or certified applicators or State-licensed "trainees" apply herbicides, or they can be applied by BLM employees under the direct supervision of a BLM-certified applicator. *(SOP)*
- Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. *(SOP)*
- Review, understand, and conform to the "Environmental Hazards" section on the herbicide product label. This section warns of known herbicide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. *(SOP)*
- Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. *(SOP)*
- Minimize the size of application area, when feasible. *(SOP)*
- Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/ landowners. *(SOP)*
- Post treated areas and specify reentry or rest times, if appropriate. *(SOP)*
- Notify adjacent landowners prior to treatment, if appropriate. *(SOP)*
- Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at http://www.cdms.net/. *(SOP)*
- Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. *(SOP)*
- Avoid accidental direct spray and spill conditions to minimize risks to resources. *(SOP)*
- Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). *(SOP)*
- Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground. *(SOP)*
- Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. *(SOP)*
- Use drift control agents and low volatile formulations. *(SOP)*
- Conduct pre-treatment surveys for sensitive habitat and Special Status species within or adjacent to proposed treatment areas. *(SOP)*
- Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. *(SOP)*
- Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. *(SOP)*
- Turn off application equipment at the completion of spray runs and during turns to start another spray run. *(SOP)*
- Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. *(SOP)*
- Clean OHVs to remove plant material. *(SOP)*

The BLM has suspended the use of the adjuvant R-11.

Air Quality
See Manual 7000 (*Soil, Water, and Air Management*)

- Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. *(SOP)*
- Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. *(SOP)*
- Use drift reduction agents, as appropriate, to reduce the drift hazard. *(SOP)*
- Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). *(SOP)*
- Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources). *(SOP)*

Soil
See Manual 7000 (*Soil, Water, and Air Management*)

- Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. *(SOP)*
- Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. *(SOP)*
- Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas. *(SOP)*

Water Resources
See Manual 7000 (*Soil, Water, and Air Management*)

- Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. *(SOP)*
- Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments. *(SOP)*
- Use local historical weather data to choose the month of treatment. (*SOP*)
- Considering the phenology of target aquatic species, schedule treatments based on the condition of the water body and existing water quality conditions. *(SOP)*
- Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. *(SOP)*
- Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. *(SOP)*
- Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. *(SOP)*
- Do not rinse spray tanks in or near water bodies. (*SOP*)
- Do not broadcast pellets where there is danger of contaminating water supplies. *(SOP)*
- Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment. *(SOP)*

- Establish appropriate (herbicide-specific) buffer zones for species/populations (Tables A2-1 and A2-2). (*MM*)
- Areas with potential for groundwater for domestic or municipal use shall be evaluated through the appropriate, validated model(s) to estimate vulnerability to potential groundwater contamination, and appropriate mitigation measures shall be developed if such an area requires the application of herbicides and cannot otherwise be treated with non-herbicide methods. (*MM*)
- Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths from water of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications. *(SOP)*
- Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide and site-specific conditions to minimize impacts to water bodies. *(SOP)*

Wetlands and Riparian Areas

- Use a selective herbicide and a wick or backpack sprayer. *(SOP)*
- Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths from water of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications. *(SOP)*
- See mitigation for Water Resources and Vegetation. (*MM*)

Vegetation
See Handbook H-4410-1 (*National Range Handbook*), and manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*)

- Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. *(SOP)*
- Use native or sterile plants for revegetation and restoration projects to compete with invasive plants until desired vegetation establishes. *(SOP)*
- Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for revegetation and other activities. *(SOP)*
- Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, to maintain desirable vegetation on the treatment site. *(SOP)*
- Minimize the use of terrestrial herbicides (especially bromacil, diuron, and sulfometuron methyl) in watersheds with downgradient ponds and streams if potential impacts to aquatic plants are identified. (*MM*)
- Establish appropriate (herbicide-specific) buffer zones (Tables A2-1 and 2) around downstream water bodies, habitats, and species/populations of interest. Consult the ecological risk assessments (ERAs) prepared for the PEIS for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios. (*MM*)
- Limit the aerial application of chlorsulfuron and metsulfuron methyl to areas with difficult land access, where no other means of application are possible. (*MM*)
- Do not apply sulfometuron methyl aerially. (*MM*)
- When necessary to protect Special Status plant species, implement all conservation measures for plants presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment* (see Appendix 5). (*MM*)

Pollinators

- Complete vegetation treatments seasonally before pollinator foraging plants bloom. *(SOP)*
- Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. *(SOP)*
- Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are treated in patches rather than in one single treatment. *(SOP)*
- Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. *(SOP)*
- Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. *(SOP)*
- Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. *(SOP)*
- Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants and in their habitats. *(SOP)*

Fish and Other Aquatic Organisms
See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)

- Use appropriate buffer zones based on label and risk assessment guidance. *(SOP)*
- Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. *(SOP)*
- Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. *(SOP)*
- For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to meet vegetation management objectives, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label. *(SOP)*
- Limit the use of diquat in water bodies that have native fish and aquatic resources. (*MM*)
- Limit the use of terrestrial herbicides (especially diuron) in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used. (*MM*)
- When necessary to protect Special Status fish and other aquatic organisms, implement all conservation measures for aquatic animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment* (see Appendix 5). (*MM*)
- Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of interest (Tables A2-3 and A2-4, and recommendations in individual ERAs). (*MM*)
- Consider the proximity of application areas to salmonid habitat and the possible effects of herbicides on riparian and aquatic vegetation. Maintain appropriate buffer zones around salmonid-bearing streams. (*MM*)
- At the local level, consider effects to Special Status fish and other aquatic organisms when designing treatment programs. (*MM*)

Wildlife
See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)

- Use herbicides of low toxicity to wildlife, where feasible. *(SOP)*

- Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. *(SOP)*
- Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife. *(SOP)*
- To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications of dicamba, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr, where feasible. (*MM*)
- Minimize the size of application areas, where practical, when applying 2,4-D, bromacil, diuron, and Overdrive® to limit impacts to wildlife, particularly through contamination of food items. (*MM*)
- Where practical, limit glyphosate and hexazinone to spot applications in grazing land and wildlife habitat areas to avoid contamination of wildlife food items. (*MM*)
- Do not use the adjuvant R-11 (*MM*)
- Either avoid using glyphosate formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians. (*MM*)
- Do not apply bromacil or diuron in rangelands, and use appropriate buffer zones (Tables A2-1 and 2) to limit contamination of off-site vegetation, which may serve as forage for wildlife. (*MM*)
- Do not aerially apply diquat directly to wetlands or riparian areas. (*MM*)
- When necessary to protect Special Status wildlife species, implement conservation measures for terrestrial animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment* (See Appendix 5) (*MM*)

Threatened, Endangered, and Sensitive Species
See Manual 6840 (*Special Status Species*)

- Provide clearances for Special Status species before treating an area as required by Special Status Species Program policy. Consider effects to Special Status species when designing herbicide treatment programs. *(SOP)*
- Use a selective herbicide and a wick or backpack sprayer to minimize risks to Special Status plants. *(SOP)*
- Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for Special Status species in area to be treated. *(SOP)*

Livestock
See Handbook H-4120-1 (*Grazing Management*)

- Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. *(SOP)*
- As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. *(SOP)*
- Use herbicides of low toxicity to livestock, where feasible. *(SOP)*
- Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. *(SOP)*
- Avoid use of diquat in riparian pasture while pasture is being used by livestock. *(SOP)*
- Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. *(SOP)*
- Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. *(SOP)*
- Provide alternative forage sites for livestock, if possible. *(SOP)*

- Minimize potential risks to livestock by applying diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr at the typical application rate where feasible. (*MM*)
- Do not apply 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, or triclopyr across large application areas, where feasible, to limit impacts to livestock, particularly through contamination of food items. (*MM*)
- Where feasible, limit glyphosate and hexazinone to spot applications in rangeland. (*MM*)
- Do not apply bromacil or diuron in rangelands, and use appropriate buffer zones (Tables A2-1 and 2) to limit contamination of off-site vegetation, which may serve as forage for wildlife. (*MM*)

Wild Horses and Burros

- Minimize using herbicides in areas grazed by wild horses and burros. *(SOP)*
- Use herbicides of low toxicity to wild horses and burros, where feasible. *(SOP)*
- Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. *(SOP)*
- Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources. *(SOP)*
- Minimize potential risks to wild horses and burros by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible, in areas associated with wild horse and burro use. (*MM*)
- Consider the size of the application area when making applications of 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, and triclopyr in order to reduce potential impacts to wild horses and burros. (*MM*)
- Apply herbicide label grazing restrictions for livestock to herbicide treatment areas that support populations of wild horses and burros. (*MM*)
- Where practical, limit glyphosate and hexazinone to spot applications in rangeland. (*MM*)
- Do not apply bromacil or diuron in grazing lands within herd management areas (HMAs), and use appropriate buffer zones identified in Tables A2-1 and 2 to limit contamination of vegetation in off-site foraging areas. (*MM*)
- Do not apply 2,4-D, bromacil, or diuron in HMAs during the peak foaling season (March through June, and especially in May and June), and do not exceed the typical application rate of Overdrive® or hexazinone in HMAs during the peak foaling season in areas where foaling is known to take place. (*MM*)

Cultural Resources and Paleontological Resources

See handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H- 8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*),and 8270 (*Paleontological Resource Management*). See also: *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act.*

- Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act* and State protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. *(SOP)*

- Follow BLM Handbook H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*) to determine known Condition I and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. *(SOP)*
- Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments; work with tribes to minimize impacts to these resources. *(SOP)*
- Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments. *(SOP)*
- Do not exceed the typical application rate when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr in known traditional use areas. (*MM*)
- Avoid applying bromacil or tebuthiuron aerially in known traditional use areas. (*MM*)
- Limit diquat applications to areas away from high residential and traditional use areas to reduce risks to Native Americans. (*MM*)

Visual Resources

See handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and manual 8400 (*Visual Resource Management*)

- Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. *(SOP)*
- Consider the surrounding land use before assigning aerial spraying as an application method. *(SOP)*
- Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. *(SOP)*
- If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). *(SOP)*
- Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment. *(SOP)*
- When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management (VRM) objectives. *(SOP)*

Wilderness and Other Special Areas

See handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual 8351 (*Wild and Scenic Rivers*)

- Encourage backcountry pack and saddle stock users to feed their livestock only weed-free feed for several days before entering a wilderness area, and to bring only weed-free hay and straw onto BLM lands. *(SOP)*
- Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. *(SOP)*
- Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. *(SOP)*

- Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. *(SOP)*
- Use the "minimum tool" to treat noxious weeds and other invasive plants, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. *(SOP)*
- Use herbicides only when they are the minimum treatment method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. *(SOP)*
- Give preference to herbicides that have the least impact on non-target species and the wilderness environment. *(SOP)*
- Implement herbicide treatments during periods of low human use, where feasible. *(SOP)*
- Address wilderness and special areas in management plans. *(SOP)*
- Control of weed infestations shall be carried out in a manner compatible with the intent of Wild and Scenic River management objectives. *(SOP)*
- Mitigation measures that may apply to wilderness and other special area resources are associated with human and ecological health and recreation (see mitigation measures for Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, Recreation, and Human Health and Safety). (*MM*)

Recreation

See Handbook H-1601-1 (*Land Use Planning Handbook, Appendix C*)

- Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. *(SOP)*
- Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. *(SOP)*
- Adhere to entry restrictions identified on the herbicide product label for public and worker access. *(SOP)*
- Post signs noting exclusion areas and the duration of exclusion, if necessary. *(SOP)*
- Mitigation measures that may apply to recreational resources are associated with human and ecological health (see mitigation measures for Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, and Human Health and Safety). (*MM*)

Social and Economic Values

- Consider surrounding land use before selecting aerial spraying as a treatment method, and avoid aerial spraying near agricultural or densely-populated areas. *(SOP)*
- Post treated areas and specify reentry or rest times, if appropriate. *(SOP)*
- Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. *(SOP)*
- Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. *(SOP)*
- Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. *(SOP)*
- Observe restricted entry intervals specified by the herbicide product label. *(SOP)*
- Notify local emergency personnel of proposed treatments. *(SOP)*
- Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources. *(SOP)*
- Consult with Native American tribes to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. *(SOP)*

- To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies for herbicide treatment projects (including the herbicides) through local suppliers. *(SOP)*
- To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated vegetation management program for projects proposing local use of herbicides. *(SOP)*

Rights-of-way

- Coordinate vegetation treatment activities where joint or multiple use of a ROW exists. *(SOP)*
- Notify other public land users within or adjacent to the ROW proposed for treatment. *(SOP)*
- Use only herbicides that are approved for use in ROW areas. *(SOP)*

Human Health and Safety

- Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. *(SOP)*
- Use protective equipment as directed by the herbicide product label. *(SOP)*
- Post treated areas with appropriate signs at common public access areas. *(SOP)*
- Observe restricted entry intervals specified by the herbicide product label. *(SOP)*
- Provide public notification in newspapers or other media where the potential exists for public exposure. *(SOP)*
- Store herbicides in secure, herbicide-approved storage. (*SOP*)
- Have a copy of MSDSs at work site. *(SOP)*
- Notify local emergency personnel of proposed treatments. *(SOP)*
- Contain and clean up spills and request help as needed. *(SOP)*
- Secure containers during transport. *(SOP)*
- Follow label directions for use and storage. *(SOP)*
- Dispose of unwanted herbicides promptly and correctly. *(SOP)*
- Use the typical application rate, where feasible, when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr to reduce risk to workers and the public. (*MM*)
- Avoid applying bromacil and diuron aerially. Do not apply sulfometuron methyl aerially. (*MM*)
- Limit application of chlorsulfuron via ground broadcast applications at the maximum application rate. (*MM*)
- Limit diquat application to ATV, truck spraying, and boat applications to reduce risks to workers; limit diquat applications to areas away from high residential and subsistence use to reduce risks to the public. (*MM*)
- Evaluate diuron applications on a site-by-site basis to avoid risks to humans. There appear to be few scenarios where diuron can be applied without risk to workers. (*MM*)
- Do not apply hexazinone with an over-the-shoulder broadcast applicator (backpack sprayer). (*MM*)

TABLE A2-1. Buffer Distances to Minimize Risk to Vegetation from Off-Site Drift of BLM-Evaluated Herbicides

Application Scenario	BROM[1]	CHLR[1]	DIQT[1]	DIUR[1]	FLUR[1]	IMAZ[1]	OVER[1]	SULF[1]	TEBU[1]
Buffer Distance (feet) from Non-target Aquatic Plants									
Typical Application Rate									
Aerial	NA	0	NE	NA	NE	0	NA	1,300	NE
Low Boom[2]	100	0	NE	900	NE	0	100	900	0
High Boom[2]	900	0	NE	1,000	NE	0	900	900	0
Maximum Application Rate									
Aerial	NA	300	NE	NA	NE	300	NA	1,500	NE
Low Boom[2]	900	0	NE	1,000	NE	0	900	900	0
High Boom[2]	900	0	NE	1,000	NE	0	900	900	0
Buffer Distance (feet) from Non-target Terrestrial Plants									
Typical Application Rate									
Aerial	NA	1,350	1,200	NA	NE	0	NA	0	NE
Low Boom[2]	950	900	100	0	NE	0	0	0	0
High Boom[2]	950	900	900	100	NE	0	100	0	0
Maximum Application Rate									
Aerial	NA	1,350	1,200	NA	NE	900	NA	0	NE
Low Boom[2]	1,000	1,000	900	200	NE	0	100	0	50
High Boom[2]	1,000	1,000	900	500	NE	0	100	0	50
Buffer Distance (feet) from Threatened, Endangered, and Sensitive Plants									
Typical Application Rate									
Aerial	NA	1,400	1,200	NA	NE	0	NA	1,500	NE
Low Boom[2]	1,200	1,000	900	1,000	NE	0	100	1,100	0
High Boom[2]	1,200	1,000	900	1,000	NE	0	900	1,000	50
Maximum Application Rate									
Aerial	NA	1,400	1,200	NA	NE	900	NA	1,500	NE
Low Boom[2]	1,200	1,050	1,000	1,000	NE	0	900	1,100	100
High Boom[2]	1,200	1,000	1,000	1,000	NE	0	900	1,000	500

[1] BROM = Bromacil; CHLR = Chlorsulfuron; DIQT = Diquat; DIUR = Diuron; FLUR = Fluridone; IMAZ = Imazapic; OVER = Diflufenzopyr + Dicamba (Overdrive); SULF = Sulfometuron methyl; and TEBU = Tebuthiuron.

[2] High boom is 50 inches above ground and low boom is 20 inches above ground.

NE = Not evaluated and NA = not applicable.

Buffer distances are the smallest modeled distance at which no risk was predicted. In some cases, buffer distances were extrapolated if the largest distance modeled still resulted in risk, or interpolated if greater precision was required.

Table A2-2. Buffer Distances to Minimize Risk to Vegetation from Off-Site Drift of Forest Service-Evaluated Herbicides

Application Scenario	2,4-D	Dicamba	Clopyralid	Glyphosate	Hexazinone	Imazapyr	Metsulfuron Methyl	Picloram	Triclopyr
Buffer Distance (feet) from Susceptible Plants[1]									
Typical Application Rate									
Aerial	NE	>900	900	300	300	900	900	>900	500
Low Boom	NE	300	900	50	NE	900	900	>900	300
Maximum Application Rate									
Aerial	NE	>900	1,000	300	900	>900	>900	>900	>900
Low Boom	NE	900	1,000	300	NE	>900	>900	>900	>900
Buffer Distance (feet) from Tolerant Terrestrial Plants									
Typical Application Rate									
Aerial	NE	0	0	25	NE	100	50	25	NE
Low Boom	NE	0	0	25	0	25	25	25	NE
Maximum Application Rate									
Aerial	NE	0	25	50	NE	300	100	50	NE
Low Boom	NE	0	25	25	100	50	25	25	NE

NE = Not evaluated.
Buffer distances are the smallest modeled distance at which no risk was predicted. In some cases, buffer distances were extrapolated if the largest distance modeled still resulted in risk, or interpolated if greater precision was required.
[1] Mitigation measures for Bureau Sensitive or Federally Listed species use these buffer distances

Table A2-3. Buffer Distances to Minimize Risk to Non-Special Status Fish and Aquatic Invertebrates from Off-Site Drift of BLM-Evaluated Herbicides from Broadcast and Aerial Treatments

Application Scenario	BROM[1]	CHLR	DIQT	DIUR	FLUR	IMAZ	OVER	SULF	TEBU
Minimum Buffer Distance (feet) from Fish and Aquatic Invertebrates									
Typical Application Rate									
Aerial	NA	0	NA	NA	NA	0	NA	0	NA
Low boom	0	0	NA	0	NA	0	0	0	0
High boom	0	0	NA	0	NA	0	0	0	0
Maximum Application Rate									
Aerial	NA	0	NA	NA	NA	0	NA	0	NA
Low boom	0	0	NA	100	NA	0	0	0	0
High boom	0	0	NA	100	NA	0	0	0	0

[1] BROM = Bromacil; CHLR = Chlorsulfuron; DIQT = Diquat; DIUR = Diuron; FLUR = Fluridone; IMAZ = Imazapic; OVER = Diflufenzopyr + Dicamba (Overdrive); SULFM = Sulfometuron methyl; and TEBU = Tebuthiuron.
NA = Not applicable.
Boom height = The Tier I ground application model allows selection of a low (20 inches) or a high (50 inches) boom height.

Table A2-4. Buffer Distances to Minimize Risk to Special Status Fish and Aquatic Organisms from Off-Site Drift of BLM-Evaluated Herbicides from Broadcast and Aerial Treatments

Application Scenario	BROM[1]	CHLR	DIQT	DIUR	FLUR	IMAZ	OVER	SULF	TEBU
Minimum Buffer Distance (feet) from Fish and Aquatic Invertebrates									
Typical Application Rate									
Aerial	NA	0	NA	NA	NA	0	NA	0	NA
Low boom	0	0	NA	0	NA	0	0	0	0
High boom	0	0	NA	100	NA	0	0	0	0
Maximum Application Rate									
Aerial	NA	0	NA	NA	NA	0	NA	0	NA
Low boom	0	0	NA	100	NA	0	0	0	0
High boom	0	0	NA	900	NA	0	0	0	0

[1] BROM = Bromacil; CHLR = Chlorsulfuron; DIQT = Diquat; DIUR = Diuron; FLUR = Fluridone; IMAZ = Imazapic; OVER = Diflufenzopyr + Dicamba (Overdrive); SULFM = Sulfometuron methyl; and TEBU = Tebuthiuron.
NA = Not applicable.
Boom height = The Tier I ground application model allows selection of a low (20 inches) or a high (50 inches) boom height.

Attachment B – Conservation Measures for Special Status Species

Introduction

These Conservation Measures were displayed in Appendix 5 of the Final EIS. They are the product of the PEIS Biological Assessment and adopted by U.S. Fish and Wildlife Service and National Marine Fisheries Service Consultation, and apply to listed and proposed species as described in those consultation documents. These do not apply where a No Effect determination can be made without them, or where site-specific consultation identifies alternative ways to achieve appropriate protection. PEIS Mitigation Measures adopted by this Record of Decision also require implementation of certain of these conservation measures "When necessary to protect Special Status plant/fish and other aquatic organisms/wildlife species…." (see Attachment A).

Conservation Measures for Birds

Conservation Measures for the California Brown Pelican
Although treatment activities are unlikely to negatively affect the brown pelican or its habitat, extra steps could be taken by the BLM to ensure that herbicide treatments conducted in brown pelican wintering habitat did not result in negative effects to the species:

- If feasible, conduct vegetation treatments in brown pelican wintering habitat outside the period when pelicans are likely to be present.
- If herbicide treatments in brown pelican habitats must be conducted during the wintering period:
  - Do not use 2,4-D in pelican wintering habitat.
  - Prior to conducting herbicide treatments on pelican wintering habitat, survey the area for pelicans. Wait for pelicans to leave the area before spraying.
  - Do not broadcast spray clopyralid, glyphosate, hexazinone, picloram, or triclopyr in pelican wintering habitats.
  - If broadcast spraying imazapyr or metsulfuron methyl in pelican wintering habitats, use the typical rather than the maximum application rate.
  - If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in brown pelican wintering habitat, utilize the typical, rather than the maximum, application rate.

Conservation Measures for the Western Snowy Plover
The following conservation measures are the minimum steps required of the BLM to ensure that treatment methods would be unlikely to negatively affect TEP species. Survey for western snowy plovers (and their nests) in suitable areas on proposed treatment areas, prior to developing treatment plans.

- Do not treat vegetation in nesting areas during the breeding season (as determined by a qualified biologist).
- Do not allow human (or domestic animal) disturbance within ¼ mile of nest sites during the nesting period.
- Ensure that nest sites are at least 1 mile from downwind smoke effects during the nesting period.
- Conduct beachgrass treatments during the plant's flowering stage, during periods of active growth.
- Closely follow all application instructions and use restrictions on herbicide labels; in wetland habitats use only those herbicides that are approved for use in wetlands.
- Do not use 2,4-D in western snowy plover habitats; do not broadcast spray 2,4-D within ¼ mile of western snowy plover habitat.

- Where feasible, avoid use of the following herbicides in western snowy plover habitat: clopyralid, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.
- Do not broadcast spray clopyralid, diuron, glyphosate, hexazinone, picloram, or triclopyr in western snowy plover habitat; do not broadcast spray these herbicides in areas adjacent to western snowy plover habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr or metsulfuron methyl in or adjacent to western snowy plover habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in western snowy plover habitat, utilize the typical, rather than the maximum, application rate.

Additional, project-specific conservation measures would be developed at the local level, as appropriate.

Conservation Measures for the Northern Spotted Owl and Marbled Murrelet

The following programmatic-level conservation measures are the minimum steps required of the BLM to ensure that treatment methods would be unlikely to negatively affect the marbled murrelet or northern spotted owl.

- Survey for marbled murrelets and northern spotted owls (and their nests) on suitable proposed treatment areas, prior to developing treatment plans.
- Delineate a 100-acre buffer around nests prior to mechanical treatments or prescribed burns.
- Do not allow human disturbance within ¼ mile of nest sites during the nesting period (as determined by a local biologist).
- Ensure that nest sites are at least 1 mile from downwind smoke effects during the nesting period.
- Protect and retain the structural components of known or suspected nest sites during treatments; evaluate each nest site prior to treatment and protect it in the most appropriate manner.
- Maintain sufficient dead and down material during treatments to support spotted owl prey species (minimums would depend on forest types, and should be determined by a wildlife biologist).
- Do not conduct treatments that alter forest structure in old-growth stands.
- Do not use 2,4-D in marbled murrelet or northern spotted owl habitats; do not broadcast spray 2,4-D within ¼ mile of marbled murrelet or northern spotted owl habitat.
- Where feasible, avoid use of the following herbicides in northern spotted owl habitat: bromacil, clopyralid, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.
- Where feasible, avoid use of the following herbicides in marbled murrelet habitat: clopyralid, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.
- Do not broadcast spray clopyralid, glyphosate, hexazinone, picloram, or triclopyr in marbled murrelet or northern spotted owl habitat; do not broadcast spray these herbicides in areas adjacent to marbled murrelet or northern spotted owl habitat under conditions when spray drift onto the habitat is likely.
- Do not broadcast spray diuron in northern spotted owl habitat; do not broadcast spray these herbicides in areas adjacent to northern spotted owl habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr or metsulfuron methyl in or adjacent to marbled murrelet or northern spotted owl habitat, apply at the typical, rather than the maximum, application rate.
- If broadcast spraying bromacil in or adjacent to northern spotted owl habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in marbled murrelet or northern spotted owl habitat, utilize the typical, rather than the maximum, application rate.
- Follow all instructions and Standard Operating Procedures to avoid spill and direct spray scenarios into aquatic habitats, particularly marine habitats where murrelets forage for prey.

Additional conservation measures would be developed, as necessary, at the project level to fine-tune protection of these species.

Conservation Measures for Aquatic Animals

Many local BLM offices already have management plans in place that ensure the protection of these species, and have completed formal or informal consultations on similar treatment activities. These consultations have identified protection zones alongside aquatic habitats that support these species. The conservation measures discussed below are probable steps required of the BLM to ensure that vegetation treatments would minimize impacts to TEP species. These conservation measures are intended as broad guidance at the programmatic level; further analysis of treatment programs and species habitats at the local level is required to better reduce potential impacts from proposed vegetation treatments. Completion of consultation at the local level will fine-tune conservation measures associated with treatment activities and ensure consistency of the treatments with ESA requirements.

The aquatic TEP species considered in the programmatic BA for the PEIS (and applicable to the Oregon Record of Decision) occur in varied habitats, over a large geographic area. The conservation measures guidance presented below is intended to apply broadly to aquatic species and habitats over the entire region covered by this BA, based on the common features found in nearly all aquatic and riparian habitats. Some species with alternate or unusual habitat requirements may require additional conservation measures to ensure a Not Likely to Adversely Affect determination at the local level. Such additional conservation measure are outside the scope of this BA, and will be completed at the local level.

Some local BLM plans have delineated protected riparian areas, or portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines (USDA Forest Service 1995). These protected riparian areas include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by 1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; 2) providing root strength for channel stability; 3) shading the stream; and 4) protecting water quality. Examples of protected riparian areas are the BLM's Riparian Reserves of the Pacific Northwest and the Interior Columbia Basin, as described in the Aquatic Conservation Strategy (USDA Forest Service and USDI BLM 1994). The term "riparian areas," as used in the conservation measures guidance below, refers to riparian protected areas, wherever such designations apply. However, since not all local BLM plans have made such designations, "riparian areas," when the above-mentioned use is not applicable, generally refers to: 1) for streams, the stream channel and the extent of the 100-year floodplain; and 2) for wetlands, ponds, and lakes, and other aquatic habitats, the area extending to the edges of the riparian vegetation, provided it is no less than the minimum buffer distance for a given site established by local BLM biologists.

Conservation Measures for Site Access and Fueling/Equipment Maintenance
For treatments occurring in watersheds with TEP species or designated or undesignated critical habitat (i.e., unoccupied habitat critical to species recovery):

- Where feasible, access work site only on existing roads, and limit all travel on roads when damage to the road surface will result or is occurring.
- Where TEP aquatic species occur, consider ground-disturbing activities on a case by case basis, and implement Standard Operating Procedures to ensure minimal erosion or impact to the aquatic habitat.
- Within riparian areas, do not use vehicle equipment off of established roads.
- Outside of riparian areas, allow driving off of established roads only on slopes of 20% or less.

- Except in emergencies, land helicopters outside of riparian areas.
- Within 150 feet of wetlands or riparian areas, do not fuel/refuel equipment, store fuel, or perform equipment maintenance (locate all fueling and fuel storage areas, as well as service landings outside of protected riparian areas).
- Prior to helicopter fueling operations prepare a transportation, storage, and emergency spill plan and obtain the appropriate approvals; for other heavy equipment fueling operations use a slip-tank not greater than 250 gallons; Prepare spill containment and cleanup provisions for maintenance operations.

Conservation Measures Related to Revegetation Treatments

- Outside riparian areas, avoid hydro-mulching within buffer zones established at the local level. This precaution will limit adding sediments and nutrients and increasing water turbidity.
- Within riparian areas, engage in consultation at the local level to ensure that revegetation activities incorporate knowledge of site-specific conditions and project design.

Conservation Measures Related to Herbicide Treatments

The complexity of this action within riparian areas requires local consultation, which will be based on herbicide risk assessments.

Possible Conservation Measures:

- Maintain equipment used for transportation, storage, or application of chemicals in a leak proof condition.
- Do not store or mix herbicides, or conduct post-application cleaning within riparian areas.
- Ensure that trained personnel monitor weather conditions at spray times during application.
- Strictly enforce all herbicide labels.
- Do not broadcast spray within 100 feet of open water when wind velocity exceeds 5 mph.
- Do not broadcast spray when wind velocity exceeds 10 mph.
- Do not spray if precipitation is occurring or is imminent (within 24 hours).
- Do not spray if air turbulence is sufficient to affect the normal spray pattern.
- Do not broadcast spray herbicides in riparian areas that provide habitat for TEP aquatic species. Appropriate buffer distances should be determined at the local level to ensure that overhanging vegetation that provides habitat for TEP species is not removed from the site. Buffer distances provided as conservation measures in the assessment of effects to plants (Chapter 4 of this BA) and fish and aquatic invertebrates should be consulted as guidance (Table A2-3). (Note: the Forest Service did not determine appropriate buffer distances for TEP fish and aquatic invertebrates when evaluating herbicides in Forest Service Environmental Risk Assessments; buffer distances were only determined for non-TEP species.)
- Do not use fluridone, terrestrial formulations of glyphosate, or triclopyr BEE, to treat aquatic vegetation in habitats where aquatic TEP species occur or may potentially occur.
- Avoid using glyphosate formulations that include R-11[1] in the future, and either avoid using any formulations with POEA, or seek to use the formulation with the lowest amount of POEA available, to reduce risks to aquatic organisms.
- Follow all instructions and Standard Operating Procedures to avoid spill and direct spray scenarios into aquatic habitats. Special care should be followed when transporting and applying 2,4-D, bromacil, clopyralid, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr.
- Do not broadcast spray diuron, glyphosate, picloram, or triclopyr BEE in upland habitats adjacent to

[1] The BLM does not use R-11.

aquatic habitats that support (or may potentially support) aquatic TEP species under conditions that would likely result in off-site drift.

- In watersheds that support TEP species or their habitat, do not apply bromacil, diuron, tebuthiuron, or triclopyr BEE in upland habitats within ½ mile upslope of aquatic habitats that support aquatic TEP species under conditions that would likely result in surface runoff.

Numerous conservation measures were developed from information provided in ERAs. The measures listed below would apply to TEP fish and other aquatic species at the programmatic level in all 17 western states. However, local BLM field offices could use interactive spreadsheets and other information contained in the ERAs to develop more site-specific conservation measures and management plans based on local conditions (soil type, rainfall, vegetation type, and herbicide treatment method). It is possible that conservation measures would be less restrictive than those listed below if local site conditions were evaluated using the ERAs when developing project-level conservation measures.

Local BLM offices should design conservation measures for treatment plans using the above conservation measures as guidance, but altering it as needed based on local conditions and the habitat needs of the particular TEP aquatic species that could be affected by the treatments. Locally-focused conservation measures would be necessary to reduce or avoid potential impacts such that a Not Likely to Adversely Affect determination would be reached during the local-level consultation process.

Conservation Measures for Butterflies and Moths

Many local BLM offices already have management plans in place that ensure the protection of these species during activities on public lands. The following conservation measures are the minimum steps required of the BLM to ensure that treatment methods would be unlikely to negatively affect TEP species.
Each local BLM office is required to draw up management plans related to treatment activities that identify any TEP butterfly or moth species or their critical habitat that are present in the proposed treatment areas, as well as the measures that will be taken to protect these species.
Management plans should, at a minimum, follow this general guidance:

- Use an integrated pest management approach when designing programs for managing pest outbreaks.
- Survey treatment areas for TEP butterflies/moths and their host/nectar plants (suitable habitat) at the appropriate times of year.
- Minimize the disturbance area with a pre-treatment survey to determine the best access routes. Areas with butterfly/moth host plants and/or nectar plants should be avoided.
- Minimize mechanical treatments and OHV activities on sites that support host and/or nectar plants.
- Carry out vegetation removal in small areas, creating openings of 5 acres or less in size.
- Avoid burning all of a species' habitat in any 1 year. Limit area burned in butterfly/moth habitat in such a manner that the unburned units are of sufficient size to provide a refuge for the population until the burned unit is suitable for recolonization. Burn only a small portion of the habitat at any one time, and stagger timing so that there is a minimum 2-year recovery period before an adjacent parcel is burned.
- Where feasible, mow or wet around patches of larval host plants within the burn unit to reduce impacts to larvae.
- In TEP butterfly/moth habitat, burn while butterflies and/or moths of concern are in the larval stage, when the organisms would receive some thermal protection.
- Wash equipment before it is brought into the treatment area.
- Use a seed mix that contains host and/or nectar plant seeds for road/site reclamation.

- To protect host and nectar plants from herbicide treatments, follow recommended buffer zones and other conservation measures for TEP plants species when conducting herbicide treatments in areas where populations of host and nectar plants occur.
- Do not broadcast spray herbicides in habitats occupied by TEP butterflies or moths; do not broadcast spray herbicides in areas adjacent to TEP butterfly/moth habitat under conditions when spray drift onto the habitat is likely.
- Do not use 2,4-D in TEP butterfly/moth habitat.
- When conducting herbicide treatments in or near habitat used by TEP butterflies or moths, avoid use of the following herbicides, where feasible: bromacil, clopyralid, diuron, glyphosate, hexazinone, imazapyr, picloram, tebuthiuron, and triclopyr.
- If conducting manual spot applications of diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr to vegetation in TEP butterfly or moth habitat, utilize the typical, rather than the maximum, application rate.

Conservation Measures for Mammals

Conservation Measures for the Gray Wolf
Although the proposed vegetation treatments would not be likely to have negative effects on wolves or their habitat, the following programmatic-level conservation measures are recommended to ensure protection of the species. Additional or more specific guidance would also be provided at the project level, as appropriate.

- Avoid human disturbance and/or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist).
- Avoid human disturbance and/or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist).
- Do not use 2,4-D in areas where gray wolves are known to occur; do not broadcast spray within ¼ mile of areas where gray wolves are known to occur.
- Where feasible, avoid use of the following herbicides in gray wolf habitat: bromacil, clopyralid, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr.
- Do not broadcast spray clopyralid, diuron, glyphosate, hexazinone, picloram, or triclopyr in gray wolf habitat; do not broadcast spray these herbicides in areas adjacent to gray wolf habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying bromacil, imazapyr, or metsulfuron methyl in or near gray wolf habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in gray wolf habitat, utilize the typical, rather than the maximum, application rate.

Conservation Measures for the Columbian white-tailed deer (listed populations suspected on Salem District only)
The projected short-term negative effects of vegetation treatments on the Columbian white-tailed deer could be avoided by implementing the following programmatic-level conservation measures.

- Prior to treatments, survey for evidence of white-tailed deer use of areas in which treatments are proposed to occur.
- Address the protection of Columbian white-tailed deer in local management plans developed in association with treatment programs.
- In areas that are likely to support Columbian white-tailed deer, protect riparian areas from degradation by avoiding them altogether, or utilizing Standard Operating Procedures. Consult Chapter 5 for appropriate conservation measures to be used in protected riparian areas.
- In habitats used by deer, conduct treatments that use domestic animals during the plant growing season,

and remove the animals after clearing has been achieved.

- Do not use domestic animals to control weeds in woodland habitats utilized by Columbian white-tailed deer.
- In areas where Columbian white-tailed deer occur, or may possibly occur, avoid the use of fences to keep domestic animals out of sensitive habitats or to otherwise restrict their movement (fence accidents are associated with deer mortality).
- Avoid burning in deer habitats during the fawning season.
- Closely follow all application instructions and use restrictions on herbicide labels; in riparian habitats use only those herbicides that are approved for use in riparian areas.
- Avoid broadcast spray treatments in areas where Columbian white-tailed deer are known to forage.
- Do not use 2,4-D in Columbian white-tailed deer habitats; do not broadcast spray 2,4-D within ¼ mile of Columbian white-tailed deer habitat.
- Where feasible, avoid use of the following herbicides in Columbian white-tailed deer habitat: bromacil, clopyralid, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, Overdrive®, picloram, tebuthiuron, and triclopyr.
- Do not broadcast spray bromacil, clopyralid, diuron, glyphosate, hexazinone, Overdrive®, picloram, or triclopyr in Columbian white-tailed deer habitat; do not broadcast spray these herbicides in areas adjacent to Columbian white-tailed deer habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr, metsulfuron methyl, or tebuthiuron in or near Columbian white-tailed deer habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, imazapyr, metsulfuron methyl, tebuthiuron, or triclopyr to vegetation in Columbian white-tailed deer habitat, utilize the typical, rather than the maximum, application rate.

In addition, site-specific and project specific conservation measures would need to be developed by local BLM offices to ensure complete protection of the Columbian white-tailed deer.

Conservation Measures for Plants

As dictated in BLM Manual 6840 (Special Status Species Management), local BLM offices are required to develop and implement management plans and programs that will conserve listed species and their habitats. In addition, NEPA documentation related to treatment activities (i.e., projects) will be prepared that identify any TEP plant species or their critical habitat that are present in the proposed treatment areas, and that list the measures that will be taken to protect them.

Many local BLM offices already have management plans in place that ensure the protection of these plant species during activities on public land. However, a discussion of these existing plans is outside the scope of the programmatic BA for the PEIS. The following general guidance applies to all management plans developed at the local level.

Required steps include the following:

- A survey of all proposed action areas within potential habitat by a botanically qualified biologist, botanist, or ecologist to determine the presence/absence of the species.
- Establishment of site-specific no activity buffers by a qualified botanist, biologist, or ecologist in areas of occupied habitat within the proposed project area. To protect occupied habitat, treatment activities would not occur within these buffers.
- Collection of baseline information on the existing condition of TEP plant species and their habitats in the proposed project area.

- Establishment of pre-treatment monitoring programs to track the size and vigor of TEP populations and the state of their habitats. These monitoring programs would help in anticipating the future effects of vegetation treatments on TEP plant species.
- Assessment of the need for site revegetation post treatment to minimize the opportunity for noxious weed invasion and establishment.

At a minimum, the following must be included in all management plans:

- Given the high risk for damage to TEP plants and their habitat from burning, mechanical treatments, and use of domestic animals to contain weeds, none of these treatment methods should be utilized within 330 feet of sensitive plant populations UNLESS the treatments are specifically designed to maintain or improve the existing population.
- Off-highway use of motorized vehicles associated with treatments should be avoided in suitable or occupied habitat.
- Biological control agents (except for domestic animals) that affect target plants in the same genus as TEP species must not be used to control target species occurring within the dispersal distance of the agent.
- Prior to use of biological control agents that affect target plants in the same family as TEP species, the specificity of the agent with respect to factors such as physiology and morphology should be evaluated, and a determination as to risks to the TEP species made.
- Post-treatment monitoring should be conducted to determine the effectiveness of the project.

In addition, the following guidance must be considered in all management plans in which herbicide treatments are proposed to minimize or avoid risks to TEP species. The exact conservation measures to be included in management plans would depend on the herbicide that would be used, the desired mode of application, and the conditions of the site. Given the potential for off-site drift and surface runoff, populations of TEP species on lands not administered by the BLM would need to be considered if they are located near proposed herbicide treatment sites.

- Herbicide treatments should not be conducted in areas where TEP plant species may be subject to direct spray by herbicides during treatments.
- Applicators should review, understand, and conform to the "Environmental Hazards" section on herbicide labels (this section warns of known pesticide risks and provides practical ways to avoid harm to organisms or the environment).
- To avoid negative effects to TEP plant species from off-site drift, surface runoff, and/or wind erosion, suitable buffer zones should be established between treatment sites and populations (confirmed or suspected) of TEP plant species, and site-specific precautions should be taken (refer to the guidance provided below).
- Follow all instructions and Standard Operating Procedures to avoid spill and direct spray scenarios into aquatic habitats that support TEP plant species.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.

The following conservation measures refer to sites where broadcast spraying of herbicides, either by ground or aerial methods, is desired. Manual spot treatment of undesirable vegetation can occur within the listed buffer zones if it is determined by local biologists that this method of herbicide application would not pose risks to TEP plant species in the vicinity. Additional precautions during spot treatments of vegetation within habitats where TEP plant species occur should be considered while planning local treatment programs, and should be included as conservation measures in local-level NEPA documentation.

The buffer distances provided below are conservative estimates, based on the information provided by ERAs, and are designed to provide protection to TEP plants. Some ERAs used regression analysis to predict the smallest buffer distance to ensure no risks to TEP plants. In most cases, where regression analyses were not performed, suggested buffers extend out to the first modeled distance from the application site for which no risks were predicted. In some instances the jump between modeled distances was quite large (e.g., 100 feet to 900 feet). Regression analyses could be completed at the local level using the interactive spreadsheets developed for the ERAs, using information in ERAs and for local site conditions (e.g., soil type, annual precipitation, vegetation type, and treatment method), to calculate more precise, and possibly smaller buffers for some herbicides.

2,4-D

- Because the risks associated with this herbicide were not assessed, do not spray within ½ mile of terrestrial plant species or aquatic habitats where TEP aquatic plant species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- Assess local site conditions when evaluating the risks from surface water runoff to TEP plants located within ½ mile downgradient from the treatment area.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Bromacil

- Do not apply within 1,200 feet of terrestrial TEP plant species.
- If using a low boom at the typical application rate, do not apply within 100 feet of an aquatic habitat in which TEP plant species occur.
- If using a low boom at the maximum application rate or a high boom, do not apply within 900 feet of an aquatic habitat in which TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Chlorsulfuron

- Do not apply by ground methods within 1,200 feet of terrestrial TEP species.
- Do not apply by aerial methods within 1,500 feet of terrestrial TEP species.
- Do not apply by ground methods within 25 feet of aquatic habitats where TEP plant species occur.
- Do not apply by aerial methods at the maximum application rate within 300 feet of aquatic habitats where TEP plant species occur.
- Do not apply by aerial methods at the typical application rate within 100 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Clopyralid

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 900 of terrestrial TEP species.
- Do not apply by ground methods at the typical application rate within ½ mile of terrestrial TEP species.
- Do not apply by aerial methods within ½ mile of terrestrial TEP species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Dicamba

- If using a low boom at the typical application rate, do not apply within 1,050 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 1,050 feet of terrestrial TEP plant species.
- If using a high boom, do not apply within 1,050 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Diflufenzopyr

- If using a low boom at the typical application rate, do not apply within 100 feet of terrestrial TEP plant species.
- If using a high boom, or a low boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- If using a high boom, do not apply within 500 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Diuron

- Do not apply within 1,100 feet of terrestrial TEP species.
- If using a low boom at the typical application rate, do not apply within 900 feet of aquatic habitats where TEP aquatic plant species occur.
- If using a high boom, or a low boom at the maximum application rate, do not apply within 1,100 feet of aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Fluridone

- Since effects on terrestrial TEP plant species are unknown, do not apply within ½ mile of terrestrial TEP species.

Glyphosate

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species.
- Do not apply by ground methods at the typical application rate within 50 feet of terrestrial TEP plant species.
- Do not apply by ground methods at the maximum application rate within 300 feet of terrestrial TEP plant species.
- Do not apply by aerial methods within 300 feet of terrestrial TEP plant species.

Hexazinone

- Since the risks associated with using a high boom or an aerial application are unknown, only apply this herbicide by ground methods using a low boom within ½ mile of terrestrial TEP plant species and aquatic habitats that support aquatic TEP species.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species or aquatic habitats that support aquatic TEP plant species.
- Do not apply by ground methods at the maximum application rate within 900 feet of terrestrial TEP plant species or aquatic habitats that support aquatic TEP plant species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Imazapic

- Do not apply by ground methods within 25 feet of terrestrial TEP species or aquatic habitats where TEP plant species occur.
- Do not apply by helicopter at the typical application rate within 25 feet of terrestrial TEP plant species.
- Do not apply by helicopter at the maximum application rate, or by plane at the typical application rate, within 300 feet of terrestrial TEP plant species.
- Do not apply by plane at the maximum application rate within 900 feet of terrestrial TEP species.
- Do not apply by aerial methods at the maximum application rate within 300 feet of aquatic TEP species.
- Do not apply by aerial methods at the typical application rate within 100 feet of aquatic TEP species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Imazapyr

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Metsulfuron Methyl

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Overdrive® (Diflufenzopyr + Dicamba)

- If using a low boom at the typical application rate, do not apply within 100 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- If using a high boom, do not apply within 900 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Picloram

- Do not apply by ground or aerial methods, at any application rate, within ½ mile of terrestrial TEP plant species.
- Assess local site conditions when evaluating the risks from surface water runoff to TEP plants located within ½ mile downgradient from the treatment area.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Sulfometuron Methyl

- Do not apply by ground or aerial methods within 1,500 feet of terrestrial TEP species.
- Do not apply by ground methods within 900 feet of aquatic habitats where TEP plant species occur, or by aerial methods within 1,500 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Tebuthiuron

- If using a low boom at the typical application rate, do not apply within 25 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 50 feet of terrestrial TEP plant species.
- If using a high boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Triclopyr Acid

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species.
- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications at the maximum application rate of this herbicide within ½ mile of aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species.
- Do not apply by aerial methods at the typical application rate within 500 feet of terrestrial TEP plant species.
- Do not apply by ground or aerial methods at the maximum application rate within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- If applying to aquatic habitats in which aquatic TEP plant species occur, do not exceed the targeted water concentration on the product label.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Triclopyr BEE

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by aerial methods at the typical application rate within 500 feet of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground or aerial methods at the maximum application rate within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

At the local level, the BLM must make a determination as to the suitability of vegetation treatments for the populations of TEP species that are managed by local offices. The following information should be considered: the timing of the treatment in relation to the phenology of the TEP plant species; the intensity of the treatment; the duration of the treatment; and the tolerance of the TEP species to the particular type of treatment to be used. When

information about species tolerance is unavailable or is inconclusive, local offices must assume a negative effect to plant populations, and protect those populations from direct exposure to the treatment in question.

Treatment plans must also address the presence of and expected impacts on noxious weeds on the project site. These plans must be coordinated with BLM weed experts and/or appropriate county weed supervisors to minimize the spread of weeds. In order to prevent the spread of noxious weeds and other unwanted vegetation in occupied or suitable habitat, the following precautions should be taken:

- Cleared areas that are prone to downy brome or other noxious weed invasions should be seeded with an appropriate seed mixture to reduce the probability of noxious weeds or other undesirable plants becoming established on the site.
- Where seeding is warranted, bare sites should be seeded as soon as appropriate after treatment, and at a time of year when it is likely to be successful.
- In suitable habitat for TEP species, non-native species should not be used for revegetation.
- Certified noxious weed seed free seed must be used in suitable habitat, and preference should be given to seeding appropriate plant species when rehabilitation is appropriate.
- Straw and hay bales used for erosion control in suitable habitat must be certified weed- and seed-free.
- Vehicles and heavy equipment used during treatment activities should be washed prior to arriving at a new location to avoid the transfer of noxious weeds.

When BAs are drafted at the local level for treatment programs, additional conservation measures may be added to this list. Where BLM plans that consider the effects of vegetation treatments on TEP plant species already exist, these plans should be consulted, and incorporated (e.g., any guidance or conservation measures they provide) into local level BAs for vegetation treatments.

Table A5-1. State Director's Special Status Species List – Federally Threatened, Endangered, or Proposed, Oregon January 2008

Scientific Name	Common Name		Listed	Critical Habitat	Recovery Plan
Birds					
Endangered					
Pelecanus occidentalis californicus	California brown pelican		1970	None	Final 1983
Threatened					
Brachyramphus marmoratus	Marbled murrelet		1992	Designated 1996	Final 1997
Charadrius alexandrinus nivosus	Western snowy plover *(Pacific Coastal population)*		1993	Designated 2005	Final 2007
Strix occidentalis caurina	Northern spotted owl		1990	Designated 1992	Draft 2007
Fish					
Endangered					
Catostomus microps	Modoc sucker		1985	Designated 1985	None
Chasmistes brevirostris	Shortnose sucker		1988	Proposed 1994	Final 1993
Deltistes luxatus	Lost river sucker		1988	Proposed 1994	Final 1993
Gila boraxobius	Borax lake chub		1980	Final 1982	Final 1987
Oncorhynchus mykiss	Steelhead *(Upper Columbia River)*		1997	Designated 2005	Final 2007
Oncorhynchus tshawytscha	Chinook salmon *(Upper Columbia River Spring run)*		1999	Designated 2005	Final 2007
Threatened					
Catostomus warnerensis	Warner sucker		1985	Designated 1985	Final 1998
Gila bicolor ssp.	Hutton tui chub		1985	None	Final 1998
Oncorhynchus clarki henshawi	Lahontan cutthroat trout		1970	None	Final 1995
Oncorhynchus kisutch	Coho salmon	*(Lower Columbia River)*	2005	None	None
		(Northern CA / Southern Oregon Coast)	1997	Designated 1999	None
Oncorhynchus mykiss	Steelhead	*(Lower Columbia River)*	1998	Designated 2005	None
		(Middle Columbia River)	1999	Designated 2005	None
		(Upper Willamette River)	1999	Designated 2005	None
		(Snake River Basin)	1997	Designated 2005	None
Oncorhynchus tshawytscha	Chinook salmon	*(Lower Columbia River)*	1999	Designated 2005	None
		(Upper Willamette River)	1999	Designated 2005	None
		(Snake River – Fall/Spring/ Summer runs)	1992	Designated 1993	None
Rhinichthys osculus ssp.	Foskett speckled dace		1985	None	Final 1998
Salvelinus confluentus	Bull trout	*(Columbia River)*	1998	Final 2005	Draft 2002
		(Klamath River)	1998	Final 2005	Draft 2002
		(Coastal / Puget Sound)	1999	Final 2005	Draft 2004

Table A5-1. (Continued) State Director's Special Status Species List – Federally Threatened, Endangered, or Proposed, Oregon January 2008

Scientific Name	Common Name	Listed	Critical Habitat	Recovery Plan
Invertebrates				
Endangered				
Plebejus icarioides fenderi	Fender's blue butterfly	2000	Proposed 2005	None
Threatened				
Branchinecta lynchi	Vernal pool fairy shrimp	1994	Designated 2003	Final 2005
Speyeria zerene hippolyta	Oregon silverspot butterfly	1980	Designated 1980	Final 2001
Mammals				
Endangered				
Canis lupus	Gray wolf	2003	None in OR or WA	Final 1987
Odocoileus virginianus leucurus	Columbian white-tailed deer *(Columbia River population)*	1967	None	Final 1983
Threatened				
Lynx canadensis	Canada lynx	2000	Designated 2006	None
Vascular Plants				
Endangered				
Arabis macdonaldiana	Macdonald's rock-cress	1978	None	Final 1984
Arenaria paludicola	Marsh sandwort	1993	None	Final 1998
Astragalus applegatei	Applegate's milk-vetch	1993	None	Final 1998
Erigeron decumbens var. *decumbens*	Willamette valley daisy	2000	Proposed 2005	None
Fritillaria gentneri	Gentner's fritillary	1999	None	Final 2003
Lilium occidentale	Western lily	1994	None	Final 1998
Limnanthes floccosa ssp. *grandiflora*	Large-flowered wooly meadowfoam	2002	None	Draft 2006
Lomatium bradshawii	Bradshaw's desertparsley	1988	None	Final 1993
Lomatium cookii	Cook's lomatium	2002	None	Draft 2006
Plagiobothrys hirtus	Rough popcorn flower	2001	None	Final 2003
Stephanomeria malheurensis	Malheur wire-lettuce	1982	Final 1982	Final 1991
Threatened				
Castilleja levisecta	Golden paintbrush	1997	None	Final 2000
Howellia aquatilis	Water howellia	1994	None	Draft 1996
Lupinus sulphureus ssp. *kincaidii*	Kincaid's lupine	2000	Designated 2006	None
Mirabilis macfarlanei	Macfarlane's four o'clock	1979	None	Final 2000
Sidalcea nelsoniana	Nelson's checkermallow	1993	None	Final 1998
Silene spaldingii	Spalding's catchfly	2001	None	Final 2007
Thelypodium howellii ssp. *spectabilis*	Howell's spectacular thelypody	1999	None	Final 2002

Table A5-2. State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Amphibians	
Aneides flavipunctatus	Black salamander
Ascaphus montanus	Inland tailed frog
Batrachoseps attenuatus	California slender salamander
Batrachoseps wrightorum	Oregon slender salamander
Bufo woodhousii	Woodhouse's toad
Dicamptodon copei	Cope's giant salamander
Plethodon larselli	Larch mountain salamander
Plethodon stormi	Siskiyou mountains salamander
Rana boylii	Foothill yellow-legged frog
Rana luteiventris	Columbia spotted frog (Great Basin population)
Rana pipiens	Northern leopard frog
Rana pretiosa	Oregon spotted frog
Birds	
Agelaius tricolor	Tricolored blackbird
Ammodramus savannarum	Grasshopper sparrow
Bartramia longicauda	Upland sandpiper
Branta canadensis occidentalis	Dusky canada goose
Branta hutchinsii leucopareia	Aleutian canada goose
Bucephala albeola	Bufflehead
Centrocercus urophasianus	Greater sage-grouse
Charadrius alexandrinus nivosus	Western snowy plover (outside Pacific Coastal population)
Coccyzus americanus	Yellow-billed cuckoo
Coturnicops noveboracensis	Yellow rail
Cygnus buccinator	Trumpeter swan
Cypseloides niger	Black swift
Dolichonyx oryzivorus	Bobolink
Egretta thula	Snowy egret
Elanus leucurus	White-tailed kite
Eremophila alpestris strigata	Streaked horned lark
Falco peregrinus anatum	American peregrine falcon
Fratercula cirrhata	Tufted puffin
Haliaeetus leucocephalus	Bald eagle
Histrionicus histrionicus	Harlequin duck
Larus pipixcan	Franklin's gull
Leucosticte atrata	Black rosy finch
Melanerpes lewis	Lewis' woodpecker
Pelecanus erythrorhynchos	American white pelican
Picoides albolarvatus	White-headed woodpecker
Podiceps auritus	Horned grebe
Podiceps grisegena	Red-necked grebe
Pooecetes gramineus affinis	Oregon vesper sparrow
Progne subis	Purple martin
Seiurus noveboracensis	Northern waterthrush
Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Fish	
Catostomus tahoensis	Tahoe sucker
Cottus pitensis	Pit sculpin
Gila alvordensis	Alvord chub
Gila bicolor eurysoma	Sheldon tui chub
Gila bicolor oregonensis	Oregon lakes tui chub
Gila bicolor ssp.	Summer basin tui chub
Gila bicolor ssp.	Catlow tui chub
Gila bicolor thalassina	Goose lake tui chub
Lampetra minima	Miller lake lamprey
Lampetra tridentata ssp.	Goose lake lamprey
Lavinia symmetricus mitrulus	Pit roach
Oncorhynchus clarki lewisi	Westslope cutthroat trout
Oncorhynchus clarkii	Coastal cutthroat trout (Columbia River / SW Washington)
Oncorhynchus keta	Chum salmon (Pacific Coast)
Oncorhynchus kisutch	Coho Salmon (Oregon Coast)
Oncorhynchus mykiss	Steelhead (Klamath Mountains Province)
Oncorhynchus mykiss	Steelhead (Oregon Coast)
Oncorhynchus mykiss	Inland redband trout
Oncorhynchus tshawytscha	Chinook salmon (Southern Oregon / N. California Coast)
Oregonichthys kalawatseti	Umpqua chub
Rhinichthys cataractae ssp.	Millicoma dace
Richardsonius egregius	Lahontan redside shiner
Mammals	
Antrozous pallidus	Pallid bat
Arborimus longicaudus	Oregon red tree vole (NW Oregon, North of Hwy. 20)
Brachylagus idahoensis	Pygmy rabbit (outside Columbia Basin population)
Corynorhinus townsendii	Townsend's big-eared bat
Enhydra lutris	Sea otter
Euderma maculatum	Spotted bat
Gulo gulo luteus	California wolverine
Martes pennanti	Fisher
Myotis thysanodes	Fringed myotis
Odocoileus virginianus leucurus	Columbian white-tailed deer (Douglas County population)
Spermophilus washingtoni	Washington ground squirrel
Vulpes macrotis	Kit fox

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Invertebrates	
Algamorda newcombiana	Newcomb's littorine snail
Allomyia scotti	Scott's apatanian caddisfly
Boloria bellona	Meadow fritillary
Boloria selene	Silver-bordered fritillary
Bombus franklini	Franklin's bumblebee
Callophrys johnsoni	Johnson's hairstreak
Callophrys polios maritima	Hoary elfin
Chloealtis aspasma	Siskiyou short-horned grasshopper
Cicindela hirticollis siuslawensis	Siuslaw sand tiger beetle
Colligyrus sp. nov. 1	Columbia duskysnail
Cryptomastix devia	Puget oregonian
Cryptomastix populi	Hells canyon land snail
Deroceras hesperium	Evening fieldslug
Euphydryas editha taylori	Taylor's checkerspot
Fluminicola insolitus	Donner und blitzen pebblesnail
Fluminicola sp. nov. 11	Nerite pebblesnail
Fluminicola sp. nov. 3	Klamath rim pebblesnail
Gliabates oregonius	Salamander slug
Gonidea angulata	Western ridged mussel
Helisoma newberryi newberryi	Great basin ramshorn
Helminthoglypta hertleini	Oregon shoulderband
Hemphillia glandulosa	Warty jumping-slug
Hesperarion mariae	Tillamook westernslug
Juga hemphilli dallesensis	Dalles juga
Juga hemphilli hemphilli	Barren juga
Juga hemphilli maupinensis	Purple-lipped juga
Lanx klamathensis	Scale lanx
Lanx subrotunda	Rotund lanx
Lygus oregonae	Oregon plant bug
Micracanthia fennica	Harney hot spring shore bug
Monadenia chaceana	Chase sideband
Monadenia fidelis beryllica	Green sideband
Monadenia fidelis celeuthia	Travelling sideband
Monadenia fidelis ssp. nov.	Deschutes sideband
Monadenia fidelis ssp. nov.	Modoc rim sideband
Ochlodes yuma	Yuma skipper
Oreohelix variabilis sp. nov.	Deschutes mountainsnail
Pisidium ultramontanum	Montane peaclam
Plebejus saepiolus littoralis	Insular blue butterfly
Polites mardon	Mardon skipper
Pomatiopsis binneyi	Robust walker
Pomatiopsis californica	Pacific walker
Pristiloma arcticum crateris	Crater lake tightcoil
Pristiloma pilsbryi	Crowned tightcoil
Prophysaon vanattae pardalis	Spotted tail-dropper

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	***Common name***
Pterostichus rothi	Roth's blind ground beetle
Pyrgulopsis intermedia	Crooked creek springsnail
Pyrgulopsis robusta	Jackson lake springsnail
Rhyacophila chandleri	A caddisfly
Rhyacophila haddocki	Haddock's rhyacophilan caddisfly
Saldula villosa	Hairy shore bug
Speyeria coronis coronis	Coronis fritillary
Vespericola sierranus	Siskiyou hesperian
Reptiles	
Actinemys marmorata marmorata	Northwestern pond turtle
Chrysemys picta	Painted turtle
Vascular plants	
Abronia turbinata	Trans montane abronia
Abronia umbellata ssp. *breviflora*	Pink sand-verbena
Achnatherum hendersonii	Henderson's ricegrass
Achnatherum speciosum	Desert needlegrass
Achnatherum wallowaensis	Wallowa ricegrass
Adiantum jordanii	California maiden-hair
Agastache cusickii	Cusick's giant-hyssop
Agoseris elata	Tall agoseris
Agrostis howellii	Howell's bentgrass
Allenrolfea occidentalis	Iodine bush
Allium geyeri var. *geyeri*	Geyer's onion
Amsinckia carinata	Malheur valley fiddleneck
Anemone oregana var. *felix*	Bog anemone
Arabis koehleri var. *koehleri*	Koehler's rockcress
Arabis sparsiflora var. *atrorubens*	Sickle-pod rockcress
Arctostaphylos hispidula	Hairy manzanita
Argemone munita	Prickly-poppy
Arnica viscosa	Shasta arnica
Artemisia arbuscula ssp. *longicaulis*	Lahontan sagebrush
Artemisia campestris ssp. *borealis* var. *wormskioldii*	Northern wormwood
Artemisia papposa	Owyhee sagebrush
Artemisia pycnocephala	Coastal sagewort
Asplenium septentrionale	Grass-fern
Asplenium trichomanes-ramosum	Green spleenwort
Astragalus californicus	California milk-vetch
Astragalus calycosus	King's rattleweed
Astragalus collinus var. *laurentii*	Laurence's milk-vetch
Astragalus cusickii var. *sterilis*	Sterile milk-vetch
Astragalus diaphanus var. *diurnus*	South fork john day milk-vetch
Astragalus gambelianus	Gambel milk-vetch
Astragalus geyeri var. *geyeri*	Geyer's milk-vetch
Astragalus mulfordiae	Mulford's milk-vetch
Astragalus peckii	Peck's milk-vetch
Astragalus platytropis	Broad-keeled milk-vetch
Astragalus tegetarioides	Bastard kentrophyta

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Astragalus tyghensis	Tygh valley milk-vetch
Bensoniella oregana	Bensonia
Botrychium ascendens	Upward-lobed moonwort
Botrychium campestre	Prairie moonwort
Botrychium crenulatum	Crenulate moonwort
Botrychium lineare	Slender moonwort
Botrychium lunaria	Moonwort
Botrychium minganense	Gray moonwort
Botrychium montanum	Mountain grape-fern
Botrychium paradoxum	Twin-spiked moonwart
Botrychium pedunculosum	Stalked moonwort
Botrychium pumicola	Pumice grape-fern
Brodiaea terrestris	Dwarf brodiaea
Bupleurum americanum	Bupleurum
Calamagrostis breweri	Brewer's reedgrass
Callitriche marginata	Winged water-starwort
Calochortus coxii	Crinite mariposa-lily
Calochortus greenei	Greene's mariposa-lily
Calochortus howellii	Howell's mariposa-lily
Calochortus indecorus	Sexton mt. Mariposa-lily
Calochortus longebarbatus var. *peckii*	Peck's mariposa-lily
Calochortus macrocarpus var. *maculosus*	Green-band mariposa-lily
Calochortus monophyllus	One-leaved mariposa-lily
Calochortus nitidus	Broad-fruit mariposa-lily
Calochortus persistens	Siskiyou mariposa-lily
Calochortus umpquaensis	Umpqua mariposa-lily
Calyptridium roseum	Rosy pussypaws
Camassia howellii	Howell's camas
Camissonia graciliflora	Slender-flowered evening-primrose
Camissonia pygmaea	Dwarf evening-primrose
Cardamine pattersonii	Saddle mountain bittercress
Carex abrupta	Abrupt-beaked sedge
Carex atrosquama	Blackened sedge
Carex brevicaulis	Short stemmed sedge
Carex capillaris	Hairlike sedge
Carex capitata	Capitate sedge
Carex comosa	Bristly sedge
Carex constanceana	Constances's sedge
Carex cordillerana	Cordilleran sedge
Carex crawfordii	Crawford's sedge
Carex diandra	Lesser panicled sedge
Carex dioica var. *gynocrates*	Yellow bog sedge
Carex gynodynama	Hairy sedge
Carex idahoa	Idaho sedge
Carex klamathensis sp. nov.	A sedge
Carex lasiocarpa var. *americana*	Slender sedge

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Carex livida	Pale sedge
Carex macrochaeta	Large-awn sedge
Carex media	Intermediate sedge
Carex nardina	Spikenard sedge
Carex nervina	Sierra nerved sedge
Carex pelocarpa	New sedge
Carex pyrenaica ssp. *micropoda*	Pyrenaean sedge
Carex retrorsa	Retrorse sedge
Carex scabriuscula	Siskiyou sedge
Carex scirpoidea var. *stenochlaena*	Alaskan single-spiked sedge
Carex serratodens	Saw-tooth sedge
Carex subnigricans	Dark alpine sedge
Carex vernacula	Native sedge
Castilleja chlorotica	Green-tinged paintbrush
Castilleja fraterna	Fraternal paintbrush
Castilleja mendocinensis	Mendocino coast indian paintbrush
Castilleja rubida	Purple alpine paintbrush
Castilleja thompsonii	Thompson's paintbrush
Caulanthus crassicaulis var. *glaber*	Smooth wild cabbage
Caulanthus major var. *gevadensis*	Slender wild cabbage
Chaenactis xantiana	Desert chaenactis
Chaetadelpha wheeleri	Wheeler's skeleton-weed
Cheilanthes covillei	Coville's lip-fern
Cheilanthes feei	Fee's lip-fern
Cheilanthes intertexta	Coastal lipfern
Chlorogalum angustifolium	Narrow-leaved amole
Cicendia quadrangularis	Timwort
Cimicifuga elata var. *elata*	Tall bugbane
Collomia mazama	Mt. Mazama collomia
Coptis trifolia	Three-leaf goldthread
Cordylanthus maritimus ssp. *palustris*	Point reyes bird's beak
Corydalis aquae-gelidae	Cold-water corydalis
Cryptantha leiocarpa	Seaside cryptantha
Cryptantha milo-bakeri	Milo baker's cryptantha
Cryptogramma stelleri	Steller's rockbrake
Cupressus bakeri	Baker's cypress
Cymopterus acaulis var. *greeleyorum*	Greeley's cymopterus
Cymopterus longipes ssp. *ibapensis*	Ibapah wavewing
Cymopterus nivalis	Snowline spring-parsley
Cymopterus purpurascens	Purple cymopterus
Cyperus acuminatus	Short-pointed cyperus
Cyperus lupulinus ssp. *lupulinus*	A cyperus
Cypripedium fasciculatum	Clustered lady's-slipper
Delphinium bicolor	Flathead larkspur
Delphinium leucophaeum	White rock larkspur
Delphinium nudicaule	Red larkspur

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Delphinium nuttallii	Nutall's larkspur
Delphinium pavonaceum	Peacock larkspur
Dicentra pauciflora	Few-flowered bleedingheart
Dodecatheon austrofrigidum	Frigid shootingstar
Dodecatheon pulchellum var. *shoshonense*	Darkthroat shootingstar
Draba howellii	Howell's whitlow-grass
Elatine brachysperma	Short seeded waterwort
Eleocharis bolanderi	Bolander's spikerush
Epilobium oreganum	Oregon willow-herb
Ericameria arborescens	Golden fleece
Erigeron cervinus	Siskiyou daisy
Erigeron disparipilus	White cushion erigeron
Erigeron engelmannii var. *davisii*	Engelmann's daisy
Erigeron howellii	Howell's daisy
Erigeron latus	Broad fleabane
Erigeron oreganus	Oregon daisy
Eriogonum brachyanthum	Short-flowered eriogonum
Eriogonum chrysops	Golden buckwheat
Eriogonum crosbyae	Crosby's buckwheat
Eriogonum cusickii	Cusick's buckwheat
Eriogonum hookeri	Hooker's wild buckwheat
Eriogonum lobbii	Lobb's buckwheat
Eriogonum prociduum	Prostrate buckwheat
Eriogonum salicornioides	Playa buckwheat
Eriogonum umbellatum var. *glaberrimum*	Green buckwheat
Eriophorum chamissonis	Russet cotton-grass
Erythronium elegans	Coast range fawn-lily
Erythronium howellii	Howell's adder's-tongue
Eschscholzia caespitosa	Gold poppy
Eucephalus gormanii	Gorman's aster
Eucephalus vialis	Wayside aster
Filipendula occidentalis	Queen-of-the-forest
Fritillaria camschatcensis	Black lily
Galium serpenticum ssp. *warnerense*	Warner mt. Bedstraw
Gentiana newberryi	Newberry's gentian
Gentiana plurisetosa	Elegant gentian
Gentiana prostrata	Moss gentian
Gentiana setigera	Waldo gentian
Gentianella tenella ssp. *tenella*	Slender gentian
Geum rossii var. *turbinatum*	Slender-stemmed avens
Gilia millefoliata	Seaside gilia
Gratiola heterosepala	Boggs lake hedge-hyssop
Hackelia bella	Beautiful stickseed
Hackelia cronquistii	Cronquist's stickseed
Hackelia ophiobia	Three forks stickseed
Hastingsia bracteosa var. *atropurpurea*	Purple-flowered rush-lily

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Hastingsia bracteosa var. *bracteosa*	Large-flowered rush-lily
Heliotropium curassavicum	Salt heliotrope
Hieracium horridum	Shaggy hawkweed
Horkelia congesta ssp. *congesta*	Shaggy horkelia
Horkelia tridentata ssp. *tridentata*	Three-toothed horkelia
Hydrocotyle verticillata	Whorled marsh-pennywort
Hymenoxys lemmonii	Cooper's goldflower
Iliamna latibracteata	California globe-mallow
Iris tenax var. *gormanii*	Gorman's iris
Ivesia rhypara var. *shypara*	Grimy ivesia
Ivesia rhypara var. *shellyi*	Shelly's ivesia
Ivesia shockleyi	Shockley's ivesia
Juncus triglumis var. *albescens*	Three-flowered rush
Kalmiopsis fragrans	Fragrant kalmiopsis
Keckiella lemmonii	Bush beardtongue
Kobresia bellardii	Bellard's kobresia
Kobresia simpliciuscula	Simple kobresia
Lasthenia ornduffii	Large-flowered goldfields
Lathyrus holochlorus	Thin-leaved peavine
Lepidium davisii	Davis' peppergrass
Lewisia columbiana var. *columbiana*	Columbia lewisia
Lewisia leana	Lee's lewisia
Limnanthes floccosa ssp. *bellingeriana*	Bellinger's meadow-foam
Limnanthes floccosa ssp. *pumila*	Dwarf meadow-foam
Limnanthes gracilis var. *gracilis*	Slender meadow-foam
Limonium californicum	Western marsh-rosemary
Lipocarpha aristulata	Aristulate lipocarpha
Listera borealis	Northern twayblade
Lobelia dortmanna	Water lobelia
Lomatium engelmannii	Englemann's desert-parsley
Lomatium erythrocarpum	Red-fruited lomatium
Lomatium foeniculaceum ssp. *fimbriatum*	Fringed desert-parsley
Lomatium ochocense	Ochoco lomatium
Lomatium ravenii	Raven's lomatium
Lomatium suksdorfii	Suksdorf's desert parsley
Lomatium watsonii	Watson's desert parsley
Lotus stipularis	Stipuled trefoil
Luina serpentina	Colonial luina
Lupinus lepidus var. *cusickii*	Cusick's lupine
Lupinus nevadensis	Nevada lupine
Lupinus tracyi	Tracy's lupine
Lycopodiella inundata	Bog club-moss
Lycopodium complanatum	Ground cedar
Malacothrix sonchoides	Lyrate malacothrix
Meconella oregana	White fairypoppy
Mentzelia congesta	United blazingstar

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Mentzelia mollis	Smooth mentzelia
Mentzelia packardiae	Packard's mentzelia
Microseris bigelovii	Coast microseris
Microseris howellii	Howell's microseris
Mimulus bolanderi	Bolander's monkeyflower
Mimulus congdonii	Congdon's monkeyflower
Mimulus evanescens	Disappearing monkeyflower
Mimulus hymenophyllus	Membrane-leaved monkeyflower
Mimulus latidens	Broad-toothed monkeyflower
Mimulus tricolor	Three-colored monkey-flower
Muhlenbergia minutissima	Annual dropseed
Navarretia leucocephala ssp. *leucocephala*	White-flowered navarretia
Nemacladus capillaries	Slender nemacladus
Oenothera wolfii	Wolf's evening-primrose
Ophioglossum pusillum	Adder's-tongue
Oxytropis sericea var. *sericea*	White locoweed
Pellaea andromedifolia	Coffee fern
Pellaea bridgesii	Bridges' cliff-brake
Pellaea mucronata ssp. *mucronata*	Bird's-foot fern
Penstemon barrettiae	Barrett's penstemon
Penstemon glaucinus	Blue-leaved penstemon
Penstemon peckii	Peck's penstemon
Perideridia erythrorhiza	Red-rooted yampah
Phacelia argentea	Silvery phacelia
Phacelia gymnoclada	Naked-stemmed phacelia
Phacelia inundata	Playa phacelia
Phacelia leonis	Siskiyou phacelia
Phacelia lutea var. *mackenzieorum*	Mackenzie's phacelia
Phacelia minutissima	Dwarf phacelia
Phlox hendersonii	Henderson's phlox
Phlox multiflora	Many-flowered phlox
Physaria chambersii	Chambers' twinpod
Pilularia americana	American pillwort
Plagiobothrys austiniae	Austin's plagiobothrys
Plagiobothrys figuratus ssp. *corallicarpus*	Coral seeded allocarya
Plagiobothrys greenei	Greene's popcorn flower
Plagiobothrys lamprocarpus	Shiny-fruited popcorn flower
Plagiobothrys salsus	Desert allocarya
Platanthera obtusata	Small northern bog-orchid
Pleuropogon oregonus	Oregon semaphoregrass
Poa rhizomata	Timber bluegrass
Poa unilateralis	San francisco bluegrass
Pogogyne floribunda	Profuse-flowereed mesa mint
Polystichum californicum	California sword-fern
Potamogeton diversifolius	Rafinesque's pondweed
Pyrrocoma racemosa var. *racemosa*	Racemose pyrrocoma

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	***Common name***
Pyrrocoma radiata	Snake river goldenweed
Rafinesquia californica	California chicory
Ranunculus austrooreganus	Southern oregon buttercup
Ranunculus triternatus	Dalles mt. Buttercup
Rhamnus ilicifolia	Redberry
Rhynchospora alba	White beakrush
Ribes divaricatum var. *pubiflorum*	Straggly gooseberry
Romanzoffia thompsonii	Thompson's mistmaiden
Rorippa columbiae	Columbia cress
Rotala ramosior	Lowland toothcup
Rubus bartonianus	Bartonberry
Salix farriae	Farr's willow
Salix wolfii	Wolf's willow
Saxifraga adscendens ssp. *oregonensis*	Wedge-leaf saxifrage
Saxifragopsis fragarioides	Joint-leaved saxifrage
Scheuchzeria palustris var. *americana*	Scheuchzeria
Schoenoplectus subterminalis	Water clubrush
Scirpus pendulus	Drooping bulrush
Sedum moranii	Rogue river stonecrop
Senecio ertterae	Ertter's senecio
Sericocarpus rigidus	White-topped aster
Sesuvium verrucosum	Verrucose sea-purslane
Sidalcea hickmanii ssp. nov.	Hickman's checkerbloom
Sidalcea hirtipes	Bristly-stemmed sidalcea
Sidalcea malviflora ssp. *patula*	Coast checker bloom
Silene hookeri ssp. *bolanderi*	Bolander's catchfly
Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass
Sisyrinchium sarmentosum	Pale blue-eyed grass
Solanum parishii	Parish's horse-nettle
Sophora leachiana	Western sophora
Stanleya confertiflora	Biennial stanleya
Stellaria humifusa	Creeping chickweed
Streptanthus glandulosus	Common jewel flower
Streptanthus howellii	Howell's streptanthus
Streptopus streptopoides	Kruhsea
Suksdorfia violacea	Violet suksdorfia
Sullivantia oregana	Oregon sullivantia
Symphoricarpos longiflorus	Long-flowered snowberry
Talinum spinescens	Spinescent fameflower
Thalictrum alpinum	Alpine meadowrue
Thelypodium brachycarpum	Short-podded thelypody
Thelypodium eucosmum	Arrow-leaf thelypody
Townsendia montana	Mountain townsendia
Townsendia parryi	Parry's townsendia
Trifolium douglasii	Douglas' clover

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	*Common name*
Trifolium leibergii	Leiberg's clover
Trifolium owyheense	Owyhee clover
Trillium kurabayashii	Siskiyou trillium
Trollius laxus var. *albiflorus*	American globeflower
Utricularia gibba	Humped bladderwort
Utricularia minor	Lesser bladderwort
Utricularia ochroleuca	Northern bladderwort
Viola primulifolia ssp. *occidentalis*	Western bog violet
Wolffia borealis	Dotted water-meal
Wolffia columbiana	Columbia water-meal
Zigadenus fontanus	Small-flowered death camas
Bryophytes	
Andreaea schofieldiana	Moss
Barbilophozia lycopodioides	Liverwort
Bryum calobryoides	Moss
Calypogeia sphagnicola	Liverwort
Campylopus schmidii	Moss
Chiloscyphus gemmiparus	Liverwort
Codriophorus depressus	Moss
Cryptomitrium tenerum	Liverwort
Diplophyllum plicatum	Liverwort
Encalypta brevicollis	Moss
Encalypta brevipes	Moss
Encalypta intermedia	Moss
Entosthodon fascicularis	Moss
Ephemerum crassinervium	Moss
Gymnomitrion concinnatum	Liverwort
Helodium blandowii	Moss
Herbertus aduncus	Liverwort
Iwatsukiella leucotricha	Moss
Jungermannia polaris	Liverwort
Kurzia makinoana	Liverwort
Limbella fryei	Moss
Lophozia laxa	Liverwort
Meesia uliginosa	Moss
Metzgeria violacea	Liverwort
Orthodontium pellucens	Moss
Peltolepis quadrata	Liverwort
Polytrichum sphaerothecium	Moss
Porella bolanderi	Liverwort
Pseudocalliergon trifarium	Moss
Ptilidium pulcherrimum	Liverwort
Rhizomnium nudum	Moss
Rhytidium rugosum	Moss
Schistidium cinclidodonteum	Moss
Schistostega pennata	Moss

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	***Common name***
Splachnum ampullaceum	Moss
Tayloria serrata	Moss
Tetraphis geniculata	Moss
Tetraplodon mnioides	Moss
Tomentypnum nitens	Moss
Tortula mucronifolia	Moss
Trematodon boasii	Moss
Tritomaria exsectiformis	Liverwort
Fungi	
Albatrellus avellaneus	
Alpova alexsmithii	
Arcangeliella camphorata	
Boletus pulcherrimus	
Bridgeoporus nobilissimus	
Chamonixia caespitosa	
Choiromyces venosus	
Cortinarius barlowensis	
Cudonia monticola	
Cystangium idahoensis	
Dermocybe humboldtensis	
Destuntzia rubra	
Gastroboletus imbellus	
Gastroboletus vividus	
Gomphus kauffmanii	
Gymnomyces fragrans	
Gymnomyces nondistincta	
Helvella crassitunicata	
Leucogaster citrinus	
Mythicomyces corneipes	
Octaviania macrospora	
Otidea smithii	
Phaeocollybia californica	
Phaeocollybia dissiliens	
Phaeocollybia gregaria	
Phaeocollybia olivacea	
Phaeocollybia oregonensis	
Phaeocollybia pseudofestiva	
Phaeocollybia scatesiae	
Phaeocollybia sipei	
Phaeocollybia spadicea	
Pseudorhizina californica	
Ramaria amyloidea	
Ramaria gelatiniaurantia	
Ramaria largentii	
Ramaria rubella var. *blanda*	
Ramaria spinulosa var. diminutiva	

Table A5-2. (Continued) State Director's Special Status Species List – Bureau Sensitive, January 2008, Oregon BLM

Scientific name	Common name
Rhizopogon chamaleontinus	
Rhizopogon ellipsosporus	
Rhizopogon exiguus	
Rhizopogon inquinatus	
Sowerbyella rhenana	
Stagnicola perplexa	
Thaxterogaster pavelekii	
Lichens	
Bryoria pseudocapillaris	
Bryoria spiralifera	
Bryoria subcana	
Calicium adspersum	
Chaenotheca subroscida	
Dermatocarpon meiophyllizum	
Erioderma sorediatum	
Heterodermia leucomela	
Heterodermia sitchensis	
Hypogymnia duplicata	
Hypotrachyna revoluta	
Leioderma sorediatum	
Leptogium burnetiae	
Leptogium cyanescens	
Lobaria linita	
Microcalicium arenarium	
Niebla cephalota	
Pannaria rubiginosa	
Pilophorus nigricaulis	
Pseudocyphellaria mallota	
Ramalina pollinaria	
Stereocaulon spathuliferum	
Teloschistes flavicans	
Texosporium sancti-jacobi	
Tholurna dissimilis	
Usnea nidulans	

Attachment C – U.S. Fish and Wildlife Service Consultation Letter

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503) 231-6179 FAX: (503) 231-6195

Reply To: 8330.I0173(10)
File Name: PIC_BLM_Herbicides.doc
TS Number: 09-1603/10-1350
TAILS: 13420-2010-I-0173
Doc Type: Final

AUG 27 2010

Memorandum

To: Bureau of Land Management, Deputy State Director for Resource Planning, Use and Protection, Portland, Oregon

From: Donald R Progulske for State Supervisor, Oregon Fish & Wildlife Office, Portland, Oregon

RE: Informal consultation on the proposed Bureau of Land Management (BLM) Vegetation Treatments Using Herbicides on BLM Lands in Oregon [FWS *reference*: 13420-2010-I-0173].

This Letter of Concurrence (LOC) is based on our review of the Bureau of Land Management's (BLM) 2010 final Environmental Impact Statement (EIS) for *Vegetation Treatments Using Herbicides on BLM Lands in Oregon* and the 2006 programmatic Biological Assessment (BA) prepared for the national *Vegetation Treatments Using Herbicides on Bureau of Land Management in 17 Western States* programmatic Environmental Impact Statement (PEIS).

The Fish and Wildlife Service's (Service) Washington D.C. office on April 24, 2006 completed an informal section 7 consultation, in accordance with the Endangered Species Act (ESA) of 1973 (as amended (16 U.S.C. 1531 *et seq.*)), for the PEIS and BA. On the national level, the Service concurred with BLM's *May Affect, Not Likely to Adversely Affect* (NLAA) determinations for federally listed species addressed in the BA. The Service's Oregon Fish and Wildlife Office (OFWO) received a request from the BLM's Oregon State Office (OSO) on July 27, 2009 for concurrence on the draft Oregon EIS tiered to the PEIS and BA. In their request, the BLM's OSO determined that the BA adequately addressed the effects of alternatives analyzed in the draft Oregon EIS at the programmatic level and that they are not likely to adversely affect federally listed (threatened/endangered) species in Oregon (Table 1), with the understanding that further analysis and ESA section 7 consultation may be required at the project level if site specific analyses reveal adverse effects for any listed species or effects not accounted for in the national-level BA. We provide further insight about those potential impacts below in this memorandum. The OFWO received the final Oregon EIS on July 30, 2010.

Table 1. Federally listed (threatened/endangered) species and critical habitats addressed in the final Oregon EIS and BA, except as noted.

Common Name	Scientific Name	Listing Status
Mammals		
Gray wolf (Conterminous USA distinct population segment)	*Canis lupus*	E
Canada lynx	*Lynx canadensis*	CH/T
Columbian white-tailed deer (Columbia River distinct population segment)	*Odocoileus virginianus leucurus*	E
Birds		
Marbled murrelet	*Brachyramphus marmoratus*	CH/T
Western snowy (coastal) plover	*Charadrius alexandrinus nivosus*	CH/T
Northern spotted owl	*Strix occidentalis caurina*	CH/T
Fishes		
Modoc sucker	*Catostomus microps*	CH/E
Warner sucker	*Catostomus warnerensis*	CH/T
Shortnose sucker	*Chasmistes brevirostris*	PCH/E
Lost River sucker	*Deltistes luxatus*	PCH/E
Hutton tui chub	*Gila bicolor ssp.*	T
Borax Lake chub	*Gila boraxobius*	CH/E
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	T
Foskett speckled dace	*Rhinichthys osculus ssp.*	T
Bull trout	*Salvelinus confluentus*	CH/T PCH[1]
Invertebrates		
Fender's blue butterfly	*Icaricia icarioides fenderi*	CH/E
Oregon silverspot butterfly	*Speyeria zerene hippolyta*	CH/T
Vernal pool fairy shrimp	*Branchinecta lynchi*	CH/T
Plants		
McDonald's rockcress	*Arabis macdonaldiana*	E
Applegate's milk-vetch	*Astragalus applegatei*	E
Golden paintbrush	*Castilleja levisecta*	T
Willamette daisy	*Erigeron decumbens var. decumbens*	CH[2]/E
Gentner's fritillary	*Fritillaria gentneri*	E
Water howellia	*Howellia aquatilis*	T
Western lily	*Lilium occidentale*	E
Large-flowered woolly meadowfoam	*Limnanthes floccosa ssp. grandiflora*	CH[2]/E
Bradshaw's lomatium	*Lomatium bradshawii*	E
Cook's lomatium	*Lomatium cookii*	CH/E
Kincaid's lupine	*Lupinus sulphureus ssp. kincaidii*	CH/T
MacFarlane's four o'clock	*Mirabilis macfarlanei*	T
Rough popcornflower	*Plagiobothrys hirtus*	E
Nelson's checker-mallow	*Sidalcea nelsoniana*	T
Spalding's catchfly	*Silene spaldingii*	T
Malheur wire-lettuce	*Stephanomeria malheurensis*	CH/E
Howell's spectacular thelypody	*Thelypodium howellii ssp. spectabilis*	T

E – endangered, T – Threatened, CH – Designated critical habitat, PCH – Proposed critical habitat,

[1] - Proposed rule for the revised designation of critical habitat for bull Trout (Federal Register 75: 2270-2431) was completed after the July 27, 2009 request for concurrence by BLM.

[2] - Final critical habitat rule for Cook's lomatium and large-flowered woolly meadowfoam was completed after the July 27, 2009 request for concurrence by BLM.

The selected alternative (modified version of Alternative 4 in the final Oregon EIS) includes the addition of 10 herbicides to be used west of the Cascades and 13 herbicides east of the Cascades (see Table 2). According to the BLM, the four herbicides currently approved for use by the BLM in Oregon (*i.e.,* 2, 4-D, Dicamba, Glyphosate, and Picloram) cannot effectively control many noxious plant species. The BLM also would like to expand the use of these herbicides beyond noxious weed treatments to include: the control of all invasive plants; control of pests and diseases; control of native and other-invasive vegetation in rights-of-way, administrative sites, and recreation sites; and treatment of vegetation to achieve habitat goals specific in interagency Recovery Plans or other plans specifically identified as part of recovery or delisting plans, Conservation Strategies, or Conservation Agreements for federally listed species and other special status species. Herbicides will be applied through a variety of application techniques, depending on management objectives. As addressed in the final Oregon EIS, no aerial application of herbicides will be permitted west of the Cascades. Herbicide use in treatment areas may also be combined with other vegetation control techniques, such as mechanical control, prescribed fire, and biological control with livestock or other agents.

Table 2. List of additional herbicides for use on BLM lands in Oregon.

Herbicide	Use West of the Cascades	Use East of the Cascades
Bromacil		X
Chlorsulfuron		X
Clopyralid	X	X
Dicamba + Diflufenzopyr	X	X
Diuron	X	X
Fluridone	X	X
Hexazinone	X	X
Imazapic	X	X
Imazapyr	X	X
Metsulfuron methyl	X	X
Sulfometuron methyl	X	X
Tebuthiuron		X
Triclopyr	X	X

Based on the above-mentioned documents, the Service concurs with BLM's NLAA determinations at the **programmatic level** for the federally listed species listed in Table 1. The herbicide conservation measures and considerations/requirements in management and treatment plans, as addressed in the final Oregon EIS and BA, should provide sufficient protection for these species to avoid a *May Affect, Likely to Adversely Affect* (LAA) determination for any of these listed species.

However, the Service cautions that effects from the proposed action to the federally listed fish and invertebrates listed in Table 1 may potentially result in LAA determinations when project level analyses are conducted as part of ESA consultations, depending on the treatment locations. For listed fish species and the vernal pool fairy shrimp, this determination is based on the limited Oregon distribution of these species and the lack of wider buffer zones in or near aquatic habitats to prevent adverse affects from herbicide runoff, drift, direct sprays, and accidental spills

For similar reasons stated above for listed fish species, affects to Fender's blue butterfly and Oregon silverspot butterfly may result in LAA determinations at the project level. As stated in the Appendix 5 of the final Oregon EIS under conservation measures for butterflies (page 514),

"each local BLM office is required to draw up management plans related to treatment activities that identify any [listed] butterfly of moth species or their critical habitat that are present in the proposed treatment areas, as well as the measures that will be taken to protect these species." It appears that local site-specific conditions will affect what protection measures will be implemented for these two butterfly species. Conservation measures for egg, larval, and adult life stages are not adequately addressed in the final Oregon EIS and BA to ensure appropriate protection for these two butterfly species. In order to adequately analyze effects to these species, additional local site-specific vegetative treatment information will be needed to ensure their protection, as part of project level ESA consultations, depending on the project location.

This response is prepared in accordance with section 7(a)(2) and 7(c) of the Act, and concludes informal consultation at the programmatic level pursuant to 50 CFR 402. If new information or project modification reveals that the proposed actions may affect listed species in a manner or to the extent not considered in your assessment, or if a new species is listed or critical habitat is designated that may be affected by the actions, project activities should be halted and consultation reinitiated immediately.

If you have any questions regarding this informal consultation, please contact Dan Perritt or Bob Progulske at (503) 231-6179.

cc: Todd Thompson – BLM NRS Restoration Coordinator
cc: Nancy Gilbert, Gary Miller, Laura Todd, Jim Thrailkill, Laurie Sada

Attachment D – National Marine Fisheries Service Consultation Letter

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to NMFS No:
2009/05539

September 1, 2010

Michael J. Haske
Deputy State Director for Resource Planning, Use, and Protection
Bureau of Land Management
Oregon State Office
P.O. Box 2965
Portland, OR 97208

Re: Endangered Species Act Programmatic Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Conservation Recommendations for Vegetation Treatments Using Herbicides on Bureau of Land Management (BLM) Lands Across Nine BLM Districts in Oregon

Dear Mr. Haske:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the proposed treatment of vegetation using herbicides on Bureau of Land Management (BLM) lands in Oregon managed under the Federal Land Policy and Management Act. This Opinion represents NMFS' assessment of the statewide program within which vegetation treatment will be conducted. This consultation does not address the effects of individual, site-specific vegetation treatment conducted by BLM field offices. Site-specific treatments will be addressed in subsequent section 7 consultations.

In this Opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus twhawytscha*), Upper Willamette River (UWR) Chinook salmon, Upper Columbia River (UCR) Chinook salmon, Snake River (SR) spring/summer run Chinook salmon, SR fall run Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), LCR coho salmon (*O. kisutch*), Oregon Coast (OC) coho salmon, Southern Oregon/Northern California Coasts (SONCC) coho salmon, SR sockeye salmon (*O. nerka*), LCR steelhead (*O. mykiss*), UWR steelhead, Middle Columbia River (MCR) steelhead, UCR steelhead, SR steelhead, southern green sturgeon (*Acipenser medirosris*), and southern eulachon (*Thaleichthys pacificus*), or result in the destruction or adverse modification of designated critical habitat for LCR, UWR, UCR, SR spring/summer run, and SR fall-run Chinook salmon; CR chum salmon; SONCC coho salmon; SR sockeye salmon; LCR, UWR, MCR, UCR, and SR steelhead; and southern green sturgeon. Critical habitat for LCR coho salmon and eulachon has not yet been proposed or designated.

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the BLM must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two general conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH in addition to further site-specific evaluations. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, the BLM must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

If you have questions regarding this consultation, please contact Ben Meyer, in the Oregon State Habitat Office, at 503.230.5425.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

cc: Todd Thompson, BLM

Endangered Species Act
Programmatic Biological Opinion

and

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat
Conservation Recommendations

for

Vegetation Treatments Using Herbicides on Bureau of Land Management Lands
Across Nine BLM Districts in Oregon

Lead Action Agency:	Bureau of Land Management
Consultation Conducted By:	National Marine Fisheries Service Northwest Region
Date Issued:	September 1, 2010
Issued by:	for William W. Stelle, Jr. Regional Administrator
NMFS No.:	**2009/05539**

TABLE OF CONTENTS

INTRODUCTION

This document contains a biological opinion (Opinion) that was prepared by National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531, *et seq*.), and implementing regulations at 50 CFR 402.[1] It also contains essential fish habitat (EFH) conservation recommendations prepared by NMFS in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, *et seq*.) and implementing regulations at 50 CFR 600. The Opinion and EFH conservation recommendations are both in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Data Quality Act) (44 U.S.C. 3504 (d)(1) and 3516), and underwent pre-dissemination review. The administrative record for this consultation is on file at the Oregon State Habitat Office in Portland, Oregon.

Background and Consultation History

On November 8, 2005, the Bureau of Land Management (BLM) requested initiation of formal consultation on their proposed use of herbicides on BLM lands in 17 western states. The request for consultation was accompanied by a Vegetation Treatments Using Herbicides on Bureau of Lands Management Lands in 17 Western States Programmatic Draft Environmental Impact Statement (DEIS), a Draft Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report (PER) and a Draft Biological Assessment (BA) for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States.

On June 26, 2007, NMFS issued an Opinion on the effects of the BLM's Vegetation Treatment Program for 17 Western States (NMFS 2007). NMFS concluded that the proposed action was not likely to jeopardize the continued existence of endangered and threatened salmon and trout, and threatened green sturgeon. NMFS also concluded that the proposed action was not likely to destroy or adversely modify designated critical habitat for threatened ESA-listed species. Since this Opinion was completed, Oregon Coast (OC) coho salmon was listed as threatened and critical habitat was designated on February 11, 2008 (73 FR 7816); critical habitat for southern green sturgeon was designated on May 21, 2009 (FR 23822); and eulachon was proposed for listed as threatened on March 13, 2009 (FR 10857).

In June 2007, the BLM published a final environmental impact statement (EIS) (BLM 2007a) and in September 2007, the BLM published the record of decision (BLM 2007b). This document, referred to as the National EIS, outlined treatment priorities, methods and strategies (including an updated list of approved herbicides) and served as a starting point for the BLM's Vegetation Treatments Using Herbicides on BLM Lands in Oregon Project final environmental impact statement (FEIS) (BLM 2010).

On August 5, 2009, NMFS received a letter and the Oregon DEIS from the BLM, requesting initiation of formal consultation under section 7(a)(2) of the ESA, and consultation on EFH

[1] With respect to designated critical habitat, the following analysis relied only on the statutory provisions of the ESA, and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

pursuant to section 305(b) of the MSA on the proposed Vegetation Treatments Using Herbicides on BLM Lands in Oregon under the Federal Land Policy and Management Act of 1976 (FLPMA)(43 U.S.C. 1701 *et seq*.). The alternatives analyzed in the Oregon DEIS are tiered to the selected alternative from the National EIS and the BLM determined that the BA for Vegetation Treatment on Bureau of Land Management Lands in 17 Western States adequately addressed the effects of the alternative analyzed in the Oregon DEIS (BLM 2009). In the letter, the BLM reached an ESA section 7 determination of "may affect, likely to adversely affect" listed Pacific salmon and steelhead. The letter and DEIS did not address the updated status and designated critical habitat for OC coho salmon, designated critical habitat for southern green sturgeon, and the proposed listing for eulachon.

On February 17, 2010 NMFS issued a letter to the BLM stating that there was sufficient information received to initiate consultation. On July 28, 2010, NMFS received a copy of the FEIS (BLM 2010).

Scope of this Biological Opinion. This Opinion is specific to the activities assessed in the FEIS (BLM 2010) and only addresses vegetation treatment methods that are directly related to noxious weed treatments, including the control of all invasive plants; the control of pests and diseases; the control of native and other non-invasive vegetation in rights-of-way, administrative sites, and recreation sites; and, the treatment of vegetation to achieve habitat goals specified in the interagency recovery plans or other plans specifically identified as part of recovery or delisting plans, conservation strategies, or conservation agreements for Federally listed[2] and other special status species (FEIS: 7-8, 31-32). Therefore, vegetation management primarily focused on commercial timber or salvage activities are not covered in this Opinion.

Description of the Proposed Action

Purpose and Need

The following description of the proposed action is summarized from the BLM's Oregon FEIS (BLM 2010).

Invasive plants are continuing to spread at an increasing rate, and for many species, there is no effective means of control currently available to the BLM in Oregon. The ability of non-herbicide methods to effectively meet all vegetation management objectives is limited. Most non-herbicide treatments are generally more expensive than the herbicide treatments, and are limited by access requirements such as slope; many species simply cannot be controlled with manual, mechanical, biological, or other non-herbicide treatments because their roots are deep and readily re-sprout; they are in areas where soil disturbance is not acceptable; access limitations prevent treatment; or they would simply reseed into disturbed sites. For many noxious weeds, the four herbicides currently available to the BLM in Oregon do not result in effective control.

In spite of an aggressive Integrated Vegetation Management program using all available treatment methods, invasive plants are spreading, habitats are being degraded, and fuel buildup is

[2] Federally Listed means designated as threatened or endangered under the Endangered Species Act.

increasing. About 1.2 million of the 15.7 million acres of BLM lands in Oregon are currently infested at some level[3] with noxious weeds, and at least 5 million more are infested with other invasive plants. They are continuing to spread at an estimated rate of 10 to 15 percent per year (Appendix 7 in FEIS), increasing adverse effects to various valued resources. Ecological damage from extensive noxious weed infestations is often permanent. Adverse effects include displacement of native plants; reduction in habitat and forage for wildlife and livestock; loss of Federally Listed and other Special Status species' habitat; increased soil erosion; reduced water quality; reduced soil productivity; reduced wilderness and recreation values; and, changes in the intensity and frequency of fires (USFS 2005). Invasive plants also spread to adjacent non-BLM lands, increasing control costs for affected landowners and degrading land values.

There are also specific management situations where native and other non-invasive vegetation is going untreated or only partially treated because available vegetation management methods are inefficient or costly. The management of encroaching vegetation within road, power line, pipeline, and other rights-of-way and developments is being conducted with non-herbicide methods at a higher cost on BLM lands than on adjacent non-BLM lands where herbicides are available. The additional costs and reduced effectiveness ultimately affect utility subscribers and/or subtract from funds available for other vegetation treatments. Mechanical methods can also spread invasive plants. Western juniper is spreading into other native shrub/grass communities, capturing available soil water, and altering soils in ways that inhibit retention and reestablishment of native plants in those communities. The plant pathogen Sudden Oak Death is getting a foothold in southwest Oregon, threatening to kill tanoaks and other plants in the state, and leading to plant quarantines on a variety of nursery plants.

The overarching context for all of the proposed action is the BLM's Integrated Vegetation Management policy. For invasive plants, this policy emphasizes prevention of noxious weeds and other invasive plants as the first line of defense. Under this policy, the BLM uses a variety of prevention methods including employee and public education, requiring weed-free seed in restoration and other revegetation projects (BLM 2006), encouraging weed-free hay for use by pack stock, and cleaning project vehicles and other equipment before it enters BLM managed lands. Integrated Vegetation Management policy also requires the use of cost-effective methods that pose the least risk to humans, natural and cultural resources, and the environment (BLM 2007). See *Integrated Vegetation Management* in Chapter 3 of the FEIS for additional detail.

Because all other known non-herbicide methods are available and being used to the extent practicable within existing funding and capabilities, the need for more effective control measures translates to a proposal and alternatives to make more herbicides available[4] for use on public lands administered by the BLM in Oregon. The proposed action would make 14 herbicides available to the BLM west of the Cascade mountain range and 17 herbicides available east of the Cascade mountain range[5] (Table 1) in order to better meet their noxious weed and other vegetation management responsibilities. The original proposed action was Alternative 4 of the

[3] Ranging from monocultures to a few plants per acre.
[4] Actual use would depend upon subsequent district or project level analyses and decisions under NEPA.
[5] Districts west of the Cascades are Salem, Eugene, Roseburg, Coos Bay, and Medford. BLM Districts east of the Cascades are Lakeview (including the Klamath Falls Resource Area), Prineville, Burns, and Vale.

FEIS (BLM 2010). However, the proposed action now includes the addition of Diflufenzopyr + Dicamba.[6] These include the four herbicides currently available for noxious weed control.

The proposed herbicides are all included within the 18 herbicides approved in 2007 for use by the BLM in the other 16 western states. Uses would be in compliance with the programmatic environmental impact statement (PEIS) Mitigation Measures and Standard Operating Procedures adopted for use in the 17 western states by the Record of Decision for the PEIS (Appendix 2), as well as by current Department of the Interior and BLM Integrated Vegetation Management policies and priorities. All herbicide uses would comply with all applicable laws and restrictions, and would only be used for the lands and uses for which they are labeled and registered with the State of Oregon.

Proposed Action

Selection of Alternative 4 in the FEIS, as amended by the BLM, as the proposed action would allow the BLM to choose from 14 or 17 herbicides (west and east of the Cascades respectively):

- To treat noxious weeds and other invasive plants as necessary to meet Integrated Vegetation Management objectives
- To treat any vegetation to meet safety and operation objectives in administrative sites, recreation sites, and rights-of-way
- To treat any vegetation as needed to control pests and diseases in state-identified control areas, such as Sudden Oak Death in southwest Oregon
- To treat any vegetation to achieve habitat goals specified in approved recovery plans or other plans specifically identified as part of recovery or delisting plans, conservation strategies, or conservation agreements for federally listed or other special status species

No aerial application would be permitted west of the Cascades.

Administrative sites, recreation sites, and rights-of-way include:

- Linear utility transmission systems, including multi-purpose corridors
- BLM and other authorized road or railroad rights-of-way
- Oil and gas production or gas storage agreement areas and facilities
- Geothermal, wind, or solar energy production areas and facilities[7]
- Pumped storage hydro-power production area and facilities
- BLM-authorized common-material or rock quarries and storage areas (although most vegetation management at such sites is for invasive plant control)
- Federal, State, local or tribal designated fire suppression equipment sites and staging areas including helispots
- Cell phone, microwave, and other transmission sites

[6] Email to Mischa Connine, NMFS, from Todd Thompson, BLM, on August 28, 2010, stating that the BLM is adding Diflufenzopyr + Dicamba to the list of pesticides proposed for use.
[7] As of July 2010, there are no approved wind, solar or pumped storage facilities on Oregon BLM lands, but such projects might be developed in the future. A proposed wind energy project is under consideration on the Baker Resource Area of eastern Oregon.

- Mines
- BLM and Forest Service seed orchards and progeny test sites
- Public purpose lease areas, including airstrips, schools, parks, *etc*.
- Interagency special management areas (*e.g.,* reservoirs, military training)
- Watchable Wildlife, Adventures in the Past, Wild Horse Herd Viewing, Outstanding Natural Areas and other BLM designated interpretive sites
- BLM offices, fire stations, and other facilities
- Developed campgrounds, picnic areas, trails, overlooks, off-highway vehicles (OHVs) staging or parking areas, hang-gliding areas and boat facilities
- Other administrative and operational sites needed for wildfire suppression, law enforcement, search and rescue, inventory, research, resource monitoring or other authorized administrative uses

Description of Herbicide Treatment Methods

Herbicide treatment methods include the application of formulations containing 16 active ingredients (AIs) to treat vegetation on approximately 45,200 acres of BLM-administered lands in Oregon, annually. The BLM proposes to continue to use existing formulations containing 4 active ingredients (2,4-D, dicamba, glyphosate, and picloram), but is also proposing to add 13 new active ingredients (bromacil, chlorsulfuron, clopyralid, diflufenzopyr + dicamba, diuron, fluridone, hexazinone, imazapic, imazapyr, metsulfuron methyl, sulfometuron methyl, tebuthiuron, and triclopyr) to their treatment program (Table 1).

BLM generally uses several formulations of each active ingredient. Table 1 shows the AIs that BLM proposes for use and the projected number of acres that will be treated. BLM also proposes to add adjuvants as tank mixtures to increase the efficiency of the herbicides (Table 2). These active ingredients and formulations could only be applied for uses, and at application rates, specified on the label directions according to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)(P.L. 80-102), as amended.

The BLM determined that the appropriate method for applying herbicides will be dictated by: (1) Pesticide labeling restrictions; (2) treatment objective (*i.e.*, removal or reduction); (3) accessibility, topography, and size of the treatment area; (4) characteristics of the target species and the desired vegetation; (5) location of sensitive areas and potential environmental impacts in the immediate vicinity; (6) anticipated costs; equipment limitations; and (7) meteorological and vegetative conditions of the site.

Application rates will depend on: (1) The requirements printed on the herbicide label; (2) the presence of the target species; (3) the condition of the non-target vegetation; (4) soil type; and (5) depth to the water table, distance to open water sources, riparian areas and/or protected resources. Herbicides may be applied aerially by helicopter or fixed-wing aircraft when very large areas require treatment. Manual applications are used to treat small areas or sites inaccessible by vehicle. Manual spot treatments target individual plants through herbicide injections, applications on cut surfaces, or granular application to the surrounding soil (hand crank granular spreader). Backpack sprayers are used as a means of spot treatment, in which the herbicide applicator directs a spray hose at target plants. Mechanical equipment (a spray boom or

wand attached to a truck, all terrain vehicle (ATV), or other type of vehicle is used to cover a larger number of plants. Mechanical application using truck-mounted spraying is primarily limited to roadsides and flat areas that are accessible. ATVs can treat weeds in areas that are not easily accessible by road, such as hillsides.

Standard Operating Procedures and Potential Mitigation for Vegetation Treatments

The standard operating procedures (SOPs) and potential mitigation for herbicide treatments are described below.

SOPs. The SOPs identified will be used to reduce adverse effects to environmental and human resources from vegetation treatment activities based on guidance in BLM manuals and handbooks, regulations, and standard BLM and industry practices (BLM 1981, BLM 1992a, BLM 1992b, and USDI 1995). The list is not all encompassing, but is designed to give an overview of practices that would be considered when designing and implementing a vegetation treatment project on public lands. Effects described in the FEIS are predicated on application of the SOPs, that a site-specific determination is made that their application is unnecessary to achieve their intended purpose or protection, or that if the parent handbook or policy direction evolves, the new direction would continue to provide the appropriate environmental protections.

General

- Prepare an operational and spill contingency plan in advance of treatment.
- Conduct a pretreatment survey before applying herbicides.
- Select the herbicide that is least damaging to the environment while providing the desired results.
- Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, other ingredients, and tank mixtures.
- Apply the least amount of herbicide needed to achieve the desired result.
- Follow herbicide product label for use and storage.
- Have licensed or certified applicators or State-licensed “trainees” apply herbicides, or they can be applied by BLM employees under the direct supervision of a BLM-certified applicator.
- Use only USEPA-approved herbicides and follow product label directions and “advisory” statements.
- Review, understand, and conform to the “Environmental Hazards” section on the herbicide product label. This section warns of known herbicide risks to the environment and provides practical ways to avoid harm to organisms or to the environment.
- Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas.
- Minimize the size of application area, when feasible.
- Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/ landowners.
- Post treated areas and specify reentry or rest times, if appropriate.
- Notify adjacent landowners prior to treatment, if appropriate.

- Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at http:// www.cdms.net/.
- Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location.
- Avoid accidental direct spray and spill conditions to minimize risks to resources.
- Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence).
- Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground.
- Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent.
- Use drift control agents and low volatile formulations.
- Conduct pre-treatment surveys for sensitive habitat and Special Status species within or adjacent to proposed treatment areas.
- Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation.
- Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species.
- Turn off application equipment at the completion of spray runs and during turns to start another spray run.
- Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide.
- Clean OHVs to remove plant material.

Table 1. Herbicides proposed for use in Oregon and estimated* annual treatment acres west/east** of the Cascades.

Herbicide	Number of Acres Proposed for Annual Treatment
2,4-D	W: 2,300 E: 600
Dicamba	W: 100 E: 1,300
Glyphosate	W: 2,700 E: 1,200
Picloram	W: 500 E: 2,500
Bromacil	W: NA E: 900
Chlorsulfuron	W: NA E: 4,100
Clopyralid	W: 300 E: 2,000
Diflufenzopyr + Dicamba	W: 100 E: 100
Diuron	W: 100 E: 1,300
Fluridone	W: 200 E: 100
Hexazinone	W: 200 E: 100
Imazapic	W: 500 E: 13,500
Imazapyr	W: 1,600 E: 1,000
Metsulfuron methyl	W: 600 E: 2,300
Sulfometuron methyl	W: 100 E: 900
Tebuthiuron	W: NA E: 300
Triclopyr	W: 2,200 E: 1,900
Total	**W: 10,000** **E: 35,200**

* Numbers rounded up to the nearest 100.
** West of the Cascades is indicated with a W; east of the Cascades is indicated with an E.

Table 2. Adjuvants proposed for use with herbicides listed in Table 1. The BLM has suspended the use of the adjuvant, R-11.

Adjuvant Class	Adjuvant Type	Trade Name
Surfactant	Non-ionic	Spec 90/10
Surfactant	Non	Optima
Surfactant	Non	Induce
Surfactant	Non	Actamaster Spray Adjuvant
Surfactant	Non	Actamaster Soluble Spray Adjuvant
Surfactant	Non	Activator 90
Surfactant	Non	LI-700
Surfactant	Non	Spreader 90
Surfactant	Non	UAP Surfactant 80/20
Surfactant	Non	X-77
Surfactant	Non	Cornbelt Premier 90
Surfactant	Non	Spray Activator 85
Surfactant	Non	R-11
Surfactant	Non	R-900
Surfactant	Non	Super Spread 90
Surfactant	Non	Super Spread 7000
Surfactant	Spreader/Sticker	Cohere
Surfactant	Spreader/Sticker	R-56
Surfactant	Spreader/Sticker	Attach
Surfactant	Spreader/Sticker	Bond
Surfactant	Spreader/Sticker	Tactic
Surfactant	Spreader/Sticker	Lastick
Surfactant	Silicone-based	Aero Dyne-Amic
Surfactant	Silicone	Dyne-Amic
Surfactant	Silicone	Kinetic
Surfactant	Silicone	Freeway
Surfactant	Silicone	Phase
Surfactant	Silicone	Phase II
Surfactant	Silicone	Silwet L-77
Surfactant	Silicone	Sylgard 309
Surfactant	Silicone	Syl-Tac
Oil-based	Silicone	
Oil	Silicone	Crop Oil Concentrate
Oil	Silicone	Crop Oil Concentrate
Oil	Silicone	Herbimax
Oil	Silicone	Agri-Dex
Oil	Silicone	R.O.C. Rigo Oil Conc.
Oil	Silicone	Mor-Act
Oil	Methalated Seed Oil	Methylated Spray Oil Conc.
Oil	Methalated Seed Oil	MSO Concentrate
Oil	Methalated Seed Oil	Hasten
Oil	Methalated Seed Oil	Super Spread MSO
Oil	Vegetable Oil	Amigo
Oil	Vegetable Oil	Competitor
Fertilizer-based	Nitrogen-based	Quest
Fertilizer	Nitrogen	Dispatch
Fertilizer	Nitrogen	Dispatch 111
Fertilizer	Nitrogen	Dispatch 2N

Adjuvant Class	Adjuvant Type	Trade Name
Fertilizer	Nitrogen	Dispatch AMS
Fertilizer	Nitrogen	Flame
Fertilizer	Nitrogen	Bronc
Fertilizer	Nitrogen	Bronc Max
Fertilizer	Nitrogen	Bronc Max EDT
Fertilizer	Nitrogen	Bronc Plus Dry EDT Bronc Total
Fertilizer	Nitrogen	Cayuse Plus
Special Purpose or Utility	Nitrogen	
Special Purpose or Utility	Nitrogen	Tri-Fol
Special Purpose or Utility	Colorants	Hi-Light
Special Purpose or Utility	Colorants	Hi-Light WSP
Special Purpose or Utility	Colorants	Marker Dye
Special Purpose or Utility	Colorants	Signal
Special Purpose or Utility	Compatibility/Suspension Agent	EZ MIX
Special Purpose or Utility	Compatibility/Suspension Agent	Support
Special Purpose or Utility	Compatibility/Suspension Agent	Blendex VHC
Special Purpose or Utility	Deposition Aid	ProMate Impel
Special Purpose or Utility	Deposition Aid	Pointblank
Special Purpose or Utility	Deposition Aid	Strike Zone DF
Special Purpose or Utility	Deposition Aid	Intac Plus
Special Purpose or Utility	Deposition Aid	Liberate
Special Purpose or Utility	Deposition Aid	Reign
Special Purpose or Utility	Deposition Aid	Weather Gard
Special Purpose or Utility	Deposition Aid	Bivert
Special Purpose or Utility	Deposition Aid	EDT Concentrate
Special Purpose or Utility	Deposition Aid	Sta Put
Special Purpose or Utility	Defoaming Agent	Fighter-F 10
Special Purpose or Utility	Defoaming Agent	Fighter-F Dry
Special Purpose or Utility	Defoaming Agent	Foam Buster
Special Purpose or Utility	Defoaming Agent	Cornbelt Defoamer

Adjuvant Class	Adjuvant Type	Trade Name
Special Purpose or Utility	Defoaming Agent	No Foam
Special Purpose or Utility	Diluent/Deposition Agent	Improved JLB Oil Plus
Special Purpose or Utility	Foam Marker	Align
Special Purpose or Utility	Foam Marker	R-160
Special Purpose or Utility	Invert Emulsion Agent	Redi-vert II
Special Purpose or Utility	Tank Cleaner	Wipe Out
Special Purpose or Utility	Tank Cleaner	All Clear
Special Purpose or Utility	Tank Cleaner	Tank and Equipment Cleaner
Special Purpose or Utility	Tank Cleaner	Kutter
Special Purpose or Utility	Tank Cleaner	Neutral-Clean
Special Purpose or Utility	Tank Cleaner	Cornbelt Tank-Aid
Special Purpose or Utility	Water Conditioning	Blendmaster
Special Purpose or Utility	Water Conditioning	Choice
Special Purpose or Utility	Water Conditioning	Choice Xtra
Special Purpose or Utility	Water Conditioning	Choice Weather Master
Special Purpose or Utility	Water Conditioning	Cut-Rate

Air Quality

- Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks.
- Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent.
- Use drift reduction agents, as appropriate, to reduce the drift hazard.
- Select proper application equipment (*e.g.,* spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]).
- Select proper application methods (*e.g.,* set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).

Soil

- Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected.
- Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility.
- Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.

Water Resources

- Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs.
- Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments.
- Use local historical weather data to choose the month of treatment.
- Considering the phenology of target aquatic species, schedule treatments based on the condition of the waterbody and existing water quality conditions.
- Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity.
- Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination.
- Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body.
- Do not rinse spray tanks in or near waterbodies.
- Do not broadcast pellets where there is danger of contaminating water supplies.
- Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment.
- Establish appropriate (herbicide-specific) buffer zones for species/populations (Tables 3 and 4).
- Areas with potential for groundwater for domestic or municipal use shall be evaluated through the appropriate, validated model(s) to estimate vulnerability to potential groundwater contamination, and appropriate mitigation measures shall be developed if such an area requires the application of herbicides and cannot otherwise be treated with non-herbicide methods.
- Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths from water of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.
- Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide and site-specific conditions to minimize impacts to waterbodies.

Table 3. No-spray buffer distances in feet to minimize risk to vegetation from off-site drift of BLM-evaluated herbicides.

Application Scenario	Bromacil	Chlorsulfuron	Diuron	Fluridone	Imazapic	Diflufenzopyr + Dicamba	Sulfometuron methyl	Tebuthiuron
Buffer Distance (feet) from Non-target Aquatic Plants								
Typical Application Rate								
Aerial	NA	0	NA[8]	NE[9]	0	NA	1,300	NE
Low Boom2	100	0	900	NE	0	100	900	0
High Boom2	900	0	1,000	NE	0	900	900	0
Maximum Application Rate								
Aerial	NA	300	NA	NE	300	NA	1,500	NE
Low Boom2	900	0	1,000	NE	0	900	900	0
High Boom2	900	0	1,000	NE	0	900	900	0
Buffer Distance (feet) from Non-target Terrestrial Plants								
Typical Application Rate								
Aerial	NA	1,350	NA	NE	0	NA	0	NE
Low Boom2	950	900	0	NE	0	0	0	0
High Boom2	950	900	100	NE	0	100	0	0
Maximum Application Rate								
Aerial	NA	1,350	NA	NE	900	NA	0	NE
Low Boom2	1,000	1,000	200	NE	0	100	0	50
High Boom2	1,000	1,000	500	NE	0	100	0	50
Buffer Distance (feet) from Threatened, Endangered, and Sensitive Plants								
Typical Application Rate								
Aerial	NA	1,400	NA	NE	0	NA	1,500	NE
Low Boom2	1,200	1,000	1,000	NE	0	100	1,100	0
High Boom2	1,200	1,000	1,000	NE	0	900	1,000	50
Maximum Application Rate								
Aerial	NA	1,400	NA	NE	900	NA	1,500	NE
Low Boom2	1,200	1,050	1,000	NE	0	900	1,100	100
High Boom2	1,200	1,000	1,000	NE	0	900	1,000	500

[8] NA = not applicable
[9] NE = not evaluated

Table 4. Buffer distances to minimize risk to vegetation from off-site drift of USFS-evaluated herbicides.

Application Scenario	2,4-D	Dicamba	Clopyralid	Glyphosate	Hexazinone	Imazapyr	Metsulfuron Methyl	Picloram	Triclopyr
Buffer Distance (feet) from Susceptible Plants									
Typical Application Rate									
Aerial	NE	>900	900	300	300	900	900	>900	500
Low Boom	NE	300	900	50	NE	900	900	>900	300
Maximum Application Rate									
Aerial	NE	>900	1,000	300	900	>900	>900	>900	>900
Low Boom	NE	900	1,000	300	NE	>900	>900	>900	>900
Buffer Distance (feet) from Tolerant Terrestrial Plants									
Typical Application Rate									
Aerial	NE	0	0	25	NE	100	50	25	NE
Low Boom	NE	0	0	25	0	25	25	25	NE
Maximum Application Rate									
Aerial	NE	0	25	50	NE	300	100	50	NE
Low Boom	NE	0	25	25	100	50	25	25	NE

Wetlands and Riparian Areas

- Use a selective herbicide and a wick or backpack sprayer.
- Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths from water of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.

Vegetation

- Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide.
- Use native or sterile plants for revegetation and restoration projects to compete with invasive plants until desired vegetation establishes.
- Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for revegetation and other activities.
- Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, to maintain desirable vegetation on the treatment site.
- Minimize the use of terrestrial herbicides (especially bromacil, diuron, and sulfometuron methyl) in watersheds with downgradient ponds and streams if potential impacts to aquatic plants are identified.
- Establish appropriate (herbicide-specific) buffer zones (Tables 3 and 4) around downstream water bodies, habitats, and species/populations of interest. Consult the ecological risk assessments (ERAs) prepared for the PEIS for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios.
- Limit the aerial application of chlorsulfuron and metsulfuron methyl to areas with difficult land access, where no other means of application are possible.
- Do not apply sulfometuron methyl aerially.
- When necessary to protect Special Status plant species, implement all conservation measures for plants presented in the Appendix 5 of the BLM National EIS (BLM 2007b).

Fish and Other Aquatic Organisms

- Use appropriate buffer zones based on label and risk assessment guidance.
- Minimize treatments near fish-bearing waterbodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments.
- Use appropriate application equipment/method near water bodies if the potential for off-site drift exists.
- For treatment of aquatic vegetation: (1) Treat only that portion of the aquatic system necessary to meet vegetation management objectives; (2) use the appropriate application method to minimize the potential for injury to desirable

vegetation and aquatic organisms; and (3) follow water use restrictions presented on the herbicide label.

- Limit the use of terrestrial herbicides (especially diuron) in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used.
- To protect Special Status fish and other aquatic organisms, implement all conservation measures for aquatic animals presented in Appendix 5 of the BLM National EIS (2007b).
- Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of interest (Tables 5 and 6, and recommendations in individual ERAs).
- Consider the proximity of application areas to salmonid habitat and the possible effects of herbicides on riparian and aquatic vegetation. Maintain appropriate buffer zones around salmonid-bearing streams.
- At the local level, consider effects to Special Status fish and other aquatic organisms when designing treatment programs.

Threatened, Endangered, and Sensitive Species

- Provide clearances for Special Status species before treating an area as required by Special Status Species Program policy. Consider effects to Special Status species when designing herbicide treatment programs.
- Use a selective herbicide and a wick or backpack sprayer to minimize risks to Special Status plants.
- Avoid treating vegetation during time-sensitive periods (*e.g.*, nesting and migration, sensitive life stages) for Special Status species in area to be treated.

Potential Mitigation. The following potential mitigation measures were identified to respond to adverse effects identified in the FEIS. The mitigation measures listed below are in addition to mitigation measures identified in the BLM National EIS (BLM 2007b) and in addition to the SOPs described above.

Water Resources

- To protect domestic water sources, no herbicide treatments should occur within 100 feet of a well or 200 feet of a spring or known diversion used as a domestic water source, unless a written waiver is granted by the user or owner.
- Site-specific analyses for roadside treatments should specifically consider that drainage structures lead to streams, and that normal buffer distances, herbicide selection, and treatment method selection may need to be changed accordingly, particularly where those ditches are connected to streams with ESA-listed or other Special Status species.
- Buffer intermittent stream channels when there is a prediction of rain (including thunderstorms) within 48 hours.
- Proposals to boom or aerially spray herbicides within 200 feet of streams that are within 1,000 feet upstream from a public water supply intake, or spot apply

herbicides within 100 feet of streams that are within 500 feet upstream from a public water supply intake, will include coordination with the Oregon Department of Environmental Quality (ODEQ) and the municipality to whom the intake belongs.

- No aerial spraying is allowed west of the Cascades.

Fish

- Use of adjuvants with limited toxicity and low volumes is recommended for applications near aquatic habitats.

NMFS relied on the foregoing description of the proposed action, including all features identified to reduce adverse effects, to complete this consultation. To ensure that this Opinion remains valid, NMFS requests that the action agency or applicant keep NMFS informed of any changes to the proposed action.

Action Area

Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For this consultation, the action area includes all BLM lands where the herbicide treatments will be administered in the state of Oregon. The BLM manages about 15.7 million acres in Oregon, or about 25 percent of the lands in the state (Figure 1). About 2.3 million of these acres lay west of the Cascades, about 2.1 million of which was assigned to the BLM by the O&C Act of 1937 to be managed primarily for sustained timber production. BLM lands are organized into nine districts within Oregon (Salem, Eugene, Roseburg, Coos Bay, Medford, Vale, Prineville, Burn, and Lakeview). The action area for the MSA consultation includes waterways in Oregon with EFH for Chinook and coho salmon (Figure 1).

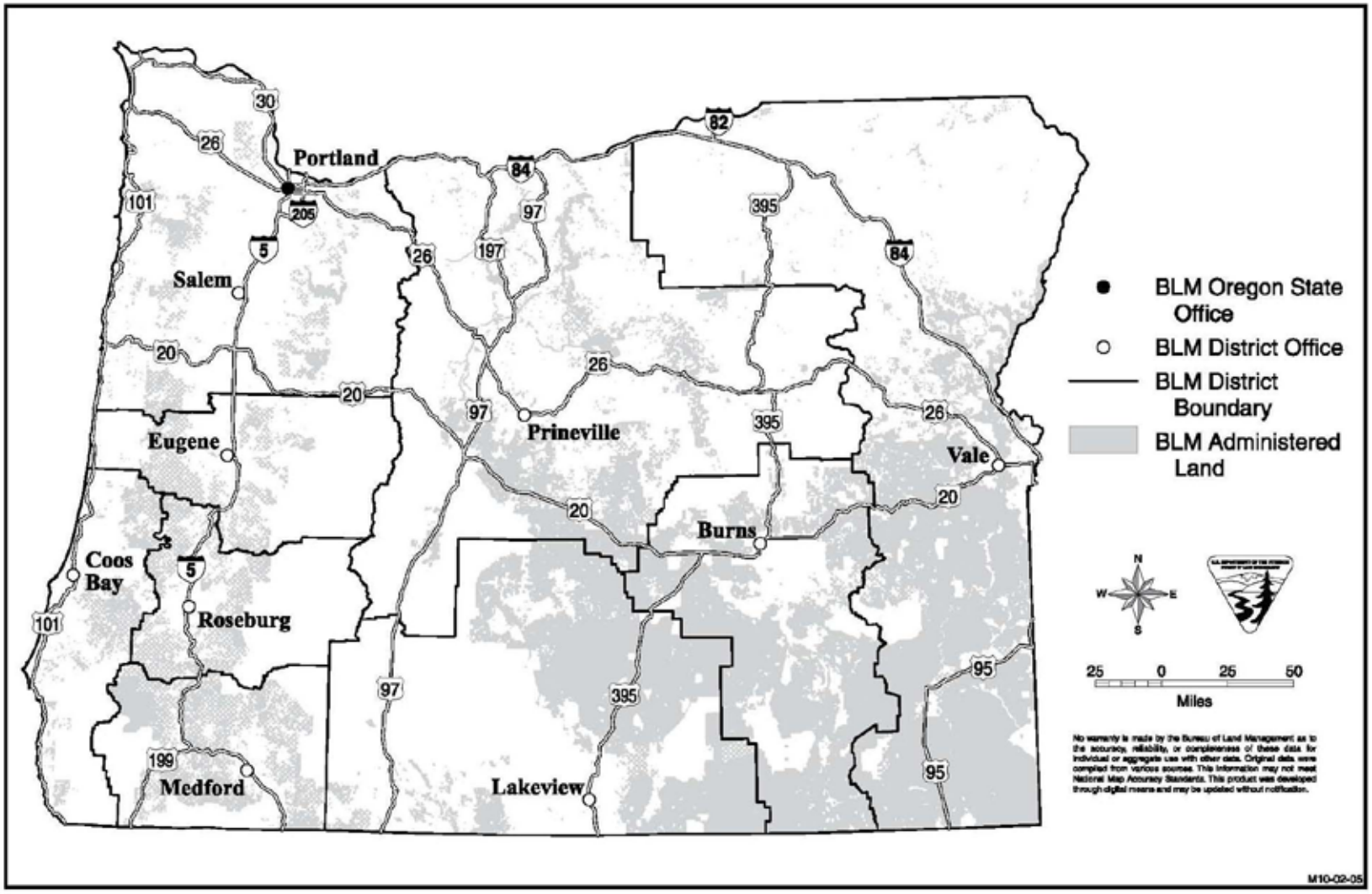
Table 5. No spray buffer distances in feet to minimize risk to non-special status fish and aquatic invertebrates from off-site drift of BLM-evaluated herbicides from broadcast and aerial treatments.

Application Scenario	Bromacil	Chlorsulfuron	Diuron	Fluridone	Imazapic	Diflufenzopyr + Dicamba	Sulfometuron methyl	Tebuthiuron
				Minimum Buffer Distance (feet) from Fish and Aquatic Invertebrates				
Typical Application Rate								
Aerial	NA	0	NA	NA	0	NA	0	NA
Low boom	0	0	0	NA	0	0	0	0
High boom	0	0	0	NA	0	0	0	0
Maximum Application Rate								
Aerial	NA	0	NA	NA	0	NA	0	NA
Low boom	0	0	100	NA	0	0	0	0
High boom	0	0	100	NA	0	0	0	0

Table 6. Buffer distances to minimize risk to special status fish and aquatic organisms from off-site drift of BLM-evaluated herbicides from broadcast and aerial treatments.

Application Scenario	Bromacil	Chlorsulfuron	Diuron	Fluridone	Imazapic	Diflufenzopyr + Dicamba	Sulfometuron methyl	Tebuthiuron
	Minimum Buffer Distance (feet) from Fish and Aquatic Invertebrates							
Typical Application Rate								
Aerial	NA	0	NA	NA	0	NA	0	NA
Low boom	0	0	0	NA	0	0	0	0
High boom	0	0	100	NA	0	0	0	0
Maximum Application Rate								
Aerial	NA	0	NA	NA	0	NA	0	NA
Low boom	0	0	100	NA	0	0	0	0
High boom	0	0	900	NA	0	0	0	0

Figure 1. Lands administered by the BLM in Oregon.



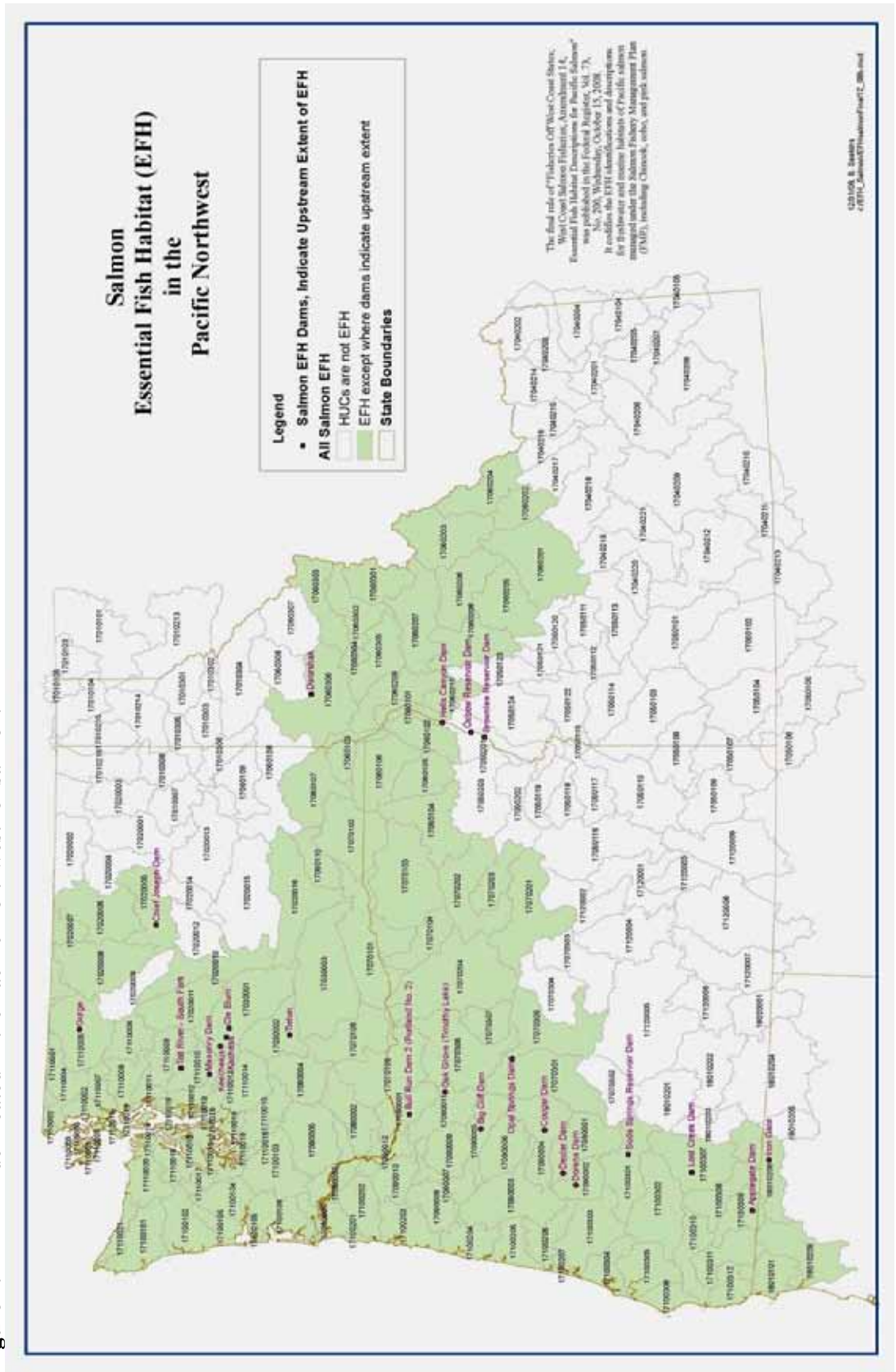


Figure 2. EFH delineated in the Pacific Northwest for salmon.

ENDANGERED SPECIES ACT BIOLOGICAL OPINION

Section 7(a)(2) of the ESA requires Federal agencies to consult with NMFS to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The Opinion that follows records the results of the interagency consultation for this proposed action. To complete the jeopardy analysis presented in this Opinion, NMFS reviewed the status of each listed species[10] considered in this consultation, the environmental baseline in the action area, the effects of the action, and cumulative effects (50 CFR 402.14(g)). From this analysis, NMFS determined whether effects of the action were likely, in view of existing risks, to appreciably reduce the likelihood of both the survival and recovery of the affected listed species.

For the critical habitat adverse modification analysis, NMFS considered the status of the entire designated area of the critical habitat considered in this consultation, the environmental baseline in the action area, the likely effects of the action on the function and conservation role of the affected critical habitat, and cumulative effects. NMFS used this assessment to determine whether, with implementation of the proposed action, critical habitat would remain functional, or retain the current ability for the primary constituent elements (PCEs) to become functionally established, to serve the intended conservation role for the species.[11]

If the action under consultation is likely to jeopardize the continued existence of an ESA-listed species, or destroy or adversely modify critical habitat, NMFS must identify any reasonable and prudent alternatives for the action that avoid jeopardy or destruction or adverse modification of critical habitat and meet other regulatory requirements (50 CFR 402.02).

Status of the Species and Critical Habitat

The summaries that follow describe the status of the ESA-listed species, and their designated critical habitats, that occur within the geographic area of this proposed action and are considered in this Opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, can be found in the listing regulations and critical habitat designations published in the Federal Register (Table 7).

[10] An ESU of Pacific salmon (Waples 1991) and a "distinct population segment" (DPS) (Policy Regarding the Recognition of District Vertebrate Population; 61 FR 4721, Feb 7, 1996) are both "species" as defined in Section 3 of the ESA.

[11] Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (November 7, 2005) (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act).

Table 7. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered; "P" means proposed.

Species	Listing Status	Critical Habitat	Protective Regulations
Marine and Anadromous Fish			
Chinook salmon (*Oncorhynchus tshawytscha*)			
Lower Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River spring-run	E 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	ESA section 9 applies
Snake River spring/summer run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Chum salmon *(O. keta*)			
Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Coho salmon (*O. kisutch*)			
Lower Columbia River	T 6/28/05; 70 FR 37160	Not applicable	6/28/05; 70 FR 37160
Oregon Coast	T 2/11/08; 73 FR 7816	2/11/08; 73 FR 7816	2/11/08; 73 FR 7816
Southern Oregon / Northern California Coasts	T 6/28/05; 70 FR 37160	5/5/99; 64 FR 24049	6/28/05; 70 FR 37160
Sockeye salmon (*O. nerka*)			
Snake River	E 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	ESA section 9 applies
Steelhead (*O. mykiss*)			
Lower Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Middle Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	2/018/06; 71 FR 5178
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Green sturgeon (*Acipenser medirosris*			
Southern	T 4/07/06; 71 FR 17757	10/09/09; 74 FR 52300	P 5/21/09; 74 FR 23822
Eulachon (*Thaleichthys pacificus*)			
Eulachon	PT 3/13/09; 74 FR 10857	Not applicable	Not applicable

It is also likely that climate change will play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. During the last century, average regional air temperatures increased by 1.5°F, and increased up to 4°F in some areas (USGCRP 2009). Warming is likely to continue during the next century as average temperatures increase another 3 to 10°F (USGCRP 2009). Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009).

Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during summer, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007, USGCRP 2009). Where snow occurs, a warmer climate will cause earlier runoff so stream flows in late spring,

summer, and fall will be lower and water temperatures will be warmer (ISAB 2007, USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (USGCRP 2009). Earlier peak stream flows will also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation (USGCRP 2009). Lower stream flows and warmer water temperatures during summer will degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

The earth's oceans are also warming, with considerable inter-annual and inter-decadal variability superimposed on the longer-term trend (Bindoff *et al*. 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (Scheuerell and Williams 2005, Zabel *et al*. 2006, USGCRP 2009). Ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel *et al*. 2006).

Status of the Species. Over the past few decades, the sizes and distributions of the populations considered in this Opinion generally have declined due to natural phenomena and human activity, including the operation of hydropower systems, over-harvest, hatcheries, and habitat degradation. Enlarged populations of terns, seals, sea lions, and other aquatic predators in the Pacific Northwest have been identified as factors that may be limiting the productivity of some Pacific salmon and steelhead populations (Bottom *et al*. 2005, Fresh *et al*. 2005).

The status of the species was described in the NMFS 2007 Opinion. However, the NMFS 2007 Opinion covered the status of the species across Idaho, Washington, Oregon, and California, and did not cover OC coho or eulachon. The status of the species specific to Oregon, along with the status of OC coho and eulachon is described below.

Willamette and Lower Columbia (WLC) Recovery Domain. Species in the WLC Recovery Domain include LCR Chinook, UWR Chinook, CR chum, LCR coho, LCR steelhead, and UWR steelhead. The WLC-technical recovery team (TRT) identified 107 demographically independent populations of those species (Table 8), including 47 populations that spawn within Oregon. These populations were further aggregated into strata, groupings above the population level that are connected by some degree of migration, based on ecological subregions. All 107 populations use parts of the mainstem of the Columbia River and the Columbia River estuary that flow through Oregon for migration, rearing, and smoltification.

The WLC-TRT recommended viability criteria[12] that follow the VSP framework and described biological or physical performance conditions that, when met, indicate a population or species has a 5% or less risk of extinction over a 100 year period (McElhany *et al.* 2006, see also, NRC 1995). McElhany *et al.* (2007) applied those criteria to populations in Oregon and found that the combined extinction risk is very high for LCR Chinook, UWR Chinook salmon, CR chum salmon, LCR coho salmon, and moderate for LCR steelhead and UWR steelhead, although the status of those species with populations in Washington is still under assessment.

Table 8. Demographically-independent populations in the WLC Recovery Domain and spawning populations in Oregon.

Species	Populations In WLC	Spawning Populations In Oregon
LCR Chinook salmon	32	12
UWR Chinook salmon	7	7
CR chum salmon	17	8
LCR coho salmon	24	9
LCR steelhead	23	6
UWR steelhead	4	5

***LCR Chinook salmon*.** This species includes all naturally-spawned populations of Chinook salmon in the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River; the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River; and progeny of seventeen artificial propagation programs. The WLC-TRT identified 32 historical populations of LCR Chinook salmon – seven in the coastal subregion, six in the Columbia Gorge, and nine in the western Cascades. Twelve of those populations occur within the action area (Table 9) and only Sandy River late fall Chinook is considered "viable" (McElhany *et al.* 2007).

The major factors limiting recovery of LCR Chinook salmon include altered channel morphology, loss of habitat diversity, excessive sediment, high water temperature, reduced access to spawning/rearing habitat, and harvest impacts (NMFS 2006).

[12] Overall viability risk for all populations: "extinct or very high" means greater than 60% chance of extinction within 100 years; "relatively high" means 60 to 25% risk of extinction in 100 years; "moderate" means 25 to 5% risk of extinction in 100 years, "low or negligible" means 5 to 1% risk of extinction in 100 years; "very low" means less than 1% chance of extinction in 100 years; and NA means not available. A low or negligible risk of extinction is considered viable.

Table 9. LCR Chinook salmon populations spawning in Oregon.

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
Coast Range	Fall	Young Bay	Very High
		Big Creek	Very High
		Clatskanie	Relatively High
		Scappoose	Very High
Columbia Gorge	Spring	Hood	Very High
	Early fall ("tule")	Upper Gorge	Very High
	Fall	Hood	Very High
		Lower Gorge	Very High
West Cascade Range	Spring	Sandy	Moderate
	Early fall ("tule")	Clackamas	Very High
		Sandy	Very High
	Late fall ("bright")	Sandy	Low

***UWR Chinook salmon*.** The species includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, and progeny of seven artificial propagation programs. All seven historical populations of UWR Chinook salmon identified by the WLC-TRT occur within the action area and are contained within a single ecological subregion, the western Cascade Range (Table 10); only the Clackamas population is characterized as "viable" (McElhany *et al.* 2007).

The major factors limiting recovery of UWR Chinook salmon identified by NMFS include lost/degraded floodplain connectivity and lowland stream habitat, degraded water quality, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006).

Table 10. UWR Chinook salmon populations.

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
West Cascade Range	Spring	Clackamas	Low
		Molalla	Relatively High
		North Santiam	Very high
		South Santiam	Very high
		Calapooia	Very high
		McKenzie	Moderate
		Middle Fork Willamette	Very high

CR chum salmon. This species includes all naturally-spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, and progeny of three artificial propagation programs. The WLC-TRT identified 17 historical populations of CR chum salmon and aggregated these into four strata (Myers *et al.* 2006). Unlike other species in the WLC Recovery Domain, CR chum salmon spawning aggregations were identified in the mainstem Columbia River. These aggregations generally were included in the population associated with the nearest river basin. Three strata and eight historical populations of CR chum salmon occur within the action area (Table 11); of these, none are "viable" (McElhany *et al.* 2007).

The major factors limiting recovery of CR chum salmon include altered channel morphology, loss of habitat diversity, excessive sediment, reduced streamflow, harassment of spawners, and harvest impacts (NMFS 2006).

Table 11. CR chum salmon populations spawning in Oregon.

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
Coast Range	Fall	Young's Bay	Very high
		Big Creek	Very high
		Clatskanie	Very high
		Scappoose	Very high
Columbia Gorge	Fall	Lower Gorge	Very high
		Upper Gorge	Very high
West Cascade Range	Fall	Clackamas	Very high
		Sandy	Very high

LCR coho salmon. This species includes all naturally-spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood rivers; in the Willamette River to Willamette Falls, Oregon; and progeny of 25 artificial propagation programs. The WLC-TRT identified 24 historical populations of LCR coho salmon and divided these into two strata based on major run timing: early and late (Myers *et al.* 2006). Three strata and nine historical populations of LCR coho salmon occur within the action area (Table 12). Of these nine populations, Clackamas River is the only population characterized as "viable" (McElhany *et al.* 2007).

The major factors limiting recovery of LCR coho salmon include degraded floodplain connectivity and channel structure and complexity, loss of riparian areas and large wood recruitment, degraded stream substrate, loss of stream flow, reduced water quality, and impaired passage (NMFS 2007a).

Table 12. LCR coho salmon populations spawning in Oregon.

Stratum		Spawning Population In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Type		
Coast Range	N	Young's Bay	Very High
		Big Creek	Very High
		Clatskanie River	Relatively High
		Scappoose River	Relatively High
Columbia Gorge	N and S	Lower Gorge	Very High
		Upper Gorge	NA
		Hood River	Very high
West Cascade Range	S	Clackamas River	Low
		Sandy River	Relatively High

LCR steelhead. The species includes all naturally-spawned anadromous steelhead populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between and including the Cowlitz and Wind rivers, Washington; in the Willamette and Hood rivers, Oregon; and progeny of ten artificial propagation programs; but excluding all steelhead from the Upper Willamette River basin above Willamette Falls, Oregon, and from the Little and Big White Salmon rivers, Washington. The WLC-TRT identified 23 historical populations of LCR steelhead (Myers *et al.* 2006). Three strata and six historical populations of LCR steelhead occur within the action area (Table 13). Of the populations in Oregon, only Clackamas is "viable" (McElhany *et al.* 2007).

The major factors limiting recovery of LCR steelhead include altered channel morphology, lost/degraded floodplain connectivity and lowland stream habitat, excessive sediment, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006A).

Table 13. LCR steelhead populations spawning in Oregon.

Stratum		Population Spawning In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Timing		
Columbia Gorge	Summer	Hood River	Very High
	Winter	Lower Gorge	Relatively High
		Upper Gorge	Moderate
		Hood River	Moderate
West Cascade Range	Winter	Clackamas	Low
		Sandy	Relatively High

UWR steelhead. This species includes all naturally-spawned anadromous steelhead populations below natural and manmade impassable barriers in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River. The WLC-

TRT identified four historical populations of UWR steelhead, all with winter run timing and all within Oregon (Myers *et al.* 2006). One stratum and five historical populations of UWR steelhead occur within the action area (Table 14), although the west-side tributaries population was included only because it is important to the species as a whole, and not because it is independent. Of these five populations, none are "viable" (McElhany *et al.* 2007).

The major factors limiting recovery of UWR steelhead include lost/degraded floodplain connectivity and lowland stream habitat, degraded water quality, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006).

Table 14. UWR steelhead populations.

Stratum		Population Spawning In Oregon (Watershed)	Overall Viability Risk
Ecological Subregion	Run Type		
West Cascade Range	Winter	Molalla	Moderate
		North Santiam	Moderate
		South Santiam	Moderate
		Calapooia	Moderate
		West-side Tributaries	Moderate

Interior Columbia (IC) Recovery Domain. Species in the IC Recovery Domain relevant to this Opinion include MCR steelhead. The IC-TRT identified 82 demographically-independent populations of those species based on genetic, geographic (hydrographic), and habitat characteristics (Table 15). In some cases, the IC-TRT further aggregated populations into "major groupings" based on dispersal distance and rate, and drainage structure, primarily the location and distribution of large tributaries (IC-TRT 2003). Of the 82 populations identified, 24 have all or part of their spawning range in Oregon, and all 82 use the lower mainstem of the Snake River, the mainstem of the Columbia River, and the Columbia River estuary, or part thereof, in Oregon for migration, rearing, and smoltification.

Table 15. MCR steelhead spawning populations in the IC Recovery Domain in Oregon.

Species	Populations In IC	Spawning Populations In Oregon
MCR steelhead	17	10

The IC-TRT also recommended viability criteria that follow the VSP framework (McElhany *et al.* 2006) and described biological or physical performance conditions that, when met, indicate a population or species has a 5% or less risk of extinction over a 100-year period (IC-TRT 2007, see also, NRC 1995). As of this writing, the IC-TRT has applied the viability criteria to 68 populations, although it has only completed a draft assessment for 55 populations (see IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon). Of those assessments, the only population that

the TRT found to be viable was the North Fork John Day population of MCR steelhead. The strength of this population is due to a combination of high abundance and productivity, and good spatial structure and diversity, although the genetic effects of the large number of out-of-species strays and of natural spawners that are hatchery strays are still significant long-term concerns.

UCR spring-run Chinook salmon. This species includes all naturally-spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River), the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to Chief Joseph Dam in Washington, as well as progeny of six artificial propagation programs. The IC-TRT identified four independent populations of UCR spring-run Chinook salmon in the upriver tributaries of Wenatchee, Entiat, Methow, and Okanogan (extirpated), but no major groups due to the relatively small geographic area affected (IC-TRT 2003, McClure *et al*. 2005). Although none of these populations spawn in Oregon, they all use the Columbia River mainstem and estuary so all adult and juvenile individuals of this species must pass through part of the action area. The IC-TRT considered that this species, as a whole, is at high risk of extinction because all extant populations are at high risk (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon).

The major factors limiting recovery of UWR spring-run Chinook salmon include altered channel morphology and floodplain, riparian degradation and loss of in-river large wood, reduced streamflow, impaired passage, hydropower system mortality, and harvest impacts (NMFS 2006).

SR spring/summer run Chinook salmon. This species includes all naturally-spawned populations of spring/summer run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins; and progeny of fifteen artificial propagation programs. The IC-TRT identified 31 historical populations of SR spring/summer run Chinook salmon, and aggregated these into major population groups (IC-TRT 2003, McClure *et al*. 2005). This species includes those fish that spawn in the Snake River drainage and its major tributaries, including the Grande Ronde River and the Salmon River, and that complete their adult, upstream migration past Bonneville Dam between March and July. Of the 31 historical populations of SR spring/summer run Chinook salmon identified by the IC-TRT, seven occur entirely or partly within Oregon (Table 16). Each of these populations is part of the Grande Ronde and Imnaha River major group, and all face a high risk of extinction (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon).

The major factors limiting recovery of SR spring/summer run Chinook salmon include altered channel morphology and floodplain, excessive sediment, degraded water quality, reduced streamflow, and hydropower system mortality (NMFS 2006).

Table 16. SR spring/summer run Chinook salmon populations in Oregon.

Major Group	Spawning Populations In Oregon (Watershed)	Viability Assessment		
		Abundance Productivity Risk	Spatial Diversity Risk	Overall Viability Risk
Grande Ronde And Imnaha Rivers	Wenaha River	High	Moderate	High
	Wallowa-Lostine River	High	Moderate	High
	Minam River	High	Moderate	High
	Catherine Creek	High	Moderate	High
	Upper Grande Ronde	High	High	High
	Imnaha River mainstem	High	Moderate	High
	Big Sheep Creek	High	Moderate	High

SR fall-run Chinook salmon. This species includes all naturally-spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River, and progeny of four artificial propagation programs. The IC-TRT identified three populations of this species, although only the lower mainstem population exists at present, and it spawns in the lower mainstems of the Clearwater, Imnaha, Grande Ronde, Salmon and Tucannon rivers (IC-TRT 2003, McClure *et al.* 2005). The IC-TRT has not completed a viability assessment of this species.

The major factors limiting recovery of SR fall-run Chinook salmon include reduced spawning/rearing habitat, degraded water quality, hydropower system mortality, and harvest impacts (NMFS 2006).

SR sockeye salmon. This species includes all anadromous and residual sockeye salmon from the Snake River basin, Idaho, and artificially-propagated sockeye salmon from the Redfish Lake captive propagation program. The IC-TRT identified historical sockeye production in at least five Stanley Basin lakes and in lake systems associated with Snake River tributaries currently cut off to anadromous access (*e.g.,* Wallowa and Payette lakes), although current returns of SR sockeye are extremely low and limited to Redfish Lake (IC-TRT 2007). SR sockeye salmon do not spawn in Oregon, but all adult and juvenile individuals of this species must pass through part of the action area.

The major factors limiting recovery of SR sockeye salmon include altered channel morphology and floodplain, reduced streamflow, impaired passage, and hydropower system mortality (NMFS 2006).

MCR steelhead. This species includes all naturally-spawned anadromous steelhead populations below natural and artificial impassable barriers in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River basin; and progeny of

seven artificial propagation programs. The IC-TRT identified 20 historical populations of MCR steelhead in major groups (IC-TRT 2003, Mc Lure *et al.* 2005). Ten populations of MCR steelhead occur in Oregon, divided among three major groups (Table 17). Of the 20 historical populations of MCR steelhead identified by the IC-TRT, only the North Fork John Day population currently meets viability criteria, and none of the major groups or the species are considered viable (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon).

The major factors limiting recovery of MCR steelhead include altered channel morphology and flood plain, excessive sediment, degraded water quality, reduced streamflow, impaired passage, and hydropower system mortality (NMFS 2006).

Table 17. MCR steelhead populations in Oregon.

Major Group	Population (Watershed)
Cascade East Slope Tributaries	Fifteenmile Creek
	Deschutes Eastside Tributaries
	Deschutes Westside Tributaries
John Day River	Lower Mainstem John Day River
	North Fork John Day River
	Middle Fork John Day River
	South Fork John Day River
	Upper Mainstem John Day River
Walla Walla and Umatilla rivers	Umatilla River
	Walla Walla River *

The Walla Walla population also occurs partly in Washington.

UCR steelhead. This species includes all naturally-spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Columbia River basin upstream from the Yakima River, Washington, to the U.S.-Canada border, and progeny of six artificial propagation programs. Four independent populations of UCR steelhead were identified by the IC-TRT in the same upriver tributaries as for the previous species (*i.e.*, Wenatchee, Entiat, Methow, and Okanogan) and, similarly, no major population groupings were identified due to the relatively small geographic area involved (IC-TRT 2003, McClure *et al.* 2005). None of these populations spawn in Oregon, although all adult and juvenile individuals of this species must pass through part of the action area. The IC-TRT has not completed a viability assessment of this species, although all extant populations are considered to be at high risk of extinction (IC-TRT - Current Status Assessments, as of April 21, 2006, available from NMFS Northwest Region, Protected Resources Division, Portland, Oregon).

The major factors limiting recovery of UCR steelhead include altered channel morphology and flood plain, riparian degradation and loss of in-river large wood, excessive sediment, degraded water quality, reduced streamflow, hydropower system mortality, harvest impacts, and hatchery impacts (NMFS 2006).

SRB steelhead. This species includes all naturally-spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Snake River basin of southeast Washington, northeast Oregon, and Idaho, and progeny of six artificial propagation programs. These fish are genetically differentiated from other interior Columbia steelhead populations and spawn at higher altitudes (up to 6,500 feet) after longer migrations (more than 900 miles). The IC-TRT identified 24 populations in five major groups (IC-TRT 2003, Mc Lure *et al.* 2005). Of those, six populations divided among three major groups spawn in Oregon (Table 18). The IC-TRT has not completed a viability assessment of this species.

The major factors limiting recovery of SRB steelhead include altered channel morphology and flood plain, excessive sediment, degraded water quality, reduced streamflow, hydropower system mortality, harvest impacts, and hatchery impacts (NMFS 2006).

Table 18. SRB steelhead populations in Oregon.

Major Group	Population (Watershed)
Grande Ronde	Lower Grande Ronde
	Joseph Creek
	Wallowa River
	Upper Grande Ronde
Imnaha River	Imnaha River
Hells Canyon Tributaries	Hells Canyon Tributaries

Oregon Coast (OC) Salmon Recovery Domain. The OC recovery domain includes one species, the OC coho salmon, and includes Oregon coastal streams south of the Columbia River and north of Cape Blanco. Streams and rivers in this area drain west into the Pacific Ocean, and vary in length from less than a mile to more than 210 miles in length. All, with the exception of the largest, the Umpqua River, drain from the crest of the Coast Range. The Umpqua transects the Coast Range and drains from the Cascade Mountains. The OC recovery domain covers cities along the coast and inland, including Tillamook, Lincoln City, Newport, Florence, Coos Bay and Roseburg, and has substantial amounts of private forest and agricultural lands. It also includes portions of the Siuslaw and Umpqua National Forests, lands managed by the U.S. Bureau of Land Management, and the Tillamook and Elliott State Forests.

OC coho salmon. This species includes all naturally-spawned populations of coho salmon in Oregon coastal streams south of the Columbia River and north of Cape Blanco, and progeny of five artificial propagation programs. The OC-TRT identified 56 historical populations, grouped into five major "biogeographic strata," based on consideration of historical distribution, geographic isolation, dispersal rates, genetic data, life history information, population dynamics, and environmental and ecological diversity (Table 19) (Lawson *et al.* 2007). The OC-TRT concluded that, if recent past conditions continue into the future, OC coho salmon are moderately likely to persist over a 100-year period without artificial support, and have a low to moderate likelihood of being able to sustain their genetic legacy and long-term adaptive potential for the foreseeable future (Wainwright *et al.* 2007).

The major factors limiting recovery of OC coho salmon include altered stream morphology, reduced habitat complexity, loss of overwintering habitat, excessive sediment, high water temperature, and variation in ocean conditions (NMFS 2006).

Table 19. OC coho salmon populations in Oregon.

Stratum	Population	Type	Stratum	Population	Type
North Coast	Necanicum	PI	Mid-Coast (cont.)	Alsea	FI
	Ecola	D		Big (Alsea)	D
	Arch Cape	D		Vingie	D
	Short Sands	D		Yachats	D
	Nehalem	FI		Cummins	D
	Spring	D		Bob	D
	Watseco	D		Tenmile	D
	Tillamook	FI		Rock	D
	Netarts	D		Big (Siuslaw)	D
	Rover	D		China	D
	Sand	D		Cape	D
	Nestucca	FI		Berry	D
	Neskowin	D		Sutton	D
Mid-Coast	Salmon	PI	Lakes	Siuslaw	FI
	Devils	D		Siltcoos	PI
	Siletz	FI		Tahkenitch	PI
	Schoolhouse	D		Tenmile	PI
	Fogarty	D	Umpqua	Lower Umpqua	FI
	Depoe	D		Middle Umpqua	FI
	Rocky	D		North Umpqua	FI
	Spencer	D		South Umpqua	FI
	Wade	D	Mid-South Coast	Threemile	D
	Coal	D		Coos	FI
	Moolack	D		Coquille	FI
	Big (Yaquina)	D		Johnson	D
	Yaquina	FI		Twomile	D
	Theil	D		Floras	PI
	Beaver	PI		Sixes	PI

Population type "D" means dependent; "FI" means functionally independent; and "PI" means potentially independent.

Southern Oregon and Northern California Coasts (SONCC) Recovery Domain. The SONCC recovery domain includes one ESA-listed species: the SONCC coho salmon. The SONCC recovery domain extends from Cape Blanco, Oregon, to Punta Gorda, California. This area includes many small-to-moderate-sized coastal basins, where high quality habitat occurs in the lower reaches of each basin, and three large basins (Rogue, Klamath and Eel) where high quality habitat is in the lower reaches, little habitat is provided by the middle reaches, and the largest amount of habitat is in the upper reaches of the subbasins.

SONCC coho salmon. This species includes all naturally-spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California; and progeny of three artificial propagation programs. The SONCC-TRT identified 50 populations that were historically present based on consideration of historical distribution, geographic

isolation, dispersal rates, genetic data, life history information, population dynamics, and environmental and ecological diversity (Williams *et al.* 2006). In some cases, the SONCC-TRT also identified groups of populations referred to as "diversity strata" largely based on the geographical arrangement of the populations and basin-scale environmental and ecological characteristics. Of those populations, 13 strata and 17 populations occur within the action area (Table 20). The SONCC-TRT has not yet developed viability criteria for use in setting recovery goals.

The major factors limiting recovery of SONCC coho salmon include loss of channel complexity, loss of estuarine and floodplain habitat, loss of riparian habitat, loss of in-river wood, excessive sediment, degraded water quality, high water temperature, reduced streamflow, unscreened water diversions, and structures blocking fish passage (NMFS 2006).

Table 20. SONCC coho salmon populations in Oregon.

Population		Population Type
River Basin	Subbasin	
Elk River		FI
Mill Creek		D
Hubbard Creek		E
Brush Creek		D
Mussel Creek		D
Euchre Creek		E
Rogue River *	Lower Rogue River	PI
	Illinois River*	FI
	Mid Rogue/Applegate*	FI
	Upper Rogue River	FI
Hunter Creek		D
Pistol River		D
Chetco River		FI
Winchuck River		PI
Smith River *		FI
Klamath River *	Middle Klamath River	PI
	Upper Klamath River	FI

*Populations that also occur partly in California.
Population type "D" means dependent; "E" means ephemeral; "FI" means functionally independent; and "PI" means potentially independent.

***Southern green sturgeon*.** In North America, spawning populations of green sturgeon are currently found in only three river systems: the Sacramento and Klamath rivers in California and the Rogue River in southern Oregon. Green sturgeon are known to range from Baja California to the Bering Sea along the North American continental shelf, primarily within the 110 meter contour. During the late summer and early fall, subadults and nonspawning adult green sturgeon frequently can be found aggregating in estuaries along the Pacific coast (Emmett *et al.* 1991, (Moser and Lindley 2007). Particularly large concentrations of green sturgeon from both the northern and southern populations occur in the Columbia River estuary, Willapa Bay, Grays Harbor and Winchester Bay, with smaller aggregations in Humboldt Bay, Tillamook Bay,

Nehalem Bay, and San Francisco and San Pablo bays (Emmett *et al* 1991, Beamesderfer *et al.* 2007). Lindley *et al.* (2008) reported that green sturgeon make seasonal migratory movements along the west coast of North America, overwintering north of Vancouver Island and south of Cape Spencer, Alaska. Individual fish from the southern DPS of green sturgeon have been detected in these seasonal aggregations. Information regarding the migration and habitat use of the southern DPS of green sturgeon has recently emerged. Lindley *et al.* (2008) presented preliminary results of large-scale green sturgeon migration studies, and verified past population structure delineations based on genetic work and found frequent large-scale migrations of green sturgeon along the Pacific Coast. This work was further expanded by recent tagging studies of green sturgeon conducted by Lindley *et al.* (2008). To date, the data indicate that North American green sturgeon are migrating considerable distances up the Pacific Coast into other estuaries, particularly the Columbia River estuary.

Available information on green sturgeon indicates that the mainstem Sacramento River may be the last viable spawning habitat for the southern DPS of green sturgeon. The current population status of southern DPS green sturgeon is unknown (Beamesderfer *et al.* 2007, Adams *et al.* 2007). The sole population of southern DPS of green sturgeon spawns within the Sacramento River basin. Recruitment data for the southern DPS of green sturgeon are essentially nonexistent. The southern DPS of green sturgeon population has been relegated to a single spawning area, which is, for the most part, outside of its historical spawning area. Coastal migrants, which include both adult and subadult life stages, are found from approximately Central California to southeastern Alaska with aggregations of southern DPS of green sturgeon occurring in several estuaries along the West Coast from California northwards to Washington during the late summer and early fall. An aggregation of green sturgeon has also recently been identified off of the northwestern tip of Vancouver Island. Although both northern and southern populations mix in the ocean and coastal estuaries, it is believed that each DPS maintains a high fidelity to their natal watershed and little straying occurs between the two DPSs.

The reduction of the southern DPS of green sturgeon spawning habitat into one reach on the Sacramento River increases the vulnerability of this spawning population to catastrophic events. Diversity, both genetic and behavioral, provides a species the opportunity to track and adapt to environmental changes. As a species' abundance decreases, and spatial structure of the ESU/DPS is reduced, a species has less flexibility to track changes in the environment. The reduction of the southern DPS of green sturgeon population to one extant population reduces the potential variation of life history expression and genetic diversity within this population. The southern DPS of green sturgeon face greater risks to long term persistence of the population due to the lack of this flexibility in their current condition.

The southern DPS of green sturgeon is at substantial risk of future population declines (Adams *et al.* 2007). The potential threats faced by the green sturgeon include enhanced vulnerability due to the reduction of spawning habitat into one concentrated area on the Sacramento River, lack of good empirical population data, vulnerability of long-term cold water supply for egg incubation and larval survival, loss of juvenile green sturgeon due to entrainment at fish collection facilities in Sacramento River's South Delta and agricultural diversions within the Sacramento River and Delta systems, alterations of food resources due to changes in the Sacramento River and Delta

habitats, and exposure to various sources of contaminants throughout the basin to juvenile, sub-adult, and adult life stages.

The southern green sturgeon was recently listed as threatened under the ESA (Table 7). This species includes all naturally-spawned green sturgeon that occurs south of the Eel River in Humboldt County, California. The principal factor for the decline of southern green sturgeon is the reduction of its spawning area to a single known population limited to a small portion of the Sacramento River. Unless spawning, green sturgeon are broadly distributed in nearshore marine areas from Mexico to the Bering Sea and are commonly observed in bays, estuaries, and sometimes the deep riverine mainstem in lower elevation reaches of non-natal rivers along the west coast of North America. The principal threat to southern green sturgeon is the reduction of available spawning habitats due to the construction of barriers along the Sacramento and Feather rivers. Other threats are insufficient flow rates, increased water temperatures, water diversion, non-native species, poaching, pesticide and heavy metal contamination, and local fishing. In Oregon, green sturgeon have been documented in the Columbia River estuary, Tillamook Bay, Yaquina Bay, Winchester Bay (Umpqua River), Coos Bay, and the Rogue River estuary. These Oregon coastal bays and estuaries provide over-summering habitat for adult and subadult feeding, optimization for growth, and thermal refugia.

Eulachon. The southern DPS of Eulachon was proposed for ESA as threatened on listing March 13, 2009 (Table 7). The southern population includes all naturally-spawned populations that occur in rivers south of the Nass River in British Columbia to the Mad River in California. Core populations for this species include the Fraser River, Columbia River and (historically) the Klamath River. Within the Columbia River, major tributaries that support spawning runs include the Grays, Skamokawa, Elochoman, Kalama, Lewis and Sandy rivers. In the early 1990s, there was an abrupt decline in the abundance of eulachon returning to the Columbia River with no evidence of returning to their former population levels since then (Drake *et al.* 2008). Of the four components of species viability criteria, abundance of southern eulachon has declined in the Columbia River to historic low levels, productivity is of concern due to climate change, diversity is limited to a single age class, and spatial structure is declining as runs sizes dwindle throughout their range (Drake *et al.* 2008). Based on these factors, the Biological Review Team (BRT) determined that the southern eulachon was at "moderate risk" of extinction (Drake *et al.* 2008).

The BRT identified the following factors affecting the southern eulachon: (1) Changes in ocean conditions due to climate change; (2) peak river flow changes (decoupling spawning and spring freshets) due to climate change; (3) dams and water diversions; (4) water quality degradation; (5) dredging; (6) commercial, recreational and subsistence harvest; (7) disease and predation; (8) bycatch; and, (9) natural events, such as the Mt. St. Helens volcano eruptions (Drake *et al.* 2008).

Status of the Critical Habitat. Climate change, as described in the introduction above, is likely to adversely affect the conservation value of designated critical habitats in the Pacific Northwest. These effects are likely to include, but are not limited to, depletion of cold water habitat and other variations in quality and quantity of tributary spawning, rearing and migration habitats and estuarine areas.

NMFS designated critical habitat for all species considered in this opinion, except LCR coho salmon and eulachon, for which critical habitat has not been proposed or designated (Table 7). To assist in the designation of critical habitat for ESA-listed species of salmon and steelhead in 2005, NMFS convened Critical Habitat Analytical Review Teams, or "CHARTs," organized by major geographic areas that roughly correspond to salmon recovery planning domain (NMFS 2005). Each CHART consisted of Federal biologists and habitat specialists from NMFS, the Fish and Wildlife Service, the Forest Service, and the Bureau of Land Management, with demonstrated expertise regarding salmon and steelhead habitat and related protective efforts within that domain.

Each CHART assessed biological information pertaining to areas under consideration for designation as critical habitat to identify the areas occupied by listed salmon and steelhead, determined whether those areas contained primary constituent elements (PCEs) essential for the conservation of those species, and whether unoccupied areas existed within the historical range of the listed salmon and steelhead that may also be essential for conservation. The CHART then scored each habitat area based on the quantity and quality of the physical and biological features; rated each habitat area as having a ''high,'' ''medium,'' or ''low'' conservation value; and identified management actions that could affect habitat for salmon and steelhead.

The NMFS reviews the status of designated critical habitat affected by the proposed action by examining the condition and trends of PCEs throughout the designated area. PCEs consist of the physical and biological features identified as essential to the conservation of the listed species in the documents that designate critical habitat (Tables 21, 22, and 23).

Table 21. PCEs of critical habitats designated for ESA-listed salmon and steelhead species considered in the Opinion (except SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, and SONCC coho salmon), and corresponding species life history events.

Primary Constituent Elements		**Species Life History Event**
Site Type	**Site Attribute**	
Freshwater spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence from gravel Fry/parr/smolt growth and development
Freshwater migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Estuarine areas	Forage Free of artificial obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation and "reverse smoltification" Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Nearshore marine areas	Forage Free of artificial obstruction Natural cover Water quantity Water quality	Adult growth and sexual maturation Adult spawning migration Nearshore juvenile rearing
Offshore marine areas	Forage Water quality	Adult growth and sexual maturation Adult spawning migration Subadult rearing

Table 22. PCEs of critical habitats designated for SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, SONCC coho salmon, and corresponding species life history events.

Primary Constituent Elements		**Species Life History Event**
Site	**Site Attribute**	
Spawning and juvenile rearing areas	Access (sockeye) Cover/shelter Food (juvenile rearing) Riparian vegetation Space (Chinook, coho) Spawning gravel Water quality Water temp (sockeye) Water quantity	Adult spawning Embryo incubation Alevin growth and development Fry emergence from gravel Fry/parr/smolt growth and development
Adult and juvenile migration corridors	Cover/shelter Food (juvenile) Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Areas for growth and development to adulthood	Ocean areas – not identified	Nearshore juvenile rearing Subadult rearing Adult growth and sexual maturation Adult spawning migration

Table 23. PCEs of critical habitat proposed for southern green sturgeon and corresponding species life history events.

Primary Constituent Elements		**Life History Event**
Site Type	**Site Attribute**	
Freshwater riverine system	Food resources Migratory corridor Sediment quality Substrate type or size Water Depth Water flow Water quality	Adult spawning Embryo incubation, growth and development Larval emergence, growth and development Juvenile metamorphosis, growth and development
Estuarine areas	Food resources Migratory corridor Sediment quality Water flow Water depth Water quality	Juvenile growth, development, seaward migration Subadult growth, development, seasonal holding, and movement between estuarine and marine areas Adult growth, development, seasonal holding, movements between estuarine and marine areas, upstream spawning movement, and seaward post-spawning movement
Coastal marine areas	Food resources Migratory corridor Water quality	Subadult growth and development, movement between estuarine and marine areas, and migration between marine areas Adult sexual maturation, growth and development, movements between estuarine and marine areas, migration between marine areas, and spawning migration

Willamette and Lower Columbia River Recovery Domain. Critical habitat was designated in the WLC Recovery Domain for UWR spring-run Chinook salmon, LCR Chinook salmon, LCR steelhead, UWR steelhead, and CR chum salmon. In addition to the Willamette and Columbia river mainstems, important tributaries on the Oregon side of the WLC include Youngs Bay, Big Creek, Clatskanie River, and Scappoose River in the Oregon Coast subbasin; Hood River in the Gorge; and the Sandy, Clackamas, Molalla, North and South Santiam, Calapooia, McKenzie, and Middle Fork Willamette rivers in the West Cascades subbasin.

The Willamette River, once a highly braided river system, has been dramatically simplified through channelization, dredging, and other activities that have reduced rearing habitat by as much as 75%. In addition, the construction of 37 dams in the basin blocked access to more than 435 miles of stream and river spawning habitat. The dams alter the temperature regime of the Willamette River and its tributaries, affecting the timing and development of naturally-spawned eggs and fry. Agriculture, urbanization, and gravel mining on the valley floor and timber harvesting in the Cascade and Coast ranges contribute to increased erosion and sediment loads throughout the basin.

The mainstem Willamette River has been channelized and stripped of large wood. Development began to encroach on the riparian forest beginning in the 1870s (Sedell and Froggatt 1984). Gregory *et al*. (2002a) calculated that the total mainstem Willamette River channel area

decreased from 41,000 to 23,000 acres between 1895 and 1995. They noted that the lower reach, from the mouth of the river to Newberg (river mile [RM] 50), is confined within a basaltic trench, and that due to this geomorphic constraint, less channel area has been lost than in upstream areas. The middle reach from Newberg to Albany (RM 50 to RM 120) incurred losses of 12% primary channel area, 16% side channels, 33% alcoves, and 9% islands. Even greater changes occurred in the upper reach, from Albany to Eugene (RM 187). There, approximately 40% of both channel length and channel area were lost, along with 21% of the primary channel, 41% of side channels, 74% of alcoves, and 80% of island areas.

The banks of the Willamette River have more than 96 miles of revetments; approximately half were constructed by the Corps. Generally, the revetments were placed in the vicinity of roads or on the outside bank of river bends, so that while only 26% of the total length is revetted, 65% of the meander bends are revetted (Gregory *et al*. 2002b). The majority of dynamic sections have been armored, reducing adjustments in channel bed and sediment storage by the river, and thereby diminishing both the complexity and productivity of aquatic habitats (Gregory *et al*. 2002c).

Riparian forests have diminished considerably in the lower reaches of the Willamette River (Gregory *et al*. 2002d). Sedell and Frogatt (1984) noted that agriculture and cutting of streamside trees were major agents of change for riparian vegetation, along with snagging of large wood in the channel. The reduced shoreline, fewer and smaller snags, and reduced riparian forest comprise large functional losses to the river, reducing structural features, organic inputs from litter fall, entrained allochthonous materials, and flood flow filtering capacity. Extensive changes began before the major dams were built, with navigational and agricultural demands dominating the early use of the river. The once expansive forests of the Willamette River floodplain provided valuable nutrients and organic matter during flood pulses, food sources for macroinvertebrates, and slow-water refugia for fish during flood events. These forests also cooled river temperatures as the river flowed through its many channels.

Gregory *et al*. (2002d) described the changes in riparian vegetation in river reaches from the mouth to Newberg, from Newberg to Albany, and from Albany to Eugene. They noted that the riparian forests were formerly a mosaic of brush, marsh, and ash tree openings maintained by annual flood inundation. Below the City of Newberg, the most noticeable change was that conifers were almost eliminated. Above Newberg, the formerly hardwood-dominated riparian forests along with mixed forest made up less than half of the riparian vegetation by 1990, while agriculture dominated. This conversion represents a loss of recruitment potential for large wood, which functions as a component of channel complexity, much as the morphology of the streambed does, to reduce velocity and provide habitat for macroinvertebrates that support the prey base for salmon and steelhead. Declining extent and quality of riparian forests have also reduced rearing and refugia habitat provided by large wood, shading by riparian vegetation which can cool water temperatures, and the availability of leaf litter and the macroinvertebrates that feed on it.

Hyporheic flow in the Willamette River has been examined through discharge measurements and was found to be significant in some areas, particularly those with gravel deposits (Fernald *et al*. 2001). The loss of channel complexity and meandering that fosters creations of gravel deposits

decreases the potential for hyporheic flows, as does gravel mining. Hyporheic flow processes water and affects its quality on reemerging into the main channel, stabilizing variations in physical and chemical water characteristics. Hyporheic exchange was found to be significant in the National Water-Quality Assessment of the Willamette Basin (Wentz *et al*. 1998). In the transient storage zone, hyporheic flow is important for ecological functions, some aspects of water quality (such as temperature and dissolved oxygen), and some benthic invertebrate life stages. Alcove habitat, limited by channelization, combines low hydraulic stress and high food availability with the potential for hyporheic flows across the steep hydraulic gradients in the gravel separating them from the main channel (Fernald *et al*. 2001).

On the mainstem of the Columbia River, hydropower projects, including the Federal Columbia River Hydropower System (FCRPS), have significantly degraded salmon and steelhead habitats (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005, NMFS 2006). The series of dams and reservoirs that make up the FCRPS block an estimated 12 million cubic yards of debris and sediment that would otherwise naturally flow down the Columbia and replenish shorelines along the Washington and Oregon coasts.

Industrial harbor and port development are also significant influences on the Lower Willamette and Lower Columbia rivers (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005, NMFS 2006). Since 1878, 100 miles of river channel within the mainstem Columbia River, its estuary, and Oregon's Willamette River have been dredged as a navigation channel by the Army Corps of Engineers. Originally dredged to a 20-foot minimum depth, the Federal navigation channel of the Lower Columbia River is now maintained at a depth of 43 feet and a width of 600 feet. The Lower Columbia River supports five ports on the Washington State side: Kalama, Longview, Skamania County, Woodland, and Vancouver. These ports primarily focus on the transport of timber and agricultural commodities. In addition to loss of riparian habitat, and disruption of benthic habitat due to dredging, high levels of several sediment chemicals, such as arsenic and polycyclic aromatic hydrocarbons (PAHs), have been identified in Lower Columbia River watersheds in the vicinity of the ports and associated industrial activities.

The most extensive urban development in the Lower Columbia River subbasin occurs in the Portland/Vancouver area. Outside of this major urban area, the majority of residences and businesses rely on septic systems. Common water quality issues with urban development and residential septic systems include higher water temperatures, lowered dissolved oxygen, increased fecal coliform bacteria, and increased chemicals associated with pesticides and urban runoff.

The Columbia River estuary has lost a significant amount of tidal marsh and tidal swamp habitat that are critical to juvenile salmon and steelhead, particularly small or ocean-type species (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005, NMFS 2006). Edges of marsh areas provide sheltered habitats for juvenile salmon and steelhead where food, in the form of amphipods or other small invertebrates which feed on marsh detritus, is plentiful, and larger predatory fish can be avoided. Historically, floodwaters of the Columbia River inundated the margins and floodplains along the estuary, allowing juvenile salmon and steelhead access to a wide expanse of low-velocity marshland and tidal channel habitats. In general, the riverbanks were gently sloping, with riparian and wetland vegetation at the higher elevations of the river floodplain

becoming habitat for salmon and steelhead during flooding river discharges or flood tides. Sherwood *et al*. (1990) estimated that the Columbia River estuary lost 20,000 acres of tidal swamps, 10,000 acres of tidal marshes, and 3,000 acres of tidal flats between 1870 and 1970. This study further estimated an 80% reduction in emergent vegetation production and a 15% decline in benthic algal production.

Habitat and food-web changes within the estuary, and other factors affecting salmon population structure and life histories, have altered the estuary's capacity to support juvenile salmon (Bottom *et al*. 2005, Fresh *et al*. 2005, NMFS 2005, NMFS 2006). Diking and filling activities that decrease the tidal prism and eliminate emergent and forested wetlands and floodplain habitats have likely reduced the estuary's salmon-rearing capacity. Moreover, water and sediment in the lower Columbia River and its tributaries have levels of toxic contaminants that are harmful to fish and wildlife (LCREP 2007). Contaminants of concern include dioxins and furans, heavy metals, polychlorinated biphenyls (PCBs) and organochlorine pesticides such as DDT. Simplification of the population structure and life-history diversity of salmon possibly is yet another important factor affecting juvenile salmon viability. Restoration of estuarine habitats, particularly diked emergent and forested wetlands, reduction of avian predation by terns, and flow manipulations to restore historical flow patterns might significantly enhance the estuary's productive capacity for salmon, although historical changes in population structure and salmon life histories may prevent salmon from making full use of the productive capacity of estuarine habitats, even in their presently altered state.

Interior Columbia Recovery Domain. Critical habitat has been designated in the IC Recovery Domain, which includes the Snake River basin, for SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, UCR spring-run Chinook salmon, SR sockeye salmon, MCR steelhead, UCR steelhead, and SRB steelhead. Major tributaries in the Oregon portion of the IC Recovery Domain include the Deschutes, John Day, Umatilla, Walla Walla, Grande Ronde, and Imnaha rivers.

Habitat quality in tributary streams in the IC Recovery Domain varies from high quality in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (Wissmar *et al.* 1994, Carmichael 2006). Critical habitat throughout the IC recovery domain has been degraded by intense agriculture, alteration of stream morphology (*i.e.*, channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, water withdrawals, livestock grazing, dredging, road construction and maintenance, timber harvest, mining, and urbanization. Reduced summer stream flows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in developed areas.

Migratory habitat quality in this area has been severely affected by the development and operation of the FCRPS dams and reservoirs in the mainstem Columbia River, Bureau of Reclamation tributary projects, and privately-owned dams in the Snake and Upper Columbia river basins. For example, construction of Hells Canyon Dam eliminated access to several likely production areas in Oregon and Idaho including the Burnt, Powder, Weiser, Payette, Malheur, Owyhee, and Boise river basins (Good *et al*. 2005), and Grande Coulee and Chief Joseph dams completely block anadromous fish passage on the upper mainstem Columbia River. Hydroelectric development modified natural flow regimes, resulting in higher water

temperatures, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adult and juveniles. Physical features of dams such as turbines also kill migrating fish. In-river survival is inversely related to the number of hydropower projects encountered by emigrating juveniles.

Similarly, development and operation of extensive irrigation systems and dams for water withdrawal and storage in tributaries have drastically altered hydrological cycles. A series of large regulating dams on the middle and upper Deschutes River affect flow and block access to upstream habitat, and have extirpated one or more populations from the Cascades Eastern Slope major population (IC-TRT 2003). Pelton Round Butte Dam blocked 32 miles of MCR steelhead habitat in the mainstem Deschutes below Big Falls and removed the historically-important tributaries of the Metolius River and Squaw Creek from production. Similarly, Condit Dam on the White Salmon River extirpated another population from the Cascades Eastern Slope major group. In the Umatilla River subbasin, the Bureau of Reclamation developed the Umatilla Project beginning in 1906. The project blocked access to more than 108 miles of historically highly productive tributary habitat for MCR steelhead in upper McKay Creek with construction of the McKay Dam and Reservoir in 1927. A flood control and irrigation dam on Willow Creek was built near RM 5, completely blocking MCR steelhead access to productive habitat upstream in this subbasin. Construction of Lewiston Dam, completed in 1927, eliminated access for Snake River basin steelhead and salmon to a major portion of the Clearwater basin. Continued operation and maintenance of large water reclamation systems such as the Umatilla Basin and Yakima Projects have significantly reduced flows and degraded water quality and physical habitat in these rivers.

Many Oregon stream reaches designated as critical habitat in the IC Recovery Domain are over-allocated under state water law, with more allocated water rights than existing streamflow conditions can support. Irrigated agriculture is common throughout this region and withdrawal of water (*e.g.*, reduced summer flows) increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence *et al.* 1996). Reduced tributary stream flow has been identified as a major limiting factor for all listed salmon and steelhead species in this area except SR fall-run Chinook salmon (NMFS 2005).

Summer stream temperature is the primary water quality problem, with many stream reaches designated as critical habitat listed on the Clean Water Act's section 303(d) list for water temperature. Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Contaminants such as insecticides and herbicides from agricultural runoff and heavy metals from mine waste are common in some areas of critical habitat.

Oregon Coast Coho Salmon Recovery Domain. In this recovery domain, critical habitat has been designated for OC coho salmon. Many large and small rivers supporting significant populations of coho salmon flow through this domain, including the Nehalem, Nestucca, Siletz, Yaquina, Alsea, Siuslaw, Umpqua, Coos, and Coquille.

The historical disturbance regime in the central Oregon Coast Range was dominated by a mixture of high and low-severity fires, with a natural rotation of approximately 271 years. Old-growth forest coverage in the Oregon Coast Range varied from 25-75% during the past 3000 years, with a mean of 47%, and never fell below 5% (Wimberly *et al.* 2000). Currently the Coast Range has approximately 5% old-growth, almost all of it on Federal lands. The dominant disturbance now is timber harvesting on a cycle of 30-100 years, with fires suppressed.

In 2005, ODFW mapped the distribution of streams with high intrinsic potential for coho salmon rearing by land ownership categories (ODFW 2005). Agricultural lands and private industrial forests have by far the highest percentage of land ownership in high intrinsic potential (HIP) areas and along all coho stream miles. Federal lands have only about 20% of coho stream miles and 10% of high intrinsic potential (HIP) stream reaches. Because of this distribution, activities in lowland agricultural areas are particularly important to the conservation of Oregon coastal coho.

The coho assessment concluded that at the scale of the entire domain, pools are generally abundant, although slow-water and off-channel habitat (which are important refugia for coho during high winter flows) are limited in the majority of streams when compared to reference streams in minimally-disturbed areas. Amounts of large wood in streams are low in all four ODFW monitoring areas and land-use types relative to reference conditions. Amounts of fine sediment are high in three of the four monitoring areas, and were comparable to reference conditions only on public lands. Approximately 62 to 91% of tidal wetland acres (depending on estimation procedures) have been lost for functionally and potentially independent populations of coho.

As part of the coastal coho assessment, the Oregon Department of Environmental Quality (ODEQ) analyzed the status and trends of water quality in the range of OC coho using the Oregon water quality index, which is based on a combination of temperature, dissolved oxygen, biological oxygen demand, pH, total solids, nitrogen, total phosphates, and bacteria. Using the index at the species scale, 42% of monitored sites had excellent to good water quality, and 29% show poor to very poor water quality. Within the four monitoring areas, the North Coast had the best overall conditions (six sites in excellent or good condition out of nine sites), and the Mid-South coast had the poorest conditions (no excellent condition sites, and only two out of eight sites in good condition). For the 10-year period monitored between 1992 and 2002, no sites showed a declining trend in water quality. The area with the most improving trends was the North Coast, where 66% of the sites (six out of nine) had a significant improvement in index scores. The Umpqua River basin, with one out of nine sites (11%) showing an improving trend, had the lowest number of improving sites.

Southern Oregon and Northern California Coasts Coho Salmon Recovery Domains. Critical habitat in this recovery domain was designated for SONCC coho salmon on June 28, 2005. Many large and small rivers supporting significant populations of coho salmon flow through the area, including the Elk, Rogue, Chetco, Smith and Klamath. The following summary of critical habitat information in the Elk, Rogue, and Chetco rivers is also applicable to habitat characteristics and limiting factors in other basins in this area.

The Elk River flows through Curry County, drains approximately 92 square miles (or 58,678 acres) (Maguire 2001). Major tributaries of the Elk River include the North Fork, South Fork, Blackberry Creek, Panther Creek, Butler Creek, and Bald Mountain Creek. The upper portion of the Elk River basin is characterized by steeply sloped forested areas with narrow valleys and tributary streams that have steep to very steep gradients. Grazing, rural/residential development and other agricultural uses are the dominant land uses in the lower portion of the basin (Maguire 2001). Over half of the Elk River basin is in the Grassy Knob wilderness area. Historical logging, mining, and road building have degraded stream and riparian habitats in the Elk River basin. Limiting factors identified for salmon and steelhead production in this basin include sparse riparian cover, especially in the lower reaches, excessive fine sediment, high water temperatures, and noxious weed invasions (Maguire 2001).

The Rogue River drains approximately 5,160 square miles within Curry, Jackson and Josephine counties in southwest Oregon. The mainstem is about 200 miles long and traverses the coastal mountain range into the Cascades. The Rogue River estuary has been modified from its historical condition. Jetties were built by the Corps in 1960, which stabilized and deepened the mouth of the river. A dike that extends from the south shore near Highway 101 to the south jetty was completed in 1973. This dike created a backwater for the large shallow area that existed here, which has been developed into a boat basin and marina, eliminating most of the tidal marsh.

The quantity of estuary habitat is naturally limited in the Rogue River. The Rogue River has a drainage area of 5,160 square miles, but the estuary at 1,880 acres is one of the smallest in Oregon. Between 1960 and 1972, approximately 13 acres of intertidal and 14 acres of subtidal land were filled in to build the boat basin dike, the marina, north shore riprap and the other north shore developments (Hicks 2005). Jetties constructed in 1960 to stabilize the mouth of the river and prevent shoaling have altered the Rogue River, which historically formed a sill during summer months (Hicks 2005).

The Lower Rogue Watershed Council's watershed analysis (Hicks 2005) lists factors limiting fish production in tributaries to Lower Rogue River watershed. The list includes water temperatures, low stream flows, riparian forest conditions, fish passage and over-wintering habitat. Limiting factors identified for the Upper Rogue River basin include fish passage barriers, high water temperatures, insufficient water quantity, lack of large wood, low habitat complexity, and excessive fine sediment (RBCC 2006).

The Chetco River is in the southwest corner of Oregon, almost entirely within Curry County, with a drainage of approximately 352 square miles. The Chetco River mainstem is about 56 miles long, and the upper 28 miles are within the Kalmiopsis Wilderness Area. Elevations in the watershed range from sea level to approximately 5,098 feet. The upper portion of the basin is characterized by steep, sloping forested areas with narrow valleys and tributary streams that have moderately steep to very steep gradient. The lowest 11 miles of the river are bordered by private land in rural/residential, forestry, and urban land uses.

The Chetco River estuary is significantly modified from its historical condition. Jetties were erected by the Corps 1957, which stabilized and deepened the mouth of the river. These jetties have greatly altered the mouth of the Chetco River and how the estuary functions as habitat for

salmon migrating to the ocean. A boat basin and marina were built in the late 1950s and eliminated most of the functional tidal marsh. The structures eliminated shallow water habitats and vegetation in favor of banks stabilized with riprap. Since then, nearly all remaining streambank in the estuary has been stabilized with riprap. The South Coast Watershed Council's watershed analysis (Maguire 2001) states the factors limiting fish production in the Chetco River appear to be high water temperature caused by lack of shade, especially in tributaries, high rates of sedimentation due to roads, poor over-wintering habitat due to a lack of large wood in tributaries and the mainstem, and poor quality estuary habitat (Maguire 2001).

Environmental Baseline

The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The NMFS describes the environmental baseline in terms of the habitat features and processes necessary to support all life stages of each listed species within the action area. Each listed species considered in this Opinion resides in or migrates through the action area. Thus, for this action area, the biological requirements for salmon, steelhead, green sturgeon, and eulachon are the habitat characteristics that support successful completion of spawning, rearing, freshwater migration, and transition to saltwater.

The biological requirements of anadromous fish vary depending on the life history stage and the natural range of variation present within aquatic systems (Groot and Margolis 1991, NRC 1996, Spence *et al*. 1996). During spawning migrations, adult fish require clean water with cool temperatures and access to thermal refugia, dissolved oxygen near 100 percent saturation, low turbidity, adequate flows and depths to allow passage over barriers to reach spawning sites, and sufficient holding and resting sites. Anadromous fish select spawning areas based on species-specific requirements of flow, water quality, substrate size, and groundwater upwelling. Embryo survival and fry emergence depend on substrate conditions (*e.g.,* gravel size, porosity, permeability, oxygen concentrations), substrate stability during high flows, and, for most species, water temperatures of 13°C or less. Habitat requirements for juvenile rearing include seasonally suitable microhabitats for holding, feeding, and resting. Migration of juveniles to rearing areas, whether the ocean, lakes, or other stream reaches, requires access to these habitats. Physical, chemical, and thermal conditions may impede movements of adult or juvenile fish.

Anadromous fish also require properly functioning estuary habitat. Estuaries represent one of three major stages in the life cycles of salmon and steelhead. In the ocean, juveniles grow to adults as they forage in food-rich environments. The estuary is where juveniles and adults undergo vast physiological changes needed to transition to and from saltwater. In addition, a properly functioning estuary provides high quality growth conditions for growth and refugia from predators.

The condition of aquatic habitats on Federal lands and adjacent lands varies from excellent in wilderness, roadless, and undeveloped areas to poor in areas heavily impacted by development and natural resource extraction (FEMAT 1993, McIntosh *et al*. 1994, Wissmar *et al.* 1994, Lee *et al.* 1997).

West of the Cascade Mountains, stream habitats and riparian areas have been degraded by road construction, timber harvest, splash damming, urbanization, agricultural activities, mining, flood control, filling of estuaries, and construction of dams (Sedell *et al.* 1991; FEMAT 1993; NMFS 1996). Road construction has increased the drainage network of watersheds, created fish passage barriers at road-stream crossings, and increased delivery of fine sediments. Timber harvest has removed shade-providing trees, decreased recruitment of large woody debris, and increased delivery of fine sediments to streams. Splash damming to move logs severely degraded steam channels by removing habitat elements such as boulders and large woody debris and increasing stream width-to-depth ratios. Mining of gravel and precious metals removed natural stream substrates, created tailing piles in riparian areas, and altered stream channels. Flood control projects straightened stream channels. Construction of dams has blocked fish passage, altered natural hydrologic cycles, and interrupted bedload movement.

East of the Cascade Mountains, aquatic habitats on Federal lands have been degraded by road building, timber harvest, splash damming, livestock grazing, water withdrawal, agricultural activities, mining, urbanization, and construction of reservoirs and dams (BLM and USFS 1994a; McIntosh *et al*. 1994; Wissmar *et al.* 1994; Lee *et al*. 1997). As with areas west of the Cascades, road construction has increased the drainage network of watersheds, created fish passage barriers at road-stream crossings, and increased delivery of fine sediments. Timber harvest has removed shade-providing trees, decreased recruitment of large woody debris, and increased delivery of fine sediments to streams. Splash damming severely degraded stream channels by removing habitat elements such as boulders and large woody debris and increasing stream width-to-depth ratios. Unmanaged livestock grazing has led to incised stream channels, removal of riparian vegetation, alterations of riparian vegetation communities, increased stream width-to-depth rations, and trampled stream banks. Water withdrawal reduces base flows in streams in montane environments where natural base flows are already low. Water diversion structures can block fish passage and unscreened diversions can entrain fish into canals where they become trapped and die. Streams have been straightened and diked to accommodate transportation infrastructure and agriculture development. Mining of precious metals has left large mine tailing piles in riparian areas and added fine sediment to streams. In some areas, stream channels have been completely destroyed by dredge mining. Abandoned mines often leach contaminated water into streams. Construction of dams and reservoirs has blocked fish passage, altered natural hydrologic cycles, and interrupted bedload movement.

Past Federal actions that affect all action areas addressed by this consultation include the adoption of broad-scale land management plans. For Federal lands in Oregon, all activities are subject to the provisions of the Northwest Forest Plan (NFP) (BLM and USFS 1994b) or PACFISH (BLM and USFS 1994b). In response to the ESA listing of the northern spotted owl and the declining aquatic habitat condition on Federal lands, the USFS and BLM developed these plans, each of which includes an aquatic conservation strategy. The NFP and PACFISH establish measurable goals for aquatic and riparian habitat, standards and guidelines for land

management activities that may affect aquatic habitat, and restoration strategies for degraded habitat. Prior to adoption of these plans, the USFS and BLM lacked a consistent aquatic conservation strategy and protection of stream and riparian function were not always a priority. Although the USFS and BLM have been challenged to fully implement these strategies, the plans represent a major step forward in protection of anadromous fish habitat.

The protections afforded anadromous fish and their habitat by the NFP and PACFISH have resulted in improvements in riparian and stream habitat conditions on Federal lands in Oregon. Many land management activities, such as riparian timber harvest, road construction, and intensive livestock grazing that degraded habitat in the past are now managed to avoid impacts to listed salmon and steelhead. The establishment of riparian reserves or riparian habitat conservation areas has switched the focus of management in these areas to achievement of riparian management objectives rather than extractive resource management. The USFS and BLM have implemented a restoration program that is focused on aquatic habitat limiting factors and restoring ecosystem function. If the NFP and PACFISH or similar plans affording an equal or greater amount of protection remain in place, habitat conditions on Federal lands should continue to recover over time.

The environmental baseline also includes the anticipated impacts of all Federal projects in the action area that have already undergone formal consultation. From 2000 to 2009, NMFS conducted 47 formal consultations with the BLM and 74 formal consultations with the Forest Service in Oregon. None of the BLM or Forest Service consultations reached a jeopardy or adverse modification of critical habitat conclusion.

Of the consultations completed with the BLM, eight consultations were conducted on restoration projects, 36 on natural resource management projects (*i.e.,* timber harvest, grazing, road maintenance, mining, special use permit, herbicide application *etc.*), and three on projects that involved both restoration actions and natural resource management. Of the consultations completed with the USFS, 16 were restoration projects, 49 were natural resources management projects, and nine were projects that involved both restoration actions and natural resource management. It is very likely that the action areas for some of these consultations will overlap with action areas for the herbicide vegetation treatments covered under this programmatic consultation. Impacts to the environmental baseline from these previous projects vary from short-term adverse effects to long-term beneficial effects.

Under the current environmental baseline, the biological needs of listed fish are being met on some Federal lands in Oregon and not being met in others. Since a typical action area of an herbicide treatment will be already degraded in one form or another, at least some biological requirements of listed fish are likely to be unmet. One of the purposes of the actions proposed in this consultation is to restore these degraded habitat conditions.

Species within the Action Area

The action area for this Opinion includes all lands managed by the BLM in Oregon. Therefore, the status of the species within the action area is described in the “Status of the Species” and “Environmental Baseline” sections of this Opinion.

Critical Habitat within the Action Area

The action area for this Opinion includes all lands managed by the BLM in Oregon. Therefore, the status of critical habitat within the action area is described in the "Status of Critical Habitat" and "Environmental Baseline" sections of this Opinion.

Effects of the Action

Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Potential Effects of Proposed Action Components. Implementation of the proposed action is likely to result in invasive plant prevention and treatment projects interrelated to the proposed action that may have beneficial or adverse affects on listed fish. Ultimately, the proposed action is likely to benefit aquatic species by restoring native vegetation and thereby restoring ecosystem and riparian function, and may have other beneficial effects as well. Consequently, most potential adverse effects are likely to be short-term and offset by long-term benefits to riparian function, surface erosion, and possibly other habitat features.

Benefits to ESA-listed fish from invasive plant control are also likely to occur. For example, invasive plants that exclude trees decrease shade, increase bank erosion, and reduce large woody debris sources. In riparian areas infested by Japanese knotweed, knotweed infestations tend to become monocultures and exclude native vegetation, organic matter input from native vegetation is reduced, and surface erosion is increased. If Japanese knotweed excludes trees, important riparian functions are affected locally and effects may persist for decades, until trees and other native vegetation can be reestablished. Thus, efforts to control invasive plants are expected to provide long-term benefits to listed fish in at least some circumstances.

Based on the risk categories documented in the FEIS, the proposed herbicide active ingredients range from no risk to high risk to listed fish. The toxicity of formulated products may be higher, depending on additives used.

General Effects of the Proposed Action – Pathways of Effects. The proposed action does not authorize site-specific herbicide vegetation treatment projects. Therefore, the magnitude, extent, and duration of the effects described in this section will vary depending on the specific herbicide vegetation treatment the BLM adopts. The timing of herbicide vegetation treatment projects can also influence which life stages of listed fish are affected, and significantly alter risk to the species. For example, exposure to effects occurring during fry emergence may have a far greater impact on survival of listed species than the same effects occurring during juvenile rearing. Additional consultations will be required on future site-

specific herbicide plant treatment projects that may affect listed fish, allowing NMFS to assess how individual future herbicide plant treatment projects affect listed species.

The effects to listed fish also depend on spatial and temporal patterns of treatments. If specific, heavily-infested areas become a focus for herbicide treatment, the risk to listed fish from adverse effects will be quite different than if treatments are spread more evenly across infested areas. The anticipated treatment level of approximately 45,200 acres per year across the state would have a higher potential for significant concerns if treatments were concentrated in high infestation areas that coincided with key or higher risk populations within a given species. The concentration of projects could be of particular concern if treatment areas were concentrated along stream corridors and roadside ditches that are hydrologically connected to streams. The risks to individuals and populations of listed species may be increased in areas with large, intensive projects. The response of both individuals and populations of listed fish to simultaneous effects on different essential habitat features may result in synergistic or currently unanticipated effects.

The use of four herbicides (2,4-D, dicamba, glyphosate, and picloram) is allowed under current statewide BLM direction. The use of 12 additional herbicides (bromacil, chlorsulfuron, clopyralid, diuron, fluridone, hexazinone, imazapyr, metsulfuron methyl, sulfometuron methyl, tebuthiuron, and triclopyr) is allowed under the proposed action. Although the treatment tools and associated mitigation methods are improved, due to the location, size, and design of treatment projects needed to control some invasive plant infestations, adverse effects to listed fish are likely.

ESA-listed and their critical habitat are likely to be affected by different herbicide vegetation treatments through the following pathways and are discussed in the subsequent narrative:

Chemical Toxicity. ESA-listed fish and their habitat are likely to be adversely affected during some riparian and roadside herbicide applications, or if an accidental direct application of an herbicide to surface water through overspray or drift occurs. In addition to active ingredients in formulations, inert ingredients, adjuvants, metabolites, and impurities could also affect listed fish. The mere presence of an herbicide may not result in effects to aquatic species; the risk of effects is a function of concentration, duration of exposure, species presence and life stage, and toxicity of the herbicide and associated compounds.

Herbicides (along with inert ingredients, adjuvants, metabolites, and impurities) indirectly enter surface water through a variety of routes. Plants treated with herbicides may release chemicals into the soil via roots or from rinsing during rainfall. Treated plant biomass containing slowly-decaying herbicides can become incorporated with soil organic matter, or overspray onto soil can contaminate soil. Herbicides and formulation additives move from soil into surface water through leaching or soil erosion from wind or water.

The sub-lethal effects of chemicals can include changes in behaviors or body functions that are not directly lethal to listed species, but could affect reproduction, juvenile to adult survival, or other life history events. Indirect sub-lethal effects to listed fish may be mediated by effects to habitat or food supply. Herbicides are designed to kill plants, and have the potential to disrupt

aquatic food webs by affecting instream primary productivity and cover provided by aquatic macrophytes.

Herbicide treatment methods indirectly introduce chemicals to surface water. Chemical concentrations, duration of exposure, and sensitivity of the species to the chemical (which can vary with life stage) affect the level of toxicity to listed fish. Chemical characteristics such as decay rate and strength of sorption to soil particles affect the concentration of the chemical in water. Environmental factors such as soil particle size, amount of organic matter in the soil, moisture level, and temperature affect decay rate, which in turn affects chemical concentrations in water.

Dissolved Oxygen (DO). Herbicide treatment will most likely affect concentrations of DO. It is likely that some herbicides will be delivered to surface water in concentrations that harm phytoplankton, algae, rooted aquatic macrophytes, and other aquatic plants. A significant reduction of primary productivity or aquatic plants and algae could decrease DO concentrations.

Riparian and Emergent Vegetation. Riparian vegetation is likely to be affected by vegetation treatments using herbicides. Because of their proximity and connections to streams, ecological conditions and processes in riparian areas strongly influence aquatic habitats. Riparian areas provide: shade that mediates water temperature; cover for hiding, resting, and feeding; structural elements of stream channels; and substrate materials. Riparian vegetation supplies and processes nutrients; supports food webs; stabilizes streambanks; dissipates stream energy; filters and traps upland and flood-transported sediments; captures marine-derived nutrients from salmonid carcasses; and hydrologically links side channels, floodplains, and groundwater (FEMAT 1993, Spence *et al.* 1996).

Vegetation treatment in riparian areas is intended to improve the function of riparian areas by restoring native ecosystem components. Loss or reduction in the coverage and density of target and non-target riparian vegetation due to treatment of invasive plants is likely, and the length of time before suitable vegetation returns to perform riparian functions will vary considerably across the state. In general, improved riparian function due to invasive plant treatment will benefit fish by restoring inputs of native detritus to stream systems and reducing erosion, though there are likely to be localized adverse effects to habitat. Emergent aquatic vegetation is likely to be adversely affected or killed by some herbicide applications, reducing hiding cover.

Water Temperature. Herbicide treatments of some invasive plant species (such as knotweed) in riparian areas are likely to decrease shading of streams by vegetation and, in certain areas, increase the amount of incident solar radiation reaching the stream, increasing water temperatures. The loss of shade will persist until native vegetation reaches and surpasses the height of the invasive plants that were removed. This loss of shade will persist from one to many years, depending on the success of invasive plant treatment, stream size and location, topography, growing conditions for the replacement plants, and the density and height of the invasive plants when treated.

Fine Sediment and Turbidity. Herbicide treatments do not kill invasive species immediately. As treated vegetation dies and loses root strength, soil can be moved into surface

water through water movement or wind. However, a substantial amount of vegetation die-off beside a stream would be necessary to significantly increase sediment delivery and turbidity.

Some applications of non-selective herbicides in riparian areas or areas hydrologically connected to streams are likely to result in increased fine sediment delivery and increased turbidity. Many herbicides are selective, acting only on specific groups of plants and leaving non-target species on the treatment site. Selective herbicides are less likely to influence sediment delivery or turbidity.

Instream Habitat. Instream habitat is likely to be affected by herbicide treatments. Herbicide treatments will affect instream habitat if removal of riparian vegetation occurs at a level that will cause erosion or damage streambanks. Bank damage can result in loss of undercut banks (hiding cover), increased width/depth ratio, and sediment delivery. The effects of sediment delivery are discussed above. As previously discussed, herbicide treatments can potentially kill or damage aquatic macrophytes that provide cover for juvenile listed fish.

Forage. Herbicides in riparian areas are likely to affect food sources for listed fish. The significance of this effect is related to the intensity, frequency, and extent of herbicide treatment in riparian areas.

Inputs of plant matter and insects from streamside vegetation are important sources of nutrients and energy in some aquatic systems, particularly small, heavily vegetated headwater streams. Changes in the composition of riparian vegetation due to invasive plant treatment could potentially cause short-term changes in the availability and composition of these food sources. However, these changes are likely to favor native food sources and ultimately benefit listed fish.

Effects to allochthonous energy/food inputs from riparian areas occur through three pathways. Any invasive plant treatment in riparian areas could reduce primary production that provides allochthonous energy to the stream in the form of leaf or other vegetative material. The duration of this effect will be limited by restoration of appropriate vegetation, which would provide a new source of vegetative matter. Insects using treated riparian vegetation may be lost because of removal of forage vegetation. The duration of this effect would also be limited by the restoration of appropriate vegetation. Herbicide treatment can be toxic to terrestrial and aquatic insects that are a source of food for listed fish. The magnitude and duration of the effect to riparian insects is a function of the sensitivity of the invertebrate to the herbicide, the herbicide breakdown rate, the extent of the area treated, the toxicity of the herbicide, and the life stages of the invertebrates affected by the herbicide.

Herbicides can damage periphyton and other aquatic plants, the sources of autochthonous primary production in surface water. The importance of autochthonous primary production to instream food webs varies significantly among stream systems. The extent of effects to aquatic plants from herbicide exposure is a function of numerous factors, including the extent of the treatment area, proximity of the treatment area to the streams, herbicide half-life and soil affinity, sensitivity of aquatic plants to a specific herbicide, surface water characteristics such as pH, and suspended sediment load of the stream.

Species within the Action Area

The applicability of effects pathways of herbicide vegetation treatments, as discussed above, to the life stages of ESA-listed fish are displayed in Table 24.

Table 24. Likely effects pathways of invasive plant control tools to species by life stages.

	Life Stage of ESA-listed Fish				
Species	Spawning	Eggs/Fry	Juvenile Rearing	Juvenile Migration	Adult Migration
Spring/Summer Chinook	1 – 4 , 7	1 – 7	1 – 7	1 – 7	1 – 4, 7
Fall Chinook	1 – 4 , 7	1 – 7	1 – 7	1 – 7	1 – 4, 7
Chum	1, 4	1, 4, 5, 6	1, 4, 5, 6	1, 4, 6	1, 4
Coho	1 – 4 , 7	1 – 7	1 – 7	1 – 7	1 – 4, 7
Sockeye	None[13]	None	None	1, 4, 5, 6	1
Steelhead	1 – 4 , 7	1 – 7	1 – 7	1 – 7	1 – 4, 7
Green Sturgeon	1,3,4	1,3,4	6	1,3,4,6	1,3,4
Eulachon	1,4	1,4	1,4,6	1,4	1,4

* Effect pathways. 1=Chemical toxicity, 2=Dissolved oxygen, 3=Water temperature, 4=Turbidity and fine sediment, 5=Instream habitat structure, 6=Forage, 7=Riparian structure.

Water quality changes likely to affect individual fish are increased turbidity, increased water temperature, altered pH and dissolved oxygen level, and the presence of herbicides and associated compounds. Increased turbidity may interfere with spawning, juvenile and adult migrations, fry, and juvenile feeding (Meehan 1991; Redding *et al.* 1987).

Increased water temperatures are likely to occur only when riparian areas heavily infested with knotweed are treated, and most vegetative shade is removed. In these circumstances, temperature increases are unlikely to be extensive due to the difficulty of large-scale treatment and patchy nature of knotweed infestations. Juvenile steelhead, spring/summer Chinook, and coho salmon are the species most likely to be present in areas affected by increased temperatures. Potential effects of increased water temperature include decreased growth, increased disease susceptibility, reduced survival, delayed migration, and increased competition from introduced warm-water fishes (EPA 2001).

Herbicides and associated compounds are likely to affect listed fish through several pathways. Lethal or sub-lethal toxicity to listed fish result if concentrations are high. Analysis conducted in the FEIS indicates that exposures to acute lethal or chronic sub-lethal concentrations as a result of the proposed action are very unlikely, and are generally not plausible. An exception may occur when heavily infested riparian areas, particularly in remote areas with difficult access, require intensive aerial treatment, trading short-term adverse effects to listed fish, which could include mortality, for the long-term ecosystem benefits of invasive plant control. Depending on the aerial application scenario, any of the listed fish and life stages covered in this consultation

[13] There are no BLM lands that occur adjacent to Sockeye spawning and rearing habitat.

could be affected. Bioaccumulation rates are low to very low for all herbicides in the proposed action, and bioaccumulation of herbicides is not an issue.

The risk of acute indirect exposure to sub-lethal concentrations of herbicides is possible from vegetation treatments. Sub-lethal effects can include disruption of behavior such as migration, feeding, and predator avoidance (Meehan 1991; Sandahl *et al.* 2004; Scholz *et al.* 2000). Behavioral changes are driven by molecular-level physiological events, such as changes in enzymatic function, ligand-receptor interaction, or oxygen metabolism (Weis *et al.* 2001). Such small or subtle changes in physiological function can have biologically relevant consequences (McEwen and Wingfield 2003), even though they are difficult or impossible to measure.

Exposure of listed fish to of varying concentrations of some herbicides is likely to occur due to geographical variation in herbicide delivery to streams, uncertainty in the efficacy of mitigation measures, and the implementation of projects that would trade short-term adverse effects to listed fish for long-term ecosystem benefits. All life stages of listed fish could be indirectly exposed to sub-lethal concentrations of herbicides or associated compounds as a result of projects following the proposed direction.

The effects of fine sediment and turbidity generated by use of some treatment methods are expected to be localized, but likely to affect spawning gravels, egg incubation, and fry emergence, particularly in smaller streams inhabited by steelhead, spring Chinook, and coho salmon. Compliance with the SOPs and mitigation measures in the proposed action would minimize effects. Sediment delivery of a magnitude sufficient to cause pool filling and other effects to stream channel morphology is not likely.

Effects to forage of fry and juvenile fish are likely to occur through indirect exposure to herbicides. Following herbicide treatments, primary producers (algae and aquatic macrophytes) are the most likely to be adversely affected. Indirect herbicide inputs to streams are likely to occur in pulses associated with rainfall, and recovery of primary producers from the low exposure levels is likely to occur quickly. If effects to primary producers results in a shortage of food supply, the growth of fry and juvenile listed fish could be affected, or they may migrate out of the area. The species most likely to be affected are those associated with smaller stream systems (steelhead, spring/summer Chinook, and coho salmon) where the probability of herbicide concentrations toxic to primary producers is highest.

Critical Habitat within the Action Area

Critical habitat within the action area consists of freshwater rearing sites, freshwater spawning sites, freshwater migration corridors, and estuarine areas, along with their essential physical and biological features as listed below. The effects to critical habitat PCEs from the proposed action are a subset of the habitat-related effects already discussed in the 'Effects of the Action' section. The intensity, duration, and extent of effects on critical habitat depend on project-specific considerations, conservation measures, and treatment methodologies as discussed in the previous section.

Freshwater spawning sites
Water quantity – No effect.
Water quality – Herbicides are likely to enter surface water through a variety of routes. Concentrations of herbicides in the stream depend on the rate of application, methodology, and the stream's surface to volume ratio. Effects are likely to be short-term, accounting for attenuation and eventual dilution. The reduction of streamside vegetation through herbicide treatments is likely to increase the amount of solar radiation reaching the water's surface, increasing temperature. Changes in the aquatic vegetative community structure can result in changes in photosynthetic oxygen production and cellular respiration. This is likely to lead to exaggerated diel shifts in oxygen concentration and pH. These effects are likely to be short-term effects until streamside vegetation regrows.
Substrate – Herbicide treatments are likely to cause alterations in the vegetative structure of riparian areas and are reasonably likely to influence aquatic ecosystems. The loss of rooting systems and vegetative cover is likely to cause streambanks and hillslopes to lose stability and increase erosion and sedimentation rates. Sedimentation is reasonably likely to reduce fry and egg survival and the quality of rearing habitat in the short and long term.

Freshwater rearing sites
Water quantity – No effect.
Floodplain connectivity – No effect.
Water quality – See above.
Forage – Herbicides leaching into the water are likely to adversely affect primary producers such as phytoplankton, algae, and rooted aquatic macrophytes by interfering with photosynthesis, respiration, growth, and reproduction. Reduced primary productivity is reasonably likely to cause negative changes in the species composition and abundance of terrestrial and aquatic communities that support terrestrial or aquatic insects, the food supply for juvenile salmon, steelhead, and sturgeon. Sedimentation from increased erosion is also likely to contribute to the reduced diversity and abundance of aquatic insects and other invertebrate prey. These effects can be of long-term duration, as effects to multiple trophic levels can take substantial recovery times.
Natural cover – Use of herbicides in riparian areas are likely to reduce cover and shade from streamside vegetation.

Freshwater migration corridors
Free passage – No effect.
Water quantity – No effect.
Water quality – respond to temperature in their upstream migrations. Delays in upstream migration are likely to occur if temperature is too high as a result from reasons stated above. In addition, migrating salmon avoid waters with high silt loads and turbidity.
Natural cover – Use of herbicides in riparian areas are likely to reduce cover and shade from streamside vegetation. The reduction in natural cover correlates with a reduction in predator refugia.

Estuarine areas
Free passage – No effect.
Water quality – Same as above.
Water quantity – No effect.

Salinity – No effect.
Natural cover – Same as above.
Juvenile forage – Same as above.
Adult forage – Same as above.

Information presented in the status and baseline sections have shown that infestation by invasive weeds has contributed to a decline of conservation value of critical habitat PCEs for the affected species. With the exception of chemical contamination, most effects on critical habitat result from changes in soil and vegetation characteristics which in turn affect the rate of delivery of water, sediments, nutrients, and other physical parameters such as temperature, dissolved oxygen, and turbidity.

In the short term, the herbicide treatments included in the proposed action are likely to adversely affect critical habitat elements for listed fish species through several effects pathways (see above), primarily through herbicide exposure and sediment introduction. The additional SOPs and mitigation measures at the project level are expected to reduce these impacts. Adverse effects would be of short duration, and the expected beneficial effects of habitat restoration are likely to last longer.

Cumulative Effects

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02).

Land uses and development on lands beside or outside BLM boundaries will likely continue to decrease effectiveness of BLM herbicide vegetation management. For example, the use of invasive plants by landowners for landscaping, while localized, can collectively result in significant impacts, especially along riparian corridors.

Positive cumulative effects could occur as BLM herbicide vegetation control efforts are combined with other efforts of Federal, state, county and private landowners, reducing the rate of spread regionally. The proposed action would complement the efforts of state control programs and community volunteer efforts. For example, the inclusion of English ivy on the state of Oregon noxious weed list has helped to reduce sale of this species in nurseries and prioritized funding for control of this species by the state. Local volunteer efforts to remove the species has not only decreased the extent of the species, but also educated the public on the problems associated with it, which in turn elicits control on the individual level in private backyards.

In areas of growing human population, adverse changes to watershed function from land uses such as residential development and water withdrawal are likely to increase. Land management activities on state and private lands, such as agriculture timber harvest or road construction, also may degrade stream habitats. In some areas, aquatic habitat quality may improve from watershed and stream restoration projects, improved management of riparian areas, and other land management improvements.

Synthesis and Integration of Effects

Species at the Population Scale

NMFS determined whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of the species' survival and recovery in the wild or lead to the destruction or adverse modification of critical habitat. NMFS used the consultation regulations to determine whether actions would further degrade the environmental baseline at a spatial scale relevant to the listed species.

Most of the populations, and all of the ESA-listed species, for which viability has been assessed by a TRT face a moderate to very high risk of extinction. Although variation in ocean productivity is a major factor controlling abundance and productivity within these species, the condition and availability of freshwater habitat are also limiting the recovery of these fish.

The effects described in the *Species within the Action Area* section will be localized and limited to a subset of streams with ESA-listed species and are likely to affect only a small portion of the total number of juveniles and adults of a given year class in a given population. Implementation of several components of the proposed action can potentially result in adverse effects to ESA-listed species. These effects will be further evaluated at the site specific scale as individual projects are brought forward. The proposed action as evaluated herein does not describe, approve, or compel any site-specific projects.

The environmental baseline for the affected species varies widely with respect to habitat conditions and levels of ecological functionality in the action area. The analysis of effects demonstrated that the proposed action will temporarily degrade the condition of the environmental baseline in some localized areas (*i.e.*, at the scale of the site or stream reach), including variables that are among the habitat limiting factors for many of the ESA-listed species. However, the degradation will be relatively short-lived and widely dispersed among watersheds. For these reasons, habitat changes due to the proposed action at the scale evaluated in this Opinion will not adversely affect the abundance, productivity, distribution, or genetic diversity of any listed species at the population scale. The action area is likely to experience cumulative effects from state and private actions at intensities that are similar to recent years, and NMFS is not aware of any specific proposals for any specific non-Federal actions that are planned within the action area. Therefore, the proposed action will not appreciably reduce the survival and recovery of any of the listed species.

Critical Habitat at the Watershed Scale

The effects analysis demonstrated that the adverse effects of the proposed action on critical habitat PCEs will be relatively short-lived, widely dispersed among watersheds, and limited to the scale of the site or stream reach where individual consultations will further analyze those effects. Because of this, critical habitat will remain functional, or retain the ability for its PCEs to become functionally established and serve the intended conservation role for the species. Therefore, the proposed action at the scale evaluated in this Opinion will not destroy or adversely modify designated critical habitats for LCR, UWR, UCR, SR spring/summer run, and SR fall-run Chinook salmon; CR chum salmon; LCR, and SONCC coho salmon; SR sockeye salmon; LCR, UWR, MCR, UCR, and SR steelhead; and southern green sturgeon.

Conclusion

After reviewing the status of LCR, UWR, UCR, and SR spring/summer run, and SR fall-run Chinook salmon; CR chum salmon; LCR, OC, and SONCC coho salmon; SR sockeye salmon; LCR, UWR, MCR, UCR, and SR steelhead; southern green sturgeon; and southern eulachon and the associated designated critical habitats (except for LCR coho salmon and southern eulachon), the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the proposed action considered herein is not likely to jeopardize the continued existence of LCR, UWR, UCR, SR spring/summer run, and SR fall-run Chinook salmon; CR chum salmon; LCR, OC, and SONCC coho salmon; SR sockeye salmon; LCR, UWR, MCR, UCR, and SR steelhead; southern green sturgeon; and southern eulachon and is not likely to destroy or adversely modify designated critical habitats for LCR, UWR, UCR, SR spring/summer run, and SR fall-run Chinook salmon; CR chum salmon; LCR and SONCC coho salmon; SR sockeye salmon; LCR, UWR, MCR, UCR, and SR steelhead; and southern green sturgeon.

Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS as significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by Fish and Wildlife Service as an intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of an incidental take statement.

Amount or Extent of Take

Vegetation treatments using herbicides are likely to occur in occupied habitat, and some level of incidental take is likely to result. As displayed in Table 24 of the "Effects of the Action" section, implementation of several components of the proposed action may result in incidental take of ESA-listed species.

Individuals of one or more of the 14 salmon and steelhead species considered in this consultation are likely to be present in the action area during part of the year when at least some effects of vegetation treatments will occur. Because these effects will injure or kill, or increase the likelihood that individuals will be injured or killed, take is reasonably certain to occur. The relationship between habitat conditions and the distribution and abundance of those individuals in an action area is imprecise such that a specific number of individuals taken cannot be practically obtained.

Take caused by the habitat-related effects of this action cannot be accurately quantified as a number of fish because the distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional and operate across far broader temporal and spatial scales than will be affected by the proposed action. Thus, the distribution and abundance of fish within each action area cannot be predicted precisely based on existing habitat conditions, nor can NMFS precisely predict the number of fish that are reasonably certain to be harmed or harassed if their habitat is modified or degraded by the proposed action. In such circumstances, NMFS uses the causal link established between the activity and the likely changes in habitat conditions affecting the listed species to describe the extent of take as a numerical level of habitat disturbance.

The best available indicators for the extent of take due to vegetation treatments are the total number of acres treated annually and the linear extent of an application buffer (without a site-specific consultation). These variables are proportional to the amounts of harm and harassment that the action is likely to cause through short-term degradation of water quality and physical habitat. NMFS assumes that up 45,200 acres per year may be carried out under this Opinion, therefore the extent of take is the treatment of up to 45,200 acres per year (of the 15.7 million acres of BLM-administered lands). NMFS assumes that vegetation treatments within a 1,500 feet buffer will undergo a site-specific consultation. Vegetation treatments outside of the 1,500-foot buffer should not result in take if minimization measures are used. The extent of habitat affected by the action (45,200 acres) and vegetation treatments within 1,500 feet of a waterbody (without site-specific consultation) are the thresholds for reinitiating consultation. Should either of these limits be exceeded during project activities, the reinitiation provisions of this Opinion apply.

Reasonable and Prudent Measures

Reasonable and Prudent Measures are non-discretionary measures to avoid or minimize take that must be carried out by cooperators for the exemption in section 7(o)(2) to apply. The BLM has the continuing duty to regulate the activities covered in this incidental take statement where

discretionary Federal involvement or control over the action has been retained or is authorized by law. The protective coverage of section 7(o)(2) may lapse if the BLM fails to exercise its discretion to require adherence to Terms and Conditions of the Incidental Take Statement, or to exercise that discretion as necessary to retain the oversight to ensure compliance with these Terms and Conditions. Similarly, if any applicant fails to act in accordance with the Terms and Conditions of the Incidental Take Statement, protective coverage may lapse. The following Reasonable and Prudent Measures are necessary and appropriate to minimize the impact on listed species of incidental taking caused by take of listed species resulting from completion of the proposed action.

The BLM shall:

1. Minimize incidental take from administration of the vegetation management plan by ensuring that site specific consultations are conducted for each planned action within 1,500 feet of any stream containing ESA listed species.
2. Minimize incidental take by applying general design criteria to all projects using this approach.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary and are applicable to more than one category of activity. Therefore, the terms and conditions listed for one type of activity are also terms and conditions of any category in which they would also minimize take of ESA-listed species or their habitats.

1. To implement reasonable and prudent measure #1, the BLM shall ensure that no application will occur within 1,500 feet of any stream containing ESA listed species without a site-specific consultation. The BLM shall submit an annual report to NMFS Oregon State Habitat Office in Portland Oregon by January 31st detailing the amount of acres that were treated on BLM lands in Oregon.

2. To implement reasonable and prudent measure #2 (general design criteria), the BLM shall ensure that the following design criteria are applied to any application within 1,500 feet of any stream containing ESA listed species subject to site-specific consultation.
    a. Where practicable, ground application adjacent to waters should only be done by hand wicking, wiping, dripping, painting or injecting.
    b. Riparian buffer zones should be flagged before beginning herbicide applications.
    c. Broadcast application should only occur when winds are not expected to cause drift into streams or no spray buffers.
    d. During broadcast application, monitor weather conditions periodically by trained personnel at spray sites to minimize drift.
    e. Consider not applying if precipitation has been forecasted to occur within 24 hours of spraying.
    f. When practicable, use water to mix (dilute) herbicide products for application.

g. The applicator should only use surfactants or adjuvants in riparian areas that do not contain any ingredients on EPA's List 1 or 2, where listing indicates a chemical is of toxicological concern, or is potentially toxic with a high priority for testing (USEPA 2000). If a surfactant or adjuvant that contains any List 1 or 2 ingredients is considered, the risk to ESA-listed species and their habitat with that chemical should be evaluated before a use decision is made.
h. Maintenance and calibration of spray equipment should occur at least seasonally to ensure proper application rates.
i. If consistent with project site objectives, use herbicide formulations containing clopyralid, glyphosate, imazapic, imazapyr, metsulfuron methyl, or sulfometuron methyl in riparian areas beside habitat used by ESA-listed species.
j. Aerial applications should be designed to deliver a median droplet diameter size appropriate to minimize drift.
k. Aerial spray should be released at the lowest height consistent with invasive plant control and flight safety.

Reinitiation of Consultation

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by NMFS where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If the amount or extent of taking specified in the Incidental Take Statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that has an effect to the listed species or designated critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat is designated that may be affected by the identified action (50 CFR 402.16).

To reinitiate consultation, contact the Oregon State Habitat Office of NMFS, and refer to the NMFS number assigned to this Opinion (2009/05539).

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitats, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) described and identified EFH for groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of coho and Chinook salmon.

Based on information provided by the BLM and the analysis of effects presented in the ESA portion of this document, NMFS concludes that Pacific Coast salmon EFH will be impacted in the same manner as the effects described in the *Critical Habitat within the Action Area* section of this Opinion.

Essential Fish Habitat Conservation Recommendations

The terms and conditions described in the ESA incidental take statement presented above of this Opinion are applicable to designated Pacific salmon EFH. Therefore, NMFS recommends that they be adopted as EFH conservation measures. The conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH.

Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations [16 U.S.C. 1855 (b)(4)(B)]. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse affects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations. The reasons must include the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

Supplemental Consultation

The BLM must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(k)].

DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility: Utility principally refers to ensuring that the information contained in this document is helpful, serviceable, and beneficial to the intended users.

The Opinion in this document concludes that the proposed vegetation treatments using herbicides on BLM lands in Oregon will not jeopardize the affected listed species. Therefore, the BLM can carry out this action in accordance with its authority under the FLPMA. The intended user is the BLM.

Individual copies were provided to the above-listed entities. This consultation will be posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA regulations (50 CFR 402.01, et seq.) and the MSA implementing regulations regarding EFH [50 CFR 600.920(j)].

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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