

**Oregon Department of Transportation
Statewide Habitat Conservation Plan
for Routine Maintenance Activities**



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Oregon Department of Transportation
Maintenance & Operations Branch
800 Airport Road SE
Salem, OR 97301-4792



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Acronyms and Abbreviations

BLM	Bureau of Land Management
BMP	Best Management Practices
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
HCP	Habitat Conservation Plan
ITP	Incidental Take Permit
IVM	Integrated Vegetation Management
RM-HCP	ODOT Routine Maintenance Habitat Conservation Plan
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statute
SMA	Special Management Area
ROW	Right of way
RPA	Resource Protection Area
USFWS	United States Fish and Wildlife Service

Executive Summary

Purpose and Scope

This Habitat Conservation Plan (HCP) was developed for ODOT's routine maintenance activities (RM-HCP), to allow impacts to certain state and federally-listed butterflies and plants during necessary routine roadside maintenance, while also protecting these species in areas where routine maintenance is not required. See Table 1-1 for list of Covered Species or Appendix D for a list of current RM-HCP sites). Not all state and federally-listed butterfly and plant species are included in this RM-HCP because it excludes Species that are not expected to occur on or near highway right of way (ROW). Throughout this document, "Covered Species" refers to the state and federally-listed plant and butterfly species included in this RM-HCP.

In the past, ODOT has received inquiries and complaints from state and federal regulatory agencies regarding maintenance work and impacts to listed plant species. With a signed Routine Maintenance Habitat Conservation Plan, ODOT may conduct routine maintenance from the edge of pavement to the right of way boundary on a regular basis on all highway rights-of-way statewide except for those locations outside of the Operational Roadway where known listed plants or butterflies occur.

- The RM-HCP is a statewide initiative. It covers all roads and associated highway ROWs owned and managed by ODOT throughout the state.
- Impacts to protected butterflies and plant populations along the highway shoulder are allowed, and mitigation for impacts will include protection of butterflies and plants in areas where normal maintenance activities will not impact them.
- Routine actions are covered under this RM-HCP. Emergency actions will be handled separately from this RM-HCP.
- A "No Surprises" component of the HCP process (63 FR 8859) assures ODOT that if unforeseen circumstances arise during the permit duration for species covered by this RM-HCP, additional land restrictions, financial compensation, and/or commitments beyond those agreed to in this RM-HCP will not be required, provided the RM-HCP is properly implemented.
- Not covered under this RM-HCP are activities occurring in stockpile sites, rest areas and maintenance yards. Further, actions that have a federal nexus (e.g., are federally funded or require a Corps permit) are also not covered.
- Third Party Activities along highway roadsides are not covered by this RM-HCP.
- Also not covered in this document are any species regulated by the National Marine Fisheries Service.
- The RM-HCP will be valid for 25 years.

Operational Roadway or Special Management Area

ODOT has coordinated internally to define the Operational Roadway where Covered Species will be impacted, and the area beyond the Operational Roadway where impacts to Covered Species will be avoided (see Section 3.4 for additional description of Operational Roadway).

The Operational Roadway is described on a site-by-site basis by the District Manager as that area critical to maintaining highway safety where protection is not feasible and impacts are proposed. Impacts to Covered Species that occur in the Operational Roadway have been mitigated as outlined in this RM-HCP.

Beyond the Operational Roadway known populations of Covered Species will be protected and managed as proposed in this RM-HCP. Such areas near or within parts of the ROW with ongoing maintenance activities fall under ODOT's current Special Management Area Program (SMA) and those located in areas that do not need routine maintenance will be designated and managed as Resource Protection Areas (RPA). Site designation, location of the Operational Roadway, and determination of protection, maintenance and management activities are based on internal and regulatory coordination about the needs of the plants/butterflies and what is reasonable for maintenance to accomplish and provide. This information is documented in site guidance documents and management plans, described below, under Implementation.

Impacts and Conservation Measures

The total known and unknown impacts to RM-HCP Covered Species are presented in Section 4.2 (Tables 4-2 and 4-3).

Mitigation measures were developed in close coordination with staff from Oregon Department of Agriculture (ODA) and US Fish and Wildlife Service (USFWS) to offset impacts to Covered Species by routine maintenance activities (see Section 5.4).

- Impacts to Fender's blue butterfly and Kincaid's lupine will be offset through planned habitat enhancement and augmentation activities at an ODOT property in Benton County.
- Bradshaw's lomatium and Nelson's checkermallow impacts have already been offset through species augmentation and enhanced management on ODOT properties in Lane and Yamhill counties, respectively.
- ODOT mitigated for impacts to Cook's lomatium and Peck's milkvetch by partnering on projects with ODA to implement augmentation and enhancement activities.
- ODOT is nearing completion of weed control experiments to offset impacts to Tygh Valley milkvetch.
- Remaining minor impacts to Covered Species will be offset through improved habitat protection and management at existing SMAs anticipated to increase populations in ODOT SMAs. As an example, listed species in some SMAs are disturbed when the site is accessed by private parties, so added protection could include the establishment of barriers or placement of warning signs. Such protections, and any avoidance measures, are negotiated on a site-by-site basis with ODOT maintenance and environmental staff.
- The above actions will be modified as needed in an adaptive management process, based upon findings from regular monitoring activities.

Implementation

Technical Services Branch and Maintenance and Operations Branch are jointly responsible for successful implementation of the RM-HCP.

The location of all known populations of Covered Species proposed to be protected under this RM-HCP are mapped in ODOT's statewide geo-database, available to USFWS and all ODOT personnel for planning maintenance and project activities. As described above, site management guidelines and plans are developed for each of these sites, based on maintenance needs and species management and protection. Each document is consistent with the conservation measures and impact activities proposed in this RM-HCP. Regulators provide review and input on the plans and they are finalized when signed by the Region Environmental Manager and the District Manager. The District Manager is responsible for ensuring commitments in the plan are met. Due to the fact that extensive surveys were conducted during the preparation of this RM-HCP, it is not anticipated that many new populations will be discovered. However, if and when new populations are discovered in the ROW, the location will be added to the statewide geodatabase and ODOT, in coordination with the USFWS, will determine maintenance needs and resource protections, determine site designation based on need for ongoing maintenance activities (i.e., SMA versus RPA), identify the Operational Roadway (as applicable), and prepare appropriate site management plans. Maintenance and other ODOT personnel will be alerted to the presence of the new populations during this coordination process. Provided that the maintenance work falls within the scope of this RM-HCP and the level of take does not exceed that allowed under the permit, additional ESA consultation for routine maintenance impacts would not be needed for RM-HCP Covered Species.

ODOT will monitor all Covered Species sites under this RM-HCP that have "ongoing" maintenance activities. Detailed population monitoring will occur every three years, and site checks will occur each year in between. Methods for population monitoring depend on the species and site conditions and are developed on a site-by-site basis. Population abundance and trends will be evaluated and reported annually to ODA and USFWS.

1.0 Introduction and Background

1.1 Overview

Butterflies and plants listed as threatened or endangered under the federal and state Endangered Species Acts (ESA; 16 U.S.C. §1531 et seq., ORS 564) sometimes occupy the right of way (ROW) land strip adjacent to highways managed by the Oregon Department of Transportation (ODOT). These species may be incidentally harmed during state-funded routine roadside maintenance activities undertaken in the ROW to ensure the safety of the traveling public and to comply with applicable laws, such as the Oregon Noxious Weed Policy (ORS 569). ODOT manages over 8,000 miles of highway and their associated ROWs. To date, federal and/or state listed butterflies and plants are known to occur at approximately 80 ODOT ROW locations, covering a total of less than 0.01% of the state highway system.

A Habitat Conservation Plan (HCP) is the mechanism by which an individual, organization, or agency without a federal nexus may obtain a federal ESA incidental take permit (ITP) when take of listed species potentially could occur while conducting otherwise lawful activities. An HCP must accompany an application for an ITP, and its purpose is to ensure that the effects of the incidental take are minimized and mitigated. ODOT's routine roadside maintenance actions are state funded and normally do not have a federal nexus. This HCP for ODOT's routine maintenance activities (RM-HCP) was developed to accompany ODOT's ITP application for take of listed butterflies during necessary routine roadside maintenance. The "No Surprises" rule of the HCP process (63 FR 8859) assures ODOT that if unforeseen circumstances arise during the permit duration for species adequately covered by this RM-HCP, additional land restrictions, financial compensation, and/or commitments beyond those agreed to in this RM-HCP will not be required, provided the RM-HCP is properly implemented.

The federal ESA for plants and wildlife are administered by the U. S. Fish and Wildlife Service (USFWS). In addition, all federal listed plants in Oregon are also protected under the Oregon state ESA and their protection and conservation are administered by the Oregon Department of Agriculture (ODA; ORS 564.105). The state ESA protects many other plant species beyond those protected under the federal ESA. All state agencies, including ODOT, must consult with ODA when a proposed action on land owned or leased by the state, or for which the state holds a recorded easement, has the potential to appreciably reduce the likelihood of the survival or recovery of any listed plant species. ODA then recommends reasonable and prudent alternatives, if any, to the proposed action which are consistent with conserving and protecting the affected species (OAR 603-073-0090(5)).

ODA may enter into agreements with federal and state agencies for the development and management of any program established for the protection of listed species (OAR 603-073-0090(3)). Similarly, USFWS is mandated under the federal ESA (Section 6) to cooperate to the maximum extent practicable with states in carrying out provisions of the ESA, including participation in management and cooperative agreements. Consequently, ODOT invited ODA, with USFWS concurrence, to participate in development of the RM-HCP, and all relevant federal and/or state listed plants are included in the plan. ODA will accept the RM-HCP and the No Surprises rule as the foundation for consultation with ODOT for possible routine roadside maintenance impacts to state listed plants, and USFWS will use the RM-HCP as the basis for an

ODOT ITP for federal listed butterflies, including those plants that have simultaneous coverage under the state ESA.

1.2 Evolution of the ODOT Routine Maintenance HCP

The major goals of ODOT Maintenance are to preserve and repair the existing state transportation system to ensure that the system operates as safely and as efficiently as possible. Meeting these requirements within the context of multiple environmental laws can be challenging. Because the ROW adjacent to roads requires regular vegetation and roadside management to provide safe sight distances and road surface drainage, maintain the hydraulic capacity of ditches and vehicle recovery areas and reduce fire potential (to name but a few roadside vegetation management justifications), routine maintenance activities have the potential to negatively impact federal and state listed species (mostly butterflies and plants).

In recognition of this conflict, in 1994 ODOT introduced a voluntary Special Management Area (SMA) Program designed to protect and manage threatened and endangered species, primarily plants, occurring adjacent to the highway. Under the SMA Program, all populations of federal and state listed plants known to occur within ODOT ROW were field located, verified, and posted. Each SMA sign included the routine maintenance activities allowed on the SMA designed to avoid impacts to the protected species. Plant populations in SMAs were monitored every other year.

Although the SMA Program aimed at avoiding impacts, occasionally impacts did occur. In 2006 the Oregon state office of USFWS recognized ODOT's SMA Program for providing significant conservation for Oregon's sensitive botanical resources (July 2006 USFWS letter to ODOT). USFWS also participated in more in-depth discussions with ODOT concerning how to minimize unauthorized take of listed species in the ROW resulting from required maintenance, and how to enhance listed plant populations within the ROW when possible.

Although the ODOT SMA Program minimizes chances for unauthorized take of listed species resulting from routine roadside maintenance activities, in 2008 it was determined that a more formal regulatory mechanism was needed for avoiding potential conflicts between efforts to address safety and maintenance issues within the ROW and ESA compliance. ODOT and USFWS agreed that because ODOT's routine roadside maintenance impacts on listed butterflies and plants were expected to be minor or negligible, a low-effect RM-HCP under Section 10 of the federal ESA was the most appropriate mechanism to pursue.

ODOT's first step in developing the RM-HCP and addressing the issue of unauthorized take in the ROW was to develop consensus among ODOT, USFWS and ODA for the "Operational Roadway," i.e., the collection of road components required to maintain a safe and functional road. In typical situations, the Operational Roadway includes the road and shoulder to 4 feet (1.2 m) beyond the bottom of the roadside drainage ditch. (See Section 3.4 for a more detailed description of the Operational Roadway.) Agreement was reached that, as part of the RM-HCP, ODOT would not protect or manage listed butterflies or plants in the Operational Roadway because the primary importance of this area is for transportation safety. As part of this effort, ODOT has identified known populations outside the Operational Roadway that we propose to avoid impacting by routine road maintenance. Many of the known populations of listed plants are managed for protection under the SMA Program. The SMA Program covers additional protected resources such as cultural sites. For the purposes of this document, when we refer to

the SMA Program we mean the known populations of rare plants on ODOT ROW that ODOT has agreed to avoid impacting.

ODOT subsequently entered into an Inter-Agency Agreement (IAA) with ODA to retain the service of ODA to assist with development of the RM-HCP for Butterflies and Plants and to be a signatory authority. ODOT considered ODA involvement in the RM-HCP process as both desirable and necessary because all federal listed plant species in Oregon are also state listed, and because there are an additional 43 plant species that are listed by the state but not federally listed. In 2009, ODA was awarded an ESA Section 6 Habitat Conservation Planning Assistance Grant from USFWS to participate in the RM-HCP development process.

An RM-HCP Steering Committee was formed with representatives from ODOT Environmental and Maintenance, USFWS ESA specialists, and botanists from the ODA Native Plant Conservation Program. Various working groups were assembled to gather or collect information necessary for the RM-HCP. Butterfly specialists with USFWS, the Oregon Zoo, and the private sector were consulted as necessary, and internal and external stakeholders (see Appendix A for a stakeholder list) were kept informed of RM-HCP progress and contacted as appropriate for document review and comment.

This RM-HCP is the culmination of many years of collaborative effort between ODOT, USFWS, ODA, and other interested parties. Implementation of the RM-HCP will not only result in the protection of listed butterflies and plants adjacent to ODOT managed roads, but also greater efficiencies in resource protection without compromising the safety of the traveling public.

1.3 Permit Duration

The RM-HCP and associated ITP from the USFWS will be valid for 25 years. The ODA agreement with ODOT to accept the RM-HCP as compliance under the state ESA will also be valid for 25 years. All conditions of the RM-HCP, USFWS ITP, and ODA RM-HCP Agreement will expire 25 years from the date that the ITP is issued unless circumstances change and ODOT chooses to terminate the RM-HCP sooner. In addition, should ODOT choose to include additional species into the RM-HCP during its 25-years duration, the RM-HCP, ITP and ODA RM-HCP Agreement (as applicable) may be revised and amended.

1.4 Regulatory/Legal Framework for the RM-HCP

1.4.1 Federal Endangered Species Act (ESA)

Section 9 of the federal ESA of 1973, as amended, prohibits the “take” of any fish or wildlife species listed under the ESA as endangered or threatened unless otherwise specifically authorized by regulation. In the 1982 amendments to the ESA, Congress established a provision in Section 10 that allows for the “incidental take” of endangered and threatened species, other than for scientific research or conservation actions, by non-federal entities. Under Section 10(a)(2)(B) of the ESA, an applicant for an ITP is required to submit a “conservation plan” that specifies, among other things, the impacts that are likely to result from the taking, and the measures the permit applicant will undertake to monitor, minimize and mitigate such impacts.

Section 10, as revised, provides a clear regulatory mechanism to permit the incidental take of federally listed fish and wildlife species by private interests and non-federal government agencies during lawful land, water and ocean activities. However, Congress also intended this process to reduce conflicts between listed species and economic development, and to provide a

framework that would integrate non-federal development and land use activities with listed species and habitat conservation goals. As part of the Section 10(a)(1)(B) process, non-federal entities are assured that if “unforeseen circumstances” arise, the Services will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee. The government will honor these assurances as long as a permittee is implementing the terms and conditions of the HCP, permit, and other associated documents in good faith. In effect, this regulation states that the government will honor its commitment as long as the HCP permittees honor theirs. This provision is referred to as the "No Surprises Rule" (February 23, 1998; 63 FR 8859).

The prohibitions for federally- listed plants under the ESA are more limited than for listed animals. Section 9(a)(2)(B) prohibits the removal of listed plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of listed plants on non-federal areas in violation of state law or regulation.

1.4.2 State Endangered Species Laws

Oregon’s version of the ESA (Senate Bill 533 and its corresponding Oregon Revised Statute , ORS 564) was enacted in 1987. ORS 564 was amended in 1995. Plants and animals may be listed as threatened or endangered under the Oregon ESA even if they are not federally listed. However, all federal listed plants are administratively protected under the state law whether or not they have been formally listed by the state. ODA is responsible for implementing the Oregon ESA for plants and the Oregon Department of Fish and Wildlife (ODFW) is responsible for vertebrate animals. There is no government agency responsible for invertebrate species (e.g., butterflies) under the state ESA.

The Oregon ESA protects listed plants on state owned or leased lands or waters. State lands are defined as any non-federal public lands in Oregon and they include lands owned or managed by state agencies, counties, cities, and any non-federal public entities.

State law prohibits “take” of state and federal listed plants on non-federal public lands. Take includes collecting, damaging, killing, removing, transplanting, or otherwise disturbing the listed species or its habitat. Take also includes destruction or disturbance of pollinators and removal of property containing listed plants from protection (e.g., sale to a private entity). Any ground- or vegetation-disturbing land action that results in or may result in the take of a listed plant requires consultation with ODA staff and/or an ODA ESA permit.

1.5 Plan Area

The RM-HCP is a statewide initiative. It covers all roads and associated ROWs owned and managed by ODOT throughout the state (Figure 1-1), as well as other ODOT sites intended for RM-HCP mitigation regardless of their location. ODOT owns over 8,000 miles (12,875 km) of highway with more than 50,000 acres (20,234 ha) of ROW. With a few exceptions, the RM-HCP does not cover ODOT properties owned, managed or leased that are not directly adjacent to the roadway and managed for the safety of the traveling public (e.g., maintenance yards and rest areas; see Section 3.4).

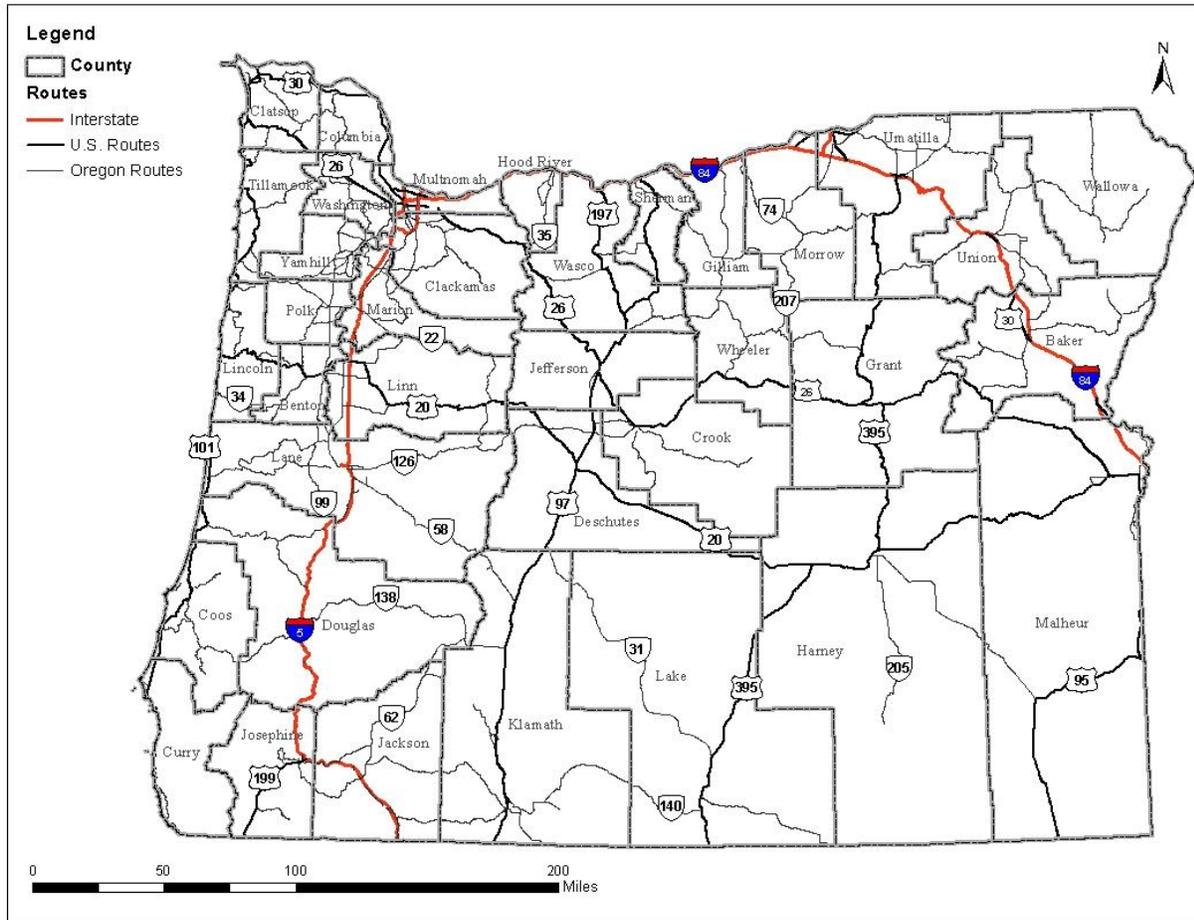


Figure 1-1. The location of roads¹ managed by the Oregon Department of Transportation.

1.6 Covered Species

1.6.1 Animal Species

In Oregon, there are two federal listed butterflies that can be associated with routine roadside maintenance: the endangered Fender’s blue butterfly (*Icaricia icarioides fenderi*) and the threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*). Fender’s blue is a Willamette Valley prairie species and Oregon silverspot is a coastal species. These butterflies are included in this RM-HCP (see Table 1-1) because their eggs, larvae and pupae can be injured during routine maintenance of ROW vegetation. Additionally, the plant food resources of these butterflies may be impacted by maintenance activities, most notably the threatened Kincaid’s lupine (*Lupinus sulphureus* (=oreganus) ssp. *kincaidii* (=var. *kincaidii*)), the primary larval food plant for Fender’s blue.

1.6.2 Plant Species

Currently, there are 60 plant species listed as threatened or endangered under the Oregon ESA, 17 of which are also federally listed. Site reports, occurrence records, and habitat descriptions were reviewed for each species to determine its occurrence or potential to occur on ODOT

¹ Based on available map data; some state managed roads may not be shown but are covered under the RM-HCP.

ROW. This preliminary review resulted in the removal of 17 species from the list of Covered Species because the state highway system does not overlap with the ranges of these species or their unique habitats. Subsequent surveys for suitable habitat allowed for the removal of seven additional species because suitable habitat was not found in the ROW. The remaining 36 plant species either have known populations or suitable habitat in ODOT ROW. These 36 species, 14 of which are federally listed, are covered under this RM-HCP (Table 1-1).

Table 1-1. Species covered under the RM-HCP for Routine Roadside Maintenance.

Species ¹	Scientific Name ¹	Federal Status ²	State Status ²
Animals			
Fender's blue butterfly	<i>Icaricia icarioides fenderi</i>	E/CH	none
Oregon silverspot butterfly	<i>Speyeria zerene hippolyta</i>	T/CH	none
Plants			
Applegate's milk-vetch	<i>Astragalus applegatei</i>	E	E
Arrow-leaf thelypody	<i>Thelypodium eucozum</i>	SOC	T
Bradshaw's desert parsley	<i>Lomatium bradshawii</i>	E	E
Cascade Head catchfly	<i>Silene douglasii</i> var. <i>oraria</i>	SOC	T
Cook's lomatium	<i>Lomatium cookii</i>	E/PCH	E
Cox's mariposa lily	<i>Calochortus coxii</i>	SOC	E
Cronquist's stickseed	<i>Hackelia cronquistii</i>	SOC	T
Gentner's fritillary	<i>Fritillaria gentneri</i>	E	E
Howell's mariposa lily	<i>Calochortus howellii</i>	SOC	T
Howell's microseris	<i>Microseris howellii</i>	none	T
Howell's spectacular thelypody	<i>Thelypodium howellii</i> ssp. <i>spectabilis</i>	T	E
Kincaid's lupine	<i>Lupinus oregonus</i> (= <i>L. sulphureus</i> ssp. <i>kincaidii</i>)	T/CH	T
Large-flowered rush lily	<i>Hastingsia bracteosa</i> var. <i>bracteosa</i>	SOC	T
Large-flowered woolly meadowfoam	<i>Limnanthes pumila</i> ssp. <i>grandiflora</i> (= <i>L. floccosa</i> ssp. <i>grandiflora</i>)	E	E
Laurence's milk-vetch	<i>Astragalus collinus</i> var. <i>laurentii</i>	SOC	T
Malheur wire-lettuce	<i>Stephanomeria malheurensis</i>	E	E
McDonald's rockcress	<i>Arabis macdonaldiana</i>	E	E
Nelson's checker-mallow	<i>Sidalcea nelsoniana</i>	T	T
Oregon semaphore grass	<i>Pleuropogon oregonus</i>	SOC	T
Pale larkspur	<i>Delphinium leucophaeum</i>	SOC	E
Peacock larkspur	<i>Delphinium pavonaceum</i>	SOC	E
Peck's milkvetch	<i>Astragalus peckii</i>	none	T
Point Reyes bird's-beak	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	SOC	E
Pumice grape-fern	<i>Botrychium pumicola</i>	none	T
Rough popcornflower	<i>Plagiobothrys hirtus</i>	E	E
Silvery phacelia	<i>Phacelia argentea</i>	SOC	E
Snake River goldenweed	<i>Pyrrocoma radiata</i>	SOC	E
Spalding's catchfly	<i>Silene spaldingii</i>	T	E

Species ¹	Scientific Name ¹	Federal Status ²	State Status ²
Sterile milkvetch	<i>Astragalus cusickii</i> var. <i>sterilis</i>	none	T
Tygh Valley milkvetch	<i>Astragalus tyghensis</i>	none	T
Umpqua mariposa-lily	<i>Calochortus umpquaensis</i>	SOC	E
Wayside aster	<i>Eucephalus vialis</i> (= <i>Aster vialis</i>)	SOC	T
Western lily	<i>Lilium occidentale</i>	E	E
Whitetop aster	<i>Sericocarpus rigidus</i> (= <i>Aster curtus</i>)	SOC	T
Willamette daisy	<i>Erigeron decumbens</i> (= <i>Erigeron decumbens</i> var. <i>decumbens</i>)	E/CH	E
Wolf's evening-primrose	<i>Oenothera wolffii</i>	SOC	T

1. Nomenclature throughout RM-HCP follows USFWS 2012 or ORBIC (2010b) .

2. Status acronyms for all tables: E = Endangered; T = Threatened; SOC = Species of Concern; CH = designated Critical Habitat; PCH = proposed Critical Habitat; none = not listed by the agency.

1.7 Species Not Covered

The RM-HCP only pertains to select threatened and endangered terrestrial species under the jurisdiction of USFWS and ODA that have significant potential to be impacted by ODOT's routine roadside maintenance activities.

1.7.1 Animal Species

Twenty-five animal species listed under the federal ESA and under the jurisdiction of USFWS are omitted from this RM-HCP because of their limited or nonexistent association with highway roadsides (Table 1-2), and due to the focus of this document on Butterflies and plants.

Additionally, ODOT's routine roadside maintenance activities typically can be delivered in a manner that avoids impacts to these species if they are present.

Table 1-2. Federal listed animal species in Oregon under the jurisdiction of USFWS that are excluded from the RM-HCP since they are not known to occur on covered lands or unlikely to be impacted by ODOT maintenance activities.

Species	Scientific Name	Federal Status
Mammals		
Gray wolf (conterminous USA DPS = Distinct Population Segment)	<i>Canis lupus</i>	E
Canada lynx	<i>Lynx canadensis</i>	T/CH
Columbian white-tailed deer	<i>Odocoileus virginianus leucurus</i>	E
Birds		
Marbled murrelet	<i>Brachyramphus marmoratus</i>	T/CH
Western snowy (coastal) plover	<i>Charadrius alexandrinus nivosus</i>	T/CH
Streaked horned lark	<i>Eremophila alpestris strigata</i>	T/CH
Short-tailed albatross	<i>Phoebastria albatrus</i>	E
Northern spotted owl	<i>Strix occidentalis caurina</i>	T/CH
Reptiles and Amphibians		
Loggerhead sea turtle	<i>Caretta caretta</i>	E
Green sea turtle	<i>Chelonia mydas</i>	T
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E
Olive (=Pacific) ridley sea turtle	<i>Lepidochelys olivacea</i>	T

Species	Scientific Name	Federal Status
Oregon spotted frog	<i>Rana pretiosa</i>	T
Fish (Inland)		
Modoc sucker	<i>Catostomus microps</i>	E/CH
Warner sucker	<i>Catostomus warnerensis</i>	T/CH
Shortnose sucker	<i>Chasmistes brevirostris</i>	E/PCH
Lost River sucker	<i>Deltistes luxatus</i>	E/PCH
Hutton tui chub	<i>Gila bicolor</i> ssp.	T
Borax Lake chub	<i>Gila boraxobius</i>	E/CH
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	T
Oregon chub	<i>Oregonichthys crameri</i>	T/CH
Foskett speckled dace	<i>Rhinichthys osculus</i> ssp.	T
Bull trout	<i>Salvelinus confluentus</i>	T/CH
Invertebrates		
Taylor's Checkerspot butterfly	<i>Euphydryas editha taylori</i>	E/ CH
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	T/CH

1.7.2 Plant Species

As noted in Section 1.6.2, 24 state listed plants, three of which are also federally listed, are omitted from this RM-HCP because neither the species nor their habitats have been found along the ODOT ROW (Table 1-3). In addition, surveys have not identified suitable habitat for these species along the roadsides of state highways, and these conditions are not expected to change.

Table 1-3. Federal and state listed plant species in Oregon that are excluded from the RM-HCP.

Species	Scientific Name	Federal Status	State Status
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	SOC	T
Coast Range fawn lily	<i>Erythronium elegans</i>	SOC	T
Crosby's buckwheat	<i>Eriogonum crosbyae</i>	SOC	T
Cusick's lupine	<i>Lupinus cusickii</i>	SOC	E
Davis' peppergrass	<i>Lepidium davisii</i>	SOC	T
Dwarf woolly meadowfoam	<i>Limnanthes pumila</i> ssp. <i>pumila</i> (= <i>L. floccosa</i> ssp. <i>pumila</i>)	SOC	T
Golden buckwheat	<i>Eriogonum chrysops</i>	SOC	T
Golden paintbrush	<i>Castilleja levisecta</i>	T	E
Greenman's desert parsley	<i>Lomatium greenmani</i>	SOC	T
Grimy ivesia	<i>Ivesia rhypara</i> var. <i>rhypara</i>	SOC	E
Macfarlane's four o'clock	<i>Mirabilis macfarlanei</i>	T	E
Malheur Valley fiddleneck	<i>Amsinckia carinata</i>	SOC	T
Mulford's milk-vetch	<i>Astragalus mulfordiae</i>	SOC	E
Northern wormwood	<i>Artemisia campestris</i> var. <i>wormskioldii</i>	C	E
Obscure buttercup ¹	<i>Ranunculus reconditis</i>	SOC	--
Owyhee clover	<i>Trifolium owyheense</i>	SOC	E

Species	Scientific Name	Federal Status	State Status
Packard's stickleaf	<i>Mentzelia packardiae</i>	SOC	T
Pink sand-verbena	<i>Abronia umbellata</i> ssp. <i>breviflora</i>	SOC	E
Red-fruited desert parsley	<i>Lomatium erythrocarpum</i>	SOC	E
Sexton Mountain mariposa lily	<i>Calochortus indecorus</i>	--	E
Shiny-fruited allocarya	<i>Plagiobothrys lamprocarpus</i>	--	E
Smooth stickleaf	<i>Mentzelia mollis</i>	SOC	E
South Fork John Day milkvetch	<i>Astragalus diaphanous</i> var. <i>diurnus</i>	--	T
Water howellia	<i>Howellia aquatalis</i>	T	T

1. Removed from state ESA after being combined with the more common *R. triternatus*.

2.0 Environmental Setting and Biological Resources

2.1 Environmental Setting

This RM-HCP was developed to cover all routine maintenance activities along the ROW adjacent to ODOT managed roads across all of Oregon. Oregon is composed of eight principal ecoregion areas where environmental conditions are relatively homogeneous and species complexes are relatively distinct (Omernik 1987; Figure 2-1). Locations with known populations of species covered under the RM-HCP are also shown on Figure 2-1. Ecoregion descriptions in the following subsections are from ODFW (2006).

2.1.1 Coast Range Ecoregion

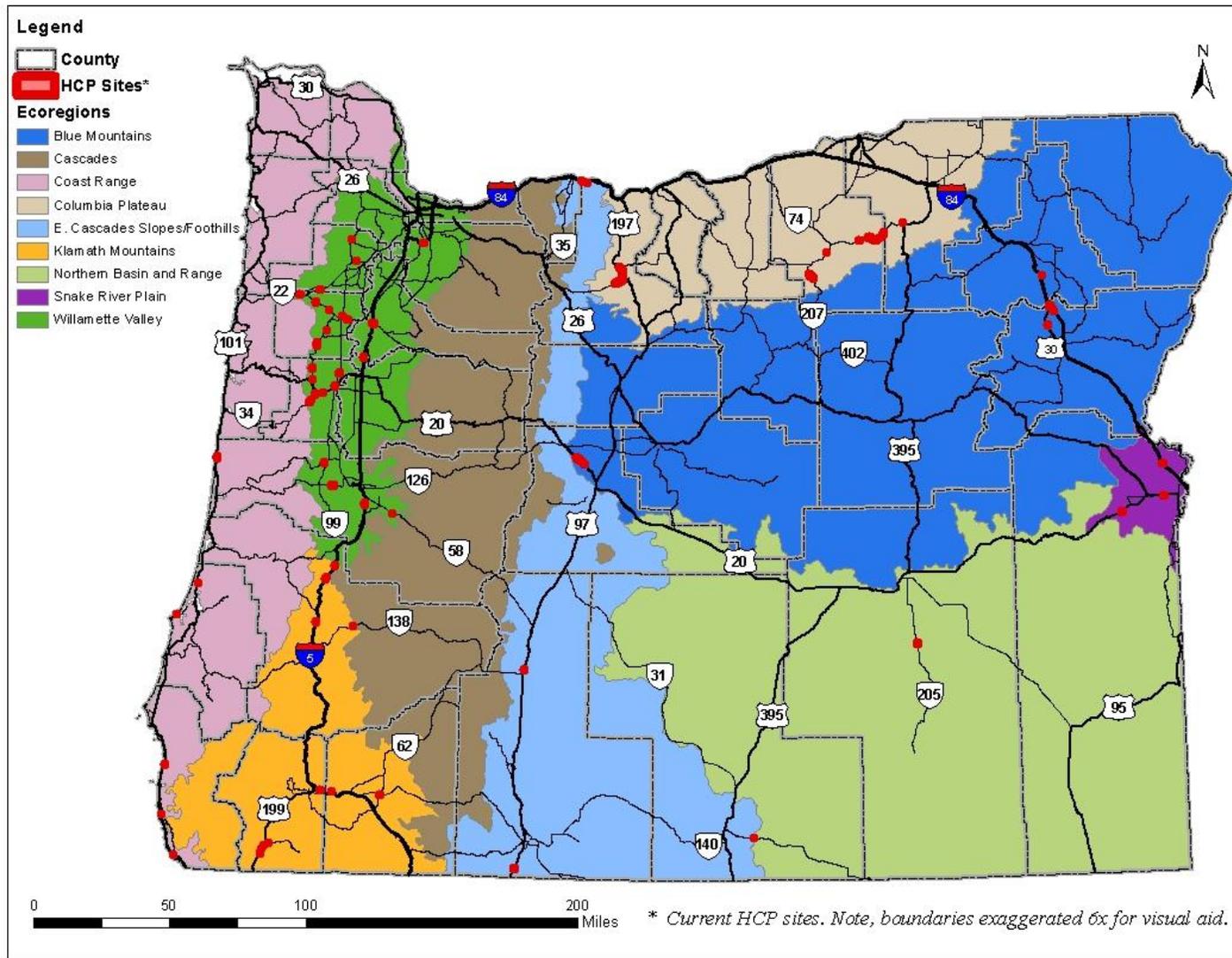
The Oregon Coast Range ecosystem extends the entire length of the Oregon coastline. The low mountains of the Coast Range stretch west from the edge of the Pacific to the Willamette Valley and Klamath Mountains. The density of streams in the Coast Range is among the highest in the state. The streams are relatively free-flowing, and stream flow is highly seasonal. Marshes in the Columbia River near the coast are regularly flooded by saltwater, and the Columbia River itself is affected by tides over 100 miles (161 km) upstream. There are 22 estuaries along the Oregon coast. Key habitats in the Coast Range Ecoregion include: coastal dunes, estuaries, grasslands including coastal bluffs and montane grasslands, late successional forests, oak woodlands, wetlands, and riparian and freshwater habitats.

2.1.2 Willamette Valley Ecoregion

The Willamette Valley is the largest river valley in Oregon; it is approximately 124 miles (229.6 km) in length and it ranges in width from 18 to 30 miles (33.5 to 56 km). The Willamette River, which flows through the Willamette Valley, originates in the Western Cascades in Lane County, Oregon, and ends at its confluence with the Columbia River in Portland. Much of the natural prairie vegetation in the Valley has been converted to agricultural use, and road density in the basin is the highest in Oregon. Key habitats in the Willamette Valley Ecoregion include: oak woodlands, grasslands including oak savanna, wetlands including wet prairies, and riparian and aquatic habitats.

2.1.3 Klamath Mountains Ecoregion

The Klamath Mountains Ecoregion is physically and biologically diverse. It consists of highly dissected, folded mountains, foothills, terraces, and floodplains, and the plant communities are among the most diverse in the world. Of the 4,000 species of native plants found in Oregon, approximately half are found in this ecoregion. Development in the Klamath Mountains Ecoregion has occurred largely in riparian areas along the North Umpqua, Applegate, and upper Rogue Rivers in the dry eastern areas of the ecoregion. Most of the region's native stocks of salmon and trout have greatly declined as a result of habitat loss. Key habitats in the Klamath Mountains Ecoregion include: ponderosa pine (*Pinus ponderosa*), pine-oak and oak woodlands, late successional conifer forests, grasslands including oak savannas, wetlands, and riparian and aquatic habitats.



1
 2 **Figure 2-1.** The eight major Oregon ecoregions and the Idaho Snake River Plain Ecoregion that extends into west-central Oregon (per Oregon
 3 Conservation Strategy, ODFW 2006).

2.1.4 Cascade Mountains Ecoregion

This mountainous ecoregion is characterized by steep ridges and river valleys in the west and a high plateau in the east. The conifer forests of the Cascades have been the foundation of a timber-based economy in the region. Most of the rivers draining the northern two-thirds of this ecoregion flow into the Willamette Valley and then into the Columbia River system. The southern third of this region drains to the Pacific Ocean through the Umpqua and Rogue River systems. The highest water quality and quantity in Oregon is found in the Cascade Mountains Ecoregion. Key habitats in the Cascade Mountains Ecoregion include: late successional conifer forests especially Douglas-fir (*Pseudotsuga menziesii*) forests, oak woodlands, grasslands including montane grasslands and oak savannas, wetlands, and riparian and aquatic habitats.

2.1.5 Eastern Cascades Slope and Foothills Ecoregion

The Eastern Cascades Slope and Foothills Ecoregion extends from the Columbia River in the north to the California border in the south. Because it is in the rain shadow of the Cascade Mountains, this area of open pine forests is highly susceptible to wildfire. The northern two-thirds of this ecoregion are drained by the Deschutes River system; the southern third is drained by the Klamath River. The Klamath basin, once a vast expanse of lakes and marshes, has largely been drained and converted to agriculture. Despite this, the northern and eastern edges of the Klamath basin have the densest wintering concentration of bald eagles (*Haliaeetus leucocephalus*) in the world, and wetlands associated with Upper Klamath Lake, Oregon's largest lake, are believed to support the largest concentrations of waterfowl in North America. All major river systems in the region are dammed and many no longer provide fish passage. Key habitats in the Eastern Cascades Slope and Foothills Ecoregion include: ponderosa pine woodlands, oak woodlands, wetlands, and riparian and aquatic habitats.

2.1.6 Columbia Plateau Ecoregion

The Columbia Plateau is a semi-arid ecoregion composed of sagebrush steppe, grassland, and agricultural systems of loess soils that are susceptible to water erosion. Erosion has resulted in widespread sedimentation in the region's rivers, including the Columbia River. Dams are extensive in this ecoregion; they have resulted in the flooding of some areas of the Columbia Plateau and they are an impediment to the upstream migration of fish. Conversely, summer flows in some of the rivers have been lowered so extensively by water withdrawal for irrigation that summer runs of anadromous fish populations are no longer supported. Key habitats in the Columbia Plateau Ecoregion include: grasslands, sagebrush steppe, wetlands, and riparian and aquatic habitats.

2.1.7 Blue Mountains Ecoregion

The Blue Mountains Ecoregion occupies most of northeastern Oregon and it is an area of deep, rocky-walled canyons, glacier-cut gorges, dissected plateaus, and broad alluvial river valleys. Extreme changes in elevation across the ecoregion result in a broad range of temperature, precipitation, and vegetation community types. Logging in the area has been extensive and much of the Blue Mountains Ecoregion is grazed by cattle. Most of the stream reaches in the region have been simplified by channelization and straightening, and dams have a significant negative impact on anadromous fish migration. Key habitats in the Blue Mountains Ecoregion include: ponderosa pine woodlands, aspen woodlands, grasslands, sagebrush steppe and shrublands, wetlands, and riparian and aquatic habitats.

2.1.8 Northern Basin and Range Ecoregion

This ecoregion covers much of southeastern Oregon, the least populated area in the state, and is Oregon's driest ecoregion. The landscape of this ecoregion is one of numerous flat, internally-drained basins separated by isolated mountain ranges. Dryland and irrigated agriculture occur in the eastern basins. The approximately 50,000 acres (20,234 ha) of marsh around Malheur Lake is the largest natural fresh-water marsh west of the Mississippi River. Key habitat in the Northern Basin and Range Ecoregion include: sagebrush shrublands, including big sagebrush habitat, aspen woodlands, wetlands, and riparian and aquatic habitats.

2.2 General Roadside Conditions

In addition to the driving surface, the road ROW includes a strip of land on either side of the road that may include shoulders, drainage ditches, appurtenances (e.g., signs, signal boxes), utility lines (above and below ground), and land for future road expansion. There is no standard ROW distance; the width of the ROW varies across the state depending upon a variety of factors including, but not limited to, location, environmental conditions, ownership patterns, and road expansion needs. The ROW boundary may or may not be delineated by a fence, making it impossible to identify without detailed legal maps and a formal survey. The main purposes of the ROW are to provide for the safety of the traveling public and to maintain the road system; consequently, activities that create unsafe conditions for those using the roadway are not allowed and active infrastructure and vegetation management is required to create desirable travel conditions.

Maintaining adequate sight distance on the road is critically important to ensure that motorists have the time needed to avoid hazards. Sight distance is the length of highway visible to the motorist. Sight lines must be kept free of obstructions that might impair the ability of a driver to see other motorists and situations that may compromise safety. Managing the height of roadside vegetation is critical to maintaining adequate sight distances.

AASHTO (2006) sets the standards for highway maintenance: "Roadside management objectives vary with the zone that is being addressed. Typically the gravel shoulders of roads are maintained as a vegetation-free area to allow surface water drainage off the pavement and into the drainage ways. Off the shoulder, an operation zone of grass or small trees and shrubs is maintained through mowing to allow for visibility of signs and traffic at interchanges and curves. Large trees are removed for safety in case vehicles accidentally leave the road. Herbicides are used very selectively for control of noxious weeds and sometimes for brush control. A wider buffer zone beyond that area is commonly maintained in natural or native, low maintenance vegetation."

2.3 Covered Species Information

2.3.1 Animals Species

2.3.1.1 Fender's Blue Butterfly (*Icaricia icarioides fenderi*)

Federal Status: endangered
State Status: none
Critical Habitat: designated
Recovery Plan: yes

Species Description. Fender's blue butterfly is a relatively small butterfly with a wingspan of approximately one inch (2.5 cm). The upper wings of males are brilliant blue with a blackish wing margin and a white fringe of scales. The upper wings of females are brown and they also have a white fringe of scales. The undersides of the wings of both sexes are creamish-tan with black spots surrounded by a fine, white border or halo. Additional information on the life history and ecology of Fender's blue butterfly can be found in the species' recovery plan (USFWS 2010a).

Range/Distribution. At the time of completion of the Recovery Plan for Prairie Species of Western Oregon and Southwestern Washington in 2010, the USFWS was aware of populations of Fender's blue butterflies in Yamhill, Polk, Benton, Linn and Lane counties, Oregon (USFWS 2010a). Since the recovery plan was completed, a large new population was discovered at Hagg Lake in Washington County and individuals may occur on suitable upland prairie habitat within Clackamas and Marion counties.

There are currently 53 known occupied Fender's blue butterfly sites comprising 20 "functioning networks" and/or "independent populations" (USFWS 2010a). Functioning networks are comprised of four or more sites, while independent populations generally contain four or fewer sites and are often just one site. Currently, ODOT has seven ROW sites occupied by Fender's blue butterfly (see Section 4.2.3 for more information).

Habitat. Fender's blue butterfly occurs in native prairie habitats. Most Willamette Valley prairies are early seral habitats, requiring natural or human induced disturbance for their long-term maintenance. The vast majority of these prairies would eventually be forested if left undisturbed. Native plants that occur on upland prairies serve as herbaceous indicators of prairie condition.

Fender's blue butterfly is typically found in native upland prairies dominated by red fescue (*Festuca rubra*) and/or Idaho fescue (*F. idahoensis*). This butterfly is known to use Kincaid's lupine as its primary larval food plant but it also uses spur lupine (*Lupinus laxiflorus* = *L. arbustus*) and sickle-keeled lupine (*L. albicaulis*) as host plants. Fender's blue butterfly density has been positively correlated with the number of Kincaid's lupine flowering racemes, and more recently, to nectar production in native flowering species used for foraging by adult Fender's. Currently, Kincaid's lupine occurs on a few small prairie remnants in the Willamette Valley.

Anecdotal evidence indicates that under ideal conditions, the adults of Fender's blue butterfly may disperse as far as 3 to 3.5 miles (5 to 6 km) from their natal lupine patches (Hammond and Wilson 1992; Schultz 1994). According to Schultz (1997), adult dispersal of this magnitude is not likely anymore. Schultz (1997) found that the butterflies are generally found within 33 feet (10 m) of lupine patches, although they might disperse more than 1.2 miles (2 km) between lupine patches. Hammond (1998) reports recolonization of a site by Fender's blue butterfly from a distance of approximately 2 miles (3 km). Schultz (1997) further theorizes that Fender's blue originally would have had a high probability of dispersing between patches that were historically located an average of 0.3 miles (0.5 km) apart. Current distribution of lupine patches range well beyond this distance, and barriers to migration between close sites may be present.

Today, remnant upland prairie acreage is extremely fragmented and remaining Fender's blue butterfly populations are so small that migration processes are not expected to maintain the population over time. Extirpation of remaining small populations is expected due to localized events and low genetic diversity of very small populations. The low availability of host lupine patches and fragmentation of habitat are seen today as the major ecological factors limiting

reproduction, dispersal, and subsequent colonization of new habitat (Hammond and Wilson 1992, 1993, Hammond 1994, Schultz 1997, Schultz and Dugosch 1999).

2.3.1.2 Oregon Silverspot Butterfly (*Speyeria zerene hippolyta*)

Federal Status: threatened

State Status: none

Critical Habitat: designated

Recovery Plan: yes

Species Description. Oregon silverspot butterfly is a medium-sized, orange and brown butterfly with black veins and spots on the dorsal (upper) wing surface, and a yellowish submarginal band and bright metallic silver spots on the ventral (under-side) wing surface. The *hippolyta* subspecies is distinguished from other subspecies of silverspot butterflies by a somewhat smaller size and darker coloration at the base of the wings. These are morphological adaptations for survival in a persistently windy and foggy environment. Additional information on the life history and ecology of the Oregon silverspot butterfly can be found in its revised recovery plan (USFWS 2001).

Range/Distribution. The historical range of the Oregon silverspot butterfly extends from Long Beach Peninsula, Pacific County, Washington, south to Del Norte County, California. At least 20 separate locations were known to support this butterfly in the past. Currently, Oregon silverspot butterfly populations are thought to occur at only six sites. These butterflies most likely are extirpated from the Long Beach Peninsula in Washington. Two populations occur in Lane County, Oregon (Rock Creek and Bray Point), two are in Tillamook County, Oregon (Cascade Head and Mount Hebo), and one is in Del Norte County, California (Lake Earl). The population status at a sixth site in Clatsop County, Oregon (Clatsop Plains), has declined in recent surveys with only one individual documented in 1998 (VanBuskirk 1998). It is also possible that Oregon silverspot butterflies may occur in suitable habitat in Lincoln and Yamhill counties, Oregon. Although many of the populations in Oregon are near the Oregon Coast Highway (US 101), the USFWS considers that suitable habitat within the ODOT ROW only occurs at the Rock Creek population.

Habitat. The Oregon silverspot butterfly occupies three types of grassland habitat. The marine terrace/coastal headland salt-spray meadows and stabilized dunes are strongly influenced by proximity to the ocean, mild temperatures, high rainfall, and persistent fog. The third habitat type, montane grasslands, is found on Mount Hebo. Conditions at these mountain sites include colder temperatures, significant snow accumulations, reduced coastal fog, and no salt spray. Apparently the more inland meadow sites occupied by related subspecies of silverspots are not accessible to Oregon silverspots.

The most important habitat feature for the Oregon silverspot butterfly is the presence of the early blue violet (*Viola adunca*). This plant is normally the only species in the wild on which the butterfly can successfully feed and develop as larva. In the laboratory, however, the butterflies will accept other species of violets, and there is evidence that some individuals on Mount Hebo are using another species of violet. The violet is an obligatory component of the butterfly's habitat. Other features of optimum habitat include moderate grass cover, including red fescue used as a shelter for larvae, and a mixture of herbaceous plants such as California aster (*Symphotrichum chilensis*) and pearly everlasting (*Anaphalis margaritacea*) used for nectaring by adults.

Although the salt-spray meadow environment serves as a nursery area for larvae of the Oregon silverspot butterfly, making it a key element of this species' habitat, salt-spray meadows are rather harsh environments for the adults. Upon eclosion (metamorphosis of the pupa into the adult butterfly), adult butterflies generally move out of the meadows into the fringe of conifers or brush where there is shelter for more efficient heat conservation and nectaring flights. Forest shelter may also be used for courtship and mating. Where such sheltered conditions exist, adults will use a variety of nectar sources, including native and exotic plants.

2.3.2 Plant Species

2.3.2.1 Applegate's milk-vetch (*Astragalus applegatei*)

Federal Status: endangered
State Status: endangered
Critical Habitat: not designated
Recovery Plan: yes

Species Description. Applegate's milk-vetch is a perennial member of the pea family (Fabaceae). Stems are usually simple or with few branches, and are 10 to 15.5 inches (25 to 40 cm) long. The whitish flowers (with lilac-tinged tip on the keel) grow on racemes of up to 3 inches (7 cm) in length, and bloom from June to early August (Meinke 1982). Leaves are 1.5 to 3 inches (3.5 to 7 cm) long with seven to 11 leaflets. The widely-spreading or declined pods are 0.3 to 0.4 inch (8 to 11 mm) long and 0.1 to 0.3 inch (2.4 to 8 mm) wide (Meinke 1982, USFWS 1998a). Applegate's milk-vetch has been shown to be self-compatible or visited by diverse insect pollinators, including solitary bees and the Melissa blue butterfly (*Plebejus melissa*; Gisler and Meinke 2001a). Additional information on the life history and ecology of the Applegate's milk-vetch can be found in its recovery plan (USFWS 1998).

Range/Distribution. Applegate's milk-vetch is a narrow endemic restricted to the Lower Klamath Basin of southern Oregon, near the city of Klamath Falls. Only six known occurrences remain, three of which are quite small. Two of the occurrences (one large and one small) are on state-protected lands. The other four are under private ownership, although one of the large, albeit apparently declining, occurrences is managed by The Nature Conservancy for the preservation of Applegate's milk-vetch (ORBIC 2010a). The only record for this species on ODOT ROW is in southern Klamath County. The species is believed to no longer occur on ODOT property, but rather it occurs on adjacent private property. The current habitat conditions on the ROW at this location are so altered that suitable habitat for Applegate's milk-vetch is not present.

Habitat. Applegate's milk-vetch is found in meadows, moist grasslands, and along wayside ditches. It is also found along the Klamath River at approximately 4,000 feet (1,219 m) (Meinke 1982, ORBIC 2010a).

2.3.2.2 Arrow-leaf thelypody (*Thelypodium eucosmum*)

Federal Status: species of concern
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Arrow-leaf thelypody is a member of the mustard family (Brassicaceae). It is classified as a biennial or ephemeral perennial. The plants are 12 to 19.5 inches (30 to 50 cm)

tall, with perfect lavender-colored flowers and sessile, clasping arrow-shaped stem leaves (Hitchcock and Cronquist 1973). Flowers bloom from May to mid-July (OFP 2010).

Range/Distribution. This species is limited to Oregon in the lower canyons of the Blue Mountains in Grant and Wheeler counties, as well as along the river banks of John Day River tributaries (ORBIC 2010a). The Oregon Biodiversity Information Center (ORBIC) lists 61 populations, three of which are believed to have been extirpated. Of the 61 records in the ORBIC database, 48 are located in the Prineville Bureau of Land Management (BLM) District. Population sizes range from four plants to up to 5,000 plants (ORBIC 2010a). Although suitable habitat does exist along the ROW, no populations of this species are known to occur on ODOT ROW.

Habitat. Arrow-leaf thelypody is found primarily along steep, basaltic rocky stream banks and drainages with full sun exposure to moderate shade, from 1,600 to 5,500 feet (488 to 1,676 m). Soils have been described as ashy and alkaline. Occasionally, this thelypody has been found to grow on serpentine influenced soils. It is closely allied with western juniper (*Juniper occidentalis*), Great Basin wild rye (*Elymus cinereus*), and big sagebrush (*Artemesia tridentata*). Other associated species include rattlesnake brome (*Bromus brizaeformis*), horsetails (*Equisetum* spp.), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), cinquefoil (*Potentilla* spp.), and monkey flower (*Mimulus* spp.) (ORBIC 2010a, OFP 2010).

2.3.2.3 Bradshaw's desert parsley (*Lomatium bradshawii*)

Federal Status: endangered

State Status: endangered

Critical Habitat: not designated

Recovery Plan: yes

Species Description. Bradshaw's desert parsley is a low, more or less erect perennial species that grows from a long slender taproot. Leaves are 4 to 6 inches (10 to 15 cm) long on petioles of about the same length, and ternate then pinnately dissected, with the ultimate segments linear and 0.2 to 0.5 inch (0.6 to 1.2 cm) long. The peduncles are 6 to 23.5 inches (15 to 60 cm) high and the small light yellow flowers are arranged in umbels with 7 to 16 rays. The involuclers are comprised of about 10 bracts that are 0.1 to 0.2 inch (0.2 to 0.6 cm) long and ternately or biternately divided; these bracts are diagnostic of the species. Bradshaw's desert parsley flowers from mid-April through May, and reproduces by seed (Peck 1961, Meinke 1982, OFP 2010). Additional information on the life history and ecology of Bradshaw's desert parsley can be found in its recovery plan (USFWS 2010).

Range/Distribution. This species occurs in the Willamette Valley of Oregon from the city of Creswell north to Clark County in southwestern Washington. There are over 40 known occurrences in Oregon, though many of these are small, ranging from about 10 to 1,000 individuals (ORBIC 2010a). Although there are only two known occurrences of the species in Washington, they contain more plants than all the Oregon populations combined. There are three known populations of Bradshaw's desert parsley located on ODOT ROW.

Habitat. Bradshaw's desert parsley occurs in wet prairie habitats in clay soils or substrates that have a dense clay layer below the surface. The majority of populations located in the southern Willamette Valley occur in seasonally saturated or flooded prairies near creeks and small rivers. Some populations occur near the Santiam River in shallow, well-drained soils underlain by

basalt, usually in vernal wetlands or along stream channels (Meinke 1982, USFWS 2010, ORBIC 2010a).

2.3.2.4 Cascade Head catchfly (*Silene douglasii* var. *oraria*)

Federal Status: species of concern

State Status: threatened

Critical Habitat: not designated

Recovery Plan: no

Species Description. Cascade Head catchfly is a tufted perennial with a taproot. The plants are generally 4 to 16 inches (10 to 40 cm) tall with white, greenish, pink, or purplish tinged petals. Leaves are fleshy, mostly matted at the base of stems and on new shoots (Hitchcock et al. 1964, Kephart and Sturgeon 1993, Morton 2005). This species flowers from late April to early May, continuing through August (OFP 2010). Cascade Head catchfly reproduces both by seed and vegetatively by sending up new stems, each of which is capable of establishing roots. Recruitment by seeds has been reported to be low. Flowers produce pollen early, before the stigmas are receptive (i.e., protoandrous) (Kephart et al. 1999).

Range/Distribution. Cascade Head catchfly is known from only three sites in Tillamook County in northwestern Oregon: Cascade Head Preserve, Cape Lookout State Park, and Oswald West State Park. Cascade Head Preserve, managed by The Nature Conservancy, hosts the largest known occurrence of Cascade Head catchfly, with over 1,000 plants. The remaining two sites support fewer than 100 plants each (ORBIC 2010a). No populations are known to occur on ODOT property.

Habitat. Habitat for Cascade Head catchfly is somewhat specific and reflects a tradeoff between fertility and competition for light and nutrients. It is a grassland species found on steep coastal bluffs, ledges, and slopes facing the ocean at elevations ranging from 150 to 1500 feet (46 to 460 m). It can tolerate rocky, barren habitat with little associated vegetation but would otherwise grow more vigorously in deeper fertile soils (Kephart and Paladino 1997). Commonly associated native plant species include coast Indian paintbrush (*Castilleja affinis* ssp. *litoralis*), farewell to spring (*Clarkia amoena*), Menzies' larkspur (*Delphinium menziesii*), common woolly sunflower (*Eriophyllum lanatum*), red fescue, prairie Junegrass (*Koeleria macrantha*), and Bolander's ragwort (*Packera bolanderi*) (ORBIC 2010a).

2.3.2.5 Cook's lomatium (*Lomatium cookii*)

Federal Status: endangered

State Status: endangered

Critical Habitat: designated

Recovery Plan: yes

Species Description. Cook's lomatium is a small, taprooted perennial plant in the carrot family (Apiaceae). Plants are generally less than 12 inches (30 cm) tall and have umbellate, pale yellow flowers (Kagan 1986). This species blooms from mid-March to June, depending on spring weather conditions. Cook's lomatium reproduces by seeds and staggers the formation of male and female flower parts to avoid self-pollination (Brock 1987). Additional information on the life history and ecology of Cook's lomatium can be found in its recovery plan (USFWS 2006).

Range/Distribution. Cook's lomatium distribution is limited to Josephine and Jackson counties in Oregon (ORBIC 2010B). This species has a disjunct distribution with one major population

center located in the Illinois Valley region of Josephine County near the Illinois River and Cave Junction, and a second population center in the Agate Desert region of Jackson County near the Rogue River Valley and Medford. There are four known populations of this species on ODOT property, three in the Illinois Valley and one in the Agate Desert area.

Habitat. Cook's lomatium occupies vernal meadows. Soils at some sites are classified as Brockman clay loam and Agate-Winlo silty-clay loam (Brock 1987). Associated meadow species include California oatgrass (*Danthonia californica*), tufted hairgrass (*Deschampsia caespitosa*), cascade calicoflower (*Downingia yina*), and whitehead navarretia (*Navarretia leucocephala*) (ORBIC 2010a).

2.3.2.6 Cox's mariposa lily (*Calochortus coxii*)

Federal Status: species of concern

State Status: endangered

Critical Habitat: not designated

Recovery Plan: no

Species Description. Cox's mariposa lily is a perennial flower in the lily family (Liliaceae) that dies back to a bulb each year. The flower stalk is generally 6 to 10 inches (15 to 25 cm) in height and bears one to seven showy, three-petaled, cup-shaped, densely hairy, white flowers. Each flower has deep pink to yellow hairs that radiate from the center outwards. The three-winged elliptical capsules are about 1 to 1.5 inch (3 to 4 cm) long by 0.5 inch (1.5 cm) wide with a 0.1 inch (0.4 cm) persistent recurved "style." Each plant's single shiny dark green leaf is about 12 inches (30 cm) long and 0.1 to 0.3 inch (0.3 to 0.7 cm) wide and is glabrous on the surface and densely hairy on the underside (Godfrey and Callahan 1988).

Range/Distribution. Cox's mariposa lily is only found in approximately eight sites where populations are scattered along a 30 mile (48 km) long serpentine ridge in Douglas County in southwestern Oregon (ORBIC 2010a). It is not known to occur on ODOT property.

Habitat. Found in the serpentine soils of open woodlands, grasslands, and forest margins on steep to gentle slopes, Cox's mariposa lily inhabits dry sites with an open canopy or filtered sunlight at elevations of 840 to 2,785 feet (256 to 849 m). Flowering varies with elevation, beginning in early June at lower elevations and ending in mid-July at higher elevations. This species can be distinguished from Tolmie star-tulip (*Calochortus tolmiei*), a similar-looking flower, by its later flowering time (Tolmie star-tulip flowers in March to early May), the hairy undersides of the leaves (Tolmie star-tulip is glaucous on both surfaces of the leaves) and the reddish-brown anthers, which differ from the lavender-colored anthers of Tolmie star-tulip (Fredricks et al. 1992).

2.3.2.7 Cronquist's stickseed (*Hackelia cronquistii*)

Federal Status: species of concern

State Status: threatened

Critical Habitat: not designated

Recovery Plan: no

Species Description. Cronquist's stickseed is an upright, taprooted perennial in the borage family (Boraginaceae). The plants are generally 8 to 26 inches (20 to 65 cm) tall with five-lobed flowers that are white and tinged with blue. In addition, the center of the flower has five raised

protrusions (fornices) that can distinguish this species from plants in other families. Peak flowering time for this species is May (Gentry and Car 1976, Meinke 1982, Hickman 1993).

Range/Distribution. In Oregon, Cronquist's stickseed is limited to the central eastern part of the state (northern Malheur County, and southeastern Baker County) with three known populations occurring on ODOT ROW (ORBIC 2010a). In addition, some occurrences have been reported from counties in Idaho (Atwood and DeBolt 2000). There are three known locations of Cronquist's stickseed occurring on ODOT property.

Habitat. Cronquist's stickseed grows amongst grasses, sagebrush, and other forbs on sandy hillsides in the Northern Basin and Range Ecoregion. It can be found on north-facing slopes between 2,000 and 3,640 feet (610 and 1,110 m) (Meinke 1982, ORBIC 2010a, b). Commonly associated plant species include common yarrow (*Achillea millefolium*), big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), Idaho fescue, Great Basin wild rye (*Leymus cinereus*), and Sandberg bluegrass (*Poa secunda*) (ORBIC 2010a, OFP 2010).

2.3.2.8 Gentner's fritillary (*Fritillaria gentneri*)

Federal Status: endangered
State Status: endangered
Critical Habitat: not designated
Recovery Plan: yes

Species Description. Gentner's fritillary is a bulbous perennial in the lily family (Liliaceae). Plants are generally 15 to 28 inches (40 to 70 cm) tall when flowering. Bell-shaped flowers have a maroon and yellow checkerboard pattern, and stem leaves are arranged in whorls. Peak flowering time for this species is from late March to early April (Gilkey 1951). Additional information on the life history and ecology of Gentner's fritillary can be found in its recovery plan (USFWS 2003).

Range/Distribution. In Oregon, this species is limited to Jackson and Josephine counties (ORBIC 2010a). The southernmost record occurs outside of Oregon in Northern California. The majority of occurrences are near Jacksonville, Oregon. There are three known populations of Gentner's fritillary on ODOT ROW.

Habitat. Gentner's fritillary occupies a broad range of habitat including riparian, grassland, chaparral, and oak woodlands. It grows on a diverse array of soil types including those of serpentine origin. Populations occur between 780 and 4,600 feet (305 to 1,545 m) in elevation. This fritillary appears closely allied with Pacific poison oak (*Toxicodendron diversilobum*) which may shelter it from browsing animals. Other associated species include buckbrush (*Ceanothus cuneatus*), phacelia (*Phacelia* spp.), silverpuffs (*Microseris* spp.), and fawn lilies (*Erythronium* spp.) (ORBIC 2010a).

2.3.2.9 Howell's mariposa lily (*Calochortus howellii*)

Federal Status: species of concern
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Howell's mariposa lily is a perennial member of the lily family (Liliaceae). The plants are generally 8 to 16 inches (20 to 40 cm) tall, with three white to cream colored

petals, each with a lime green petal spot that is covered with dark purple hairs. Peak flowering time for this species is between June and July. Howell's mariposa lily reproduces by seed. Seedlings do not flower their first year but can be distinguished from other related species by their distinct leaf characteristics (Fredericks 1989, Fredericks 1992).

Range/Distribution. ORBIC lists 39 occurrences of Howell's mariposa lily on state, U.S. Forest Service, BLM, and private lands in Josephine County, Oregon. Most are located along the Illinois River near Cave Junction (ORBIC 2010a). This species has not been located on ODOT ROW.

Habitat. Howell's mariposa lily grows in full sun on dry, rocky, serpentine soils amongst Jeffrey pine (*Pinus jeffreyi*) and white leaf Manzanita (*Arctostaphylos viscida*) (ORBIC 2010a).

2.3.2.10 Howell's microseris (*Microseris howellii*)

Federal Status: not listed
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Howell's microseris is a taprooted perennial in the aster family (Asteraceae) that reproduces by seed. It is generally 4 to 20 inches (10 to 50 cm) tall with yellow ray flowers not unlike the common dandelion (Meinke 1982, Chambers 2006). It blooms from late April to June (OFP 2010) but distinguishing it from its look-alike species, cutleaf microseris (*Microseris laciniata*), requires close examination of mature seed.

Range/Distribution. This species is restricted to serpentine regions in southwestern Oregon within the Klamath Mountains Ecoregion. The majority of occurrences are located in Josephine County, with a few records from Curry County (ORBIC 2010a, OFP 2010). The present status of the Curry County occurrences is unknown. Two known populations of Howell's microseris occur on ODOT ROW.

Habitat. Howell's microseris grows on hillsides and alluvial flats, open shrublands, and Jeffrey pine savannas in rocky serpentine soils at elevations ranging from 980 to 3,280 feet (300 to 1,000 m) (ORBIC 2010a).

2.3.2.11 Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*)

Federal Status: threatened
State Status: endangered
Critical Habitat: not designated
Recovery Plan: yes

Species Description. Howell's spectacular thelypody is an herbaceous biennial in the mustard family (Brassicaceae). It is generally 1 to 3 inches (3 to 7 cm) tall with showy purple flowers. It can be distinguished from other closely related species by differences in leaf attachment to the stem and flower size (Al-Shehbaz 1973, ODA 2011). Peak flowering time for this species occurs from June through July (OFP 2010). Similar to other biennials, Howell's spectacular thelypody flowers the second year of its life, sets seed, and dies shortly thereafter. The following spring, seeds germinate and form ground-hugging rosettes (Currin et al. 2007). Additional information on the life history and ecology of Howell's spectacular thelypody can be found in its recovery plan (USFWS 2002).

Range/Distribution. This species is restricted to the Baker-Powder River Valley in Union and Baker counties, and the Willow Creek Valley in Malheur County (ORBIC 2010a). There are currently three known populations of Howell's spectacular thelypody on ODOT ROW.

Habitat. Howell's spectacular thelypody is found in vernal damp meadow habitats with alkaline, rain and river-derived silty clay soils from 3,000 to 3,500 feet (1,000 to 1,100 m). Associated species include Great Basin wild rye, saltgrass (*Distichlis stricta*), greasewood (*Sarcobatus vermiculatus*), green rabbitbrush (*Ericameria viscidiflora*), rubber rabbitbrush, and alkali bluegrass (*Poa juncifolia*) (ORBIC 2010a).

2.3.2.12 Kincaid's lupine (*Lupinus oregonus ssp. kincaidii*)

Federal Status: threatened

State Status: threatened

Critical Habitat: designated

Recovery Plan: yes

Species Description. Kincaid's lupine is a shade intolerant perennial species in the pea family (Fabaceae). Plants are generally 16 to 32 inches (40 to 80 cm) tall, with fragrant, bluish or purple to yellowish or creamy-white flowers (Hitchcock et al. 1961). The main flowering time for this species is May through June (OFP 2010). It reproduces by vegetative rhizomes and by seed (USFWS 2010a). Additional information on the life history and ecology of Kincaid's lupine can be found in its recovery plan (USFWS 2010).

Range/Distribution. This species has a broad range from Washington down to Douglas County, Oregon (ORNHC 2007). Despite the broad range, most populations occur in the Willamette Valley of Oregon. There are several known locations of Kincaid's lupine on ODOT ROW. Other populations are found along roadsides not maintained by ODOT.

Habitat. Kincaid's lupine occurs in remnants of upland prairie and also in intermediate zones between forest and grassland. This species grows in well-draining soil (mesic to slightly xeric) at mid to low elevations (below 2,750 feet or 838 m). Associated species include bigflower agoseris (*Agoseris grandiflora*), madrone (*Arbutus menziesii*), Puget balsamroot (*Balsamorhiza deltoidea*), crown brodiaea (*Brodiaea coronaria*), California brome (*Bromus carinatus*), Tolmie star-tulip, clearwater cryptantha (*Cryptantha intermedia*), California oatgrass, Menzies' larkspur, Oregon iris (*Iris tenax*), pacific woodrush (*Luzula comosa*), and many others (ORBIC 2010).

2.3.2.13 Large-flowered rush lily (*Hastingsia bracteosa* var. *bracteosa*)

Federal Status: species of concern

State Status: threatened

Critical Habitat: not designated

Recovery Plan: no

Species Description. Large-flowered rush lily is a bulbous perennial in the lily family (Liliaceae). It produces a lone flowering stalk with white or purple flowers depending on the variety (*var. bracteosa* or *var. atropurpurea*) in May and June. It can be distinguished from lookalike species by stamen to petal ratios and habitat differences (Becking 1986).

Range/Distribution. Currently, this species is restricted to the Illinois River Valley in southwestern Oregon; the approximately 20 populations are concentrated around Eight Dollar

Mountain. Historic records also show the large-flowered rush lily in Jackson County, Oregon and California (ORBIC 2010a, b). No populations are known to occupy ODOT ROW.

Habitat. Large-flowered rush lily habitat consists of open wetlands overlying serpentine or peridotite between 785 and 2,300 feet (240 and 700 m). The soils have been classified as Dubakella-Pearsoll. Associated species include California pitcherplant (*Darlingtonia californica*), California coneflower (*Rudbeckia californica*), Western azalea (*Rhododendron occidentale*), bog orchid (*Platanthera sparsiflora*), Bigelow's sneezeweed (*Helenium bigelovii*), California bog asphodel (*Narthecium californicum*), Vollmer's lily (*Lilium pardalinum* ssp. *volmerii*) and Jeffrey pine (ORBIC 2010a).

2.3.2.14 Large-flowered woolly meadowfoam (*Limnanthes pumila* ssp. *grandiflora*)

Federal Status: endangered
State Status: endangered
Critical Habitat: designated
Recovery Plan: yes

Species Description. Large-flowered woolly meadowfoam is a low-growing annual herb. The stems are sparsely pubescent and 2 to 6 inches (5 to 15 cm) long. The leaves are 0.3 to 2.5 inches (1 to 6 cm) long, sparsely pubescent with linear to oblanceolate leaflets that are 0.16 to 0.31 inch (4 to 8 mm) long. The flowers (especially the calyx) are quite pubescent (hence the “woolly” term) and the petals have two lines of pubescence on claws, 0.3 to 0.4 inch (7.5 to 9.5 mm) long (Mason 1952, Meinke 1982). The fruits are 0.1 to 0.2 inch (3 to 5 mm) long nutlets. Depending on the rains and temperature, this taxon can be found flowering from the beginning of March to mid-April. Additional information on the life history and ecology of large-flowered woolly meadowfoam can be found in its recovery plan (USFWS 2006).

Range/Distribution. This species is currently, and historically, only known to exist near vernal pools in the Agate Desert region, north of Medford, Oregon, near White City. Only 20 occurrences now exist, of which only 20 percent are protected (ORBIC 2010a). There is one known occurrence of large-flowered woolly meadowfoam on ODOT property.

Habitat. Large-flowered woolly meadowfoam is found near the wet inner edges of vernal pools with sparse prairie vegetation. The elevation of these pools is approximately 1,230 to 1,315 feet (375 to 400 m).

2.3.2.15 Laurence's milk-vetch (*Astragalus collinus* var. *laurentii*)

Federal Status: species of concern
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Laurence's milk-vetch is a taprooted perennial in the pea family (Fabaceae). The plants are generally 8 to 16 inches (20 to 40 cm) tall, with cream to yellowish-colored flowers. It blooms from late April to late July, but fruit characteristics are usually required for definitive identification. This plant is in fruit from late May through August (ODA 2011). Laurence's milk-vetch relies heavily on pollinators for outcrossing to produce viable seed (Gisler and Meinke 2001b).

Range/Distribution. This species is limited to four counties in northeastern Oregon: Gilliam, Morrow, Sherman, and Umatilla. Several populations are found on the ODOT ROW in the vicinity of Heppner (ORBIC 2010a).

Habitat. Laurence's milk-vetch occurs on dry grassy rocky hillsides in the Columbia Basin Ecoregion from 2,000 to 3,400 feet (600 to 1,040 m). Associated species include bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass, Idaho fescue, and cheatgrass (*Bromus tectorum*) (Meinke 1982, ORBIC 2010a).

2.3.2.16 Malheur wire-lettuce (*Stephanomeria malheurensis*)

Federal Status: endangered

State Status: endangered

Critical Habitat: designated

Recovery Plan: yes

Species Description. Malheur wire-lettuce is an annual species in the aster family (Asteraceae). After forming an initial glabrous-leaved rosette of about 6 inches (15 cm) in diameter in the spring, this species bolts in late May to June, sending up flowering stems that reach 12 inches (30 cm) in height. Flowers ranging in color from white to pink to purple are present from late June through August (Gottlieb 1978, Hitchcock and Cronquist 1973). Additional information on the life history and ecology of Malheur wire-lettuce can be found in its recovery plan (USFWS 1990).

Range/Distribution. This species is known from a single geographic area in southeastern Oregon, approximately 25 miles (40 km) south of Burns (ORBIC 2010a). One known population of Malheur wire-lettuce occurs on ODOT ROW.

Habitat. Malheur wire-lettuce was first identified on a hillside above Harney Lake, in Oregon, on tuffaceous soils. These soils differ from surrounding soils which are derived from basalt. The altitude of the site is approximately 4,920 feet (1,500 m), and the shrub-steppe vegetation is dominated by big sagebrush, rubber rabbitbrush, green rabbitbrush, and cheatgrass (Gottlieb 1978, Brauner 1988).

2.3.2.17 McDonald's rockcress (*Arabis macdonaldiana*)

Federal Status: endangered

State Status: endangered

Critical Habitat: not designated

Recovery Plan: yes

Species Description. McDonald's rockcress is a rosette-forming perennial in the mustard family (Brassicaceae). Plants are generally 2 to 12 inches (5 to 30 cm) high with showy purple four-petaled flowers that bloom from early May through June. This rockcress can be distinguished from closely-related species by its overall hairless surfaces (leaves and stems) and fruit length (Eastwood 1903, Al-Shehbaz 2010). Additional information on the life history and ecology of McDonald's rockcress can be found in its recovery plan (USFWS 1984).

Range/Distribution. McDonald's rockcress is reported from eight sites in Oregon; all are located in the Siskiyou Mountains of Curry and Josephine counties. In California, the species is reported from Del Norte, Mendocino, Siskiyou, and Trinity counties. No populations are currently known to occur in ODOT ROW (CNPS 2010, ORBIC 2010a).

Habitat. McDonald's rockcress grows in full sun on dry, rocky, serpentine/peridotite soils that have been recently exposed and generally less weathered. It tends to occur in fairly steep, erosion prone areas, on recently-exposed substrate. Associated species include huckleberry oak (*Quercus vaccinifolia*), dwarf ceanothus (*Ceanothus pumilus*), hoary manzanita (*Arctostaphylos canescens*), and wild buckwheat (*Eriogonum*), onion (*Allium*), and violet (*Viola*) species (Meinke 1982).

2.3.2.18 Nelson's checker-mallow (*Sidalcea nelsoniana*)

Federal Status: threatened
State Status: threatened
Critical Habitat: not designated
Recovery Plan: yes

Species Description. Nelson's checker-mallow is an upright perennial in the mallow family (Malvaceae). Plants are generally 16 to 40 inches (40 to 100 cm) tall and can either have pistillate (female) flowers or fully-functioning perfect flowers (Hitchcock et al. 1961, Halse et al. 1989). Flowers are pinkish lavender and most abundant from late May through mid-July (OFP 2010). Nelson's checker-mallow can be distinguished from closely-related species by its smaller stature, deeper pink petal color, and stem hair morphology (ODA 2011). This species reproduces by seed or by rhizome. Additional information on the life history and ecology of Nelson's checker-mallow can be found in its recovery plan (USFWS 2010).

Range/Distribution. Nelson's checker-mallow populations are distributed from central western Oregon north through southwest Washington, with most occurring in Benton and Marion counties in Oregon (ORBIC 2010a). There are 11 known populations of this species on ODOT ROW.

Habitat. In the Willamette Valley of Oregon, Nelson's checker-mallow grows in what is left of open prairie remnants on gravelly, well-drained loams. In the Oregon coast range, populations occur in damp meadows, stream channels, and riparian areas with light gaps. This checker-mallow species is found at elevations from about 140 to 2,000 feet (43 to 610 m) (ORBIC 2010a). Associated species include common yarrow, sedges (*Carex* spp.), hawthorns (*Crataegus* spp.), tufted hairgrass, field horsetail (*Equisetum arvense*), Virginia strawberry (*Fragaria virginiana*), Oregon ash (*Fraxinus latifolia*), stickywilly (*Galium aparine*), largeleaf avens (*Geum macrophyllum*), cow parsnip (*Heracleum lanatum*), meadow barley (*Hordeum brachyantherum*), rushes (*Juncus* spp.), big-leaf lupine (*Lupinus polyphyllus*), coast tarweed (*Madia sativa*), common selfheal (*Prunella vulgaris*), western bracken fern (*Pteridium aquilinum*), Oregon white oak (*Quercus garryana*), arrowleaf ragwort (*Senecio triangularis*), rose spirea (*Spiraea douglasii*), common snowberry (*Symphoricarpos albus*), and white brodiaea (*Triteleia hyacinthine*) (ORBIC 2010a).

2.3.2.19 Oregon semaphore grass (*Pleuropogon oregonus*)

Federal Status: species of concern
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Oregon semaphore grass is a perennial in the Poaceae family. Plants arise from slender rhizomes, and have erect, 0.8 to 1.5 inches (2 to 4 cm) long flowering spikelets that

are green tinged with purple and spread toward one side of the raceme (Chase 1938, But et al. 1985). This species blooms from June through July and is easily distinguished from a closely-related species, nodding semaphore grass (*Pleuropogon refractus*), because it grows on the opposite side of the Cascade mountain range (ODA 2011, OFP 2010). Oregon semaphore grass reproduces mainly by rhizomes, resulting in genetically-identical clonal populations (But et al. 1985).

Range/Distribution. This semaphore grass is found in three Oregon locations in Lake and Union counties that are separated by almost 250 miles (400 km) (ORBIC 2010a, b). Currently, there is one known population of this species in northeastern Oregon (Union County), partially on ODOT ROW and partially on private property. The remaining population is on private land in Lake County.

Habitat. The Oregon semaphore grass grows in full sun in open moist meadows from 2,450 to 3,950 feet (750 to 1,200 m). It shares its habitat with other grasses and sedges that are capable of tolerating similar conditions (ORBIC 2010a, OFP 2010).

2.3.2.20 Pale larkspur (*Delphinium leucophaeum*)

Federal Status: species of concern
State Status: endangered
Critical Habitat: not designated
Recovery Plan: no

Species Description. Pale larkspur is a perennial flowering plant in the buttercup family (Ranunculaceae). Between the months of May and June, it is distinguished from peacock larkspur (*D. pavonaceum*), the only other white-flowered larkspur west of the Cascades, by its shorter habit, smaller flower parts, forward-cupped sepals (versus reflexed in peacock larkspur), and narrow raceme (versus pyramidal) (Hitchcock et al. 1964, Warnock 1997, Chambers 2000).

Range/Distribution. Twenty-three populations of pale larkspur are listed by ORBIC and they span the Oregon counties of Clackamas, Yamhill, Multnomah, and Washington (ORBIC 2010b). These populations are found on private, national forest, state, and Portland Metro lands. There is one known population of pale larkspur on ODOT ROW.

Habitat. Pale larkspur is found on the edges of oak woodlands, in dry roadside ditches, on basalt cliffs, along river banks and bluffs, on moist rocky slopes, and in moist lowland meadows. It inhabits loose, shallow soils typically 2 to 3 inches (5 to 7 cm) deep with high organic matter content and a high level of sand relative to the soils in which other Pacific Northwest delphiniums occur. This species grows on slopes ranging from horizontal plateaus to vertical cliffs in open exposed areas to fairly deeply-shaded spots at 125 to 500 feet (40 to 150 m) in elevation (Meinke 1982, Goodrich 1983, ORBIC 2010a).

2.3.2.21 Peacock larkspur (*Delphinium pavonaceum*)

Federal Status: species of concern
State Status: endangered
Critical Habitat: not designated
Recovery Plan: no

Species Description. Peacock larkspur is an herbaceous perennial in the buttercup family (Ranunculaceae). Plants are generally 12 to 35 inches (30 to 90 cm) tall and have white flowers

with blue to lavender-tipped upper petals. It can be distinguished from the other white delphinium, pale larkspur, by measuring plant height and flower size. Peacock larkspur flowers from late April through June and is distinguishable from other delphiniums at this time (Hitchcock et al. 1964, Goodrich 1983, Chambers 2000).

Range/Distribution. Peacock larkspur is endemic to the Willamette Valley of Oregon, with populations concentrated primarily in Benton and Polk counties (ORBIC 2010a). The largest population occurs in a National Wildlife Refuge in Benton County. It also occurs at six sites on ODOT ROW, although three of these sites have very few plants (not evident in some years).

Habitat. Peacock larkspur grows in low elevation (150 to 400 feet or 45 to 120 m) wet prairie and Willamette River floodplain habitats. Associated species include common yarrow, meadow foxtail (*Alepocuris pratensis*), narrowleaf onion (*Allium amplexans*), small camas (*Camassia quamash*), Menzies' larkspur, tufted hairgrass, Oregon ash, largeleaf avens, Oregon geranium (*Geranium oreganum*), common velvetgrass, St. John's wort (*Hypericum perforatum*), Bradshaw's desert parsley, common lomatium (*Lomatium utriculatum*), bigleaf lupine, slender phlox (*Phlox gracilis*), sea blush (*Plectritis congesta*), Kentucky bluegrass (*Poa pratensis*), slender cinquefoil (*Potentilla gracilis*), Oregon white oak, rose species (*Rosa*), checker-mallows (*Sidalcea* spp.), common snowberry, Pacific poison oak, vetch species (*Vicia*), and California compassplant (*Wyethia angustifolia*) (Meinke 1982, ORBIC 2010a).

2.3.2.22 Peck's milkvetch (*Astragalus peckii*)

Federal Status: not listed
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Peck's milkvetch is a low-lying, taprooted, perennial in the pea family (Fabaceae). The lower half (keel) of the flower is cream and the upper half (banner) is white with vertical purple stripes. Stems often have a reddish tinge and persistent petioles. Flowering occurs June through July (Gisler and Meinke 2001b, Amsberry and Meinke 2003, ORBIC 2010a).

Range/Distribution. Peck's milkvetch occurs east of the Cascades in Deschutes and Klamath counties, Oregon. Three population centers exist: one near Sisters, another near Chemult, and a southernmost population east of Chiloquin (ORBIC 2010a, ODA 2011). Several populations have been documented on or near ODOT ROW.

Habitat. Peck's milkvetch prefers full sun locations amongst sagebrush, lodgepole pine, and juniper plant communities between 3,000 and 5,000 feet (915 and 1,525 m) elevation. Soils are mainly mazama pumice and sand with low nutrient levels (ODA 2011). Vegetation is characteristically sparse and associated species include big sagebrush, antelope bitterbrush (*Purshia tridentata*), Idaho fescue, western needlegrass (*Achnatherum occidentale*), sulphur-flower buckwheat (*Eriogonum umbellatum*), and common woolly sunflower (ORBIC 2010a).

2.3.2.23 Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *palustris*)

Federal Status: species of concern
State Status: endangered
Critical Habitat: not designated
Recovery Plan: no

Species Description. Point Reyes bird's beak is a salt tolerant annual species in the broomrape family (Orobanchaceae). Plants are generally 4 to 8 inches (10 to 20 cm) tall, with few, if any, branches and an overall purple to lavender color. Pinkish to purple flowers are arranged in dense spikes (Chuang and Heckard 1973).

Range/Distribution. Point Reyes bird's-beak is distributed along the west coast from Tillamook County in Oregon, south to Santa Clara County in California. In Oregon, this species is restricted to Netarts Bay, Yaquina Bay, and Coos Bay, with the majority of known occurrences located in Coos Bay (ORBIC 2010a, b). No known populations exist on ODOT ROW.

Habitat. Point Reyes bird's beak grows in salty marshes near the ocean where the soils are sandy with a layer of silt and the associated vegetation cover is at least 70 percent. Associated species include pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), and fleshy jaumea (*Jaumea carnosa*) (ORBIC 2010a).

2.3.2.24 Pumice grape-fern (*Botrychium pumicola*)

Federal Status: not listed

State Status: threatened

Critical Habitat: not designated

Recovery Plan: no

Species Description. Pumice grape-fern is a perennial in the adders tongue family (Ophioglossaceae). The plants have stems that are 2.5 to 9 inches (7 to 22 cm) in length and may be totally or partially buried. The above-ground spore-producing structures appear similar to a cluster of grapes. The plant has an overall grayish-green color and a dull waxy coating similar to that found on blueberries. Pumice grape-fern is in its reproductive, spore-producing life stage from July through August (Peck 1961, Meinke 1982, Wagner and Wagner 1993, Amsberry and Meinke 2002).

Range/Distribution. Pumice grape-fern occurs in Deschutes, Klamath, and Lake counties, Oregon (ORBIC 2010a). Populations occur within three different national forests, on BLM land, and in Crater Lake National Park (Hopkins et al. 2001, Ahlenslager and Potash 2007). Many ORBIC records for this species occur along roadsides; however, recent surveys have not located this species on ODOT ROW.

Habitat. Pumice grape-fern grows in the cold pumice plateau areas of Central Oregon (ORBIC 2010a). In general, the soils are low in nutrients and contain a high percentage of pumice. Populations of pumice grape-fern grow at two distinct elevation ranges, montane and alpine, from 4,240 to 9,065 feet (1,290 to 2,760 m). The alpine populations occupy ridgelines and craggy outcrops. Lower elevation populations grow on gentle sloping plateaus with lodgepole pine, juniper and herbaceous plants such as Davidson's penstemon (*Penstemon davidsonii*), silverleaf phacelia (*Phacelia hastata*), and dwarf lupine (*Lupinus lepidus*) (ORBIC 2010a).

2.3.2.25 Rough popcornflower (*Plagiobothrys hirtus*)

Federal Status: endangered

State Status: endangered

Critical Habitat: not designated

Recovery Plan: yes

Species Description. Rough popcornflower is a full sun, herbaceous plant in the borage family (Boraginaceae) that is a perennial or annual depending on weather conditions. Plants are generally 20 to 24 inches (50 to 60 cm) tall with five-petaled white flowers with yellow centers and a distinctly hairy overall appearance (Peck 1961). Plants are capable of self fertilization but require insects to transfer pollen from one flower to the next. This plant reproduces by underground rhizomes and by seed (Amsberry and Meinke 2001). Rough popcornflower is in bloom from late May through June (OFP 2010). Distinguishing rough popcornflower from other related popcornflower species can be difficult and may require examination of the nutlets. Additional information on the life history and ecology of rough popcornflower can be found in its recovery plan (USFWS 2003).

Range/Distribution. Rough popcornflower is restricted to the Umpqua Valley in Douglas County, Oregon (ORBIC 2010a). Twelve extant populations exist, with the majority of these located near Sutherlin. There is one known population of rough popcornflower on ODOT ROW and two known populations on other ODOT properties.

Habitat. In early spring, rough popcornflower can be found submerged in vernal pools; when the pools dry out, they become quickly inhabited. Soils are classified as Conser silty clay loam and have poor drainage. The habitat is open, generally flat, and at lower elevations from approximately 300 to 500 feet (100 to 150 m) (ORBIC 2010a, OFP 2010). Associated species include greensheath sedge (*Carex feta*), American sloughgrass (*Beckmannia syzigachne*), common rush (*Juncus effuses*), pointed rush (*Juncus oxymersis*), skullcap speedwell (*Veronica scutellata*), northwestern mannagrass (*Glyceria occidentalis*) and tufted hairgrass.

2.3.2.26 Silvery phacelia (*Phacelia argentea*)

Federal Status: species of concern
State Status: endangered
Critical Habitat: not designated
Recovery Plan: no

Species Description. Silvery phacelia is a perennial in the borage family (Boraginaceae). Plants are generally 4 to 18 inches (10 to 45 cm) long and lie close to the ground. Leaves often have a distinct silvery appearance. The numerous congested flowers, best seen from late May to early August, are white with exerted stamens. This species reproduces by rhizomes and by seed (Hitchcock and Cronquist 1959, Meinke 1982).

Range/Distribution. The ORBIC database lists 33 populations; 10 occur in Coos County and 23 in Curry County, Oregon (ORBIC 2010a, b). Populations occur on state, BLM, and private land. There are two known populations of silvery phacelia on ODOT ROW.

Habitat. Silvery phacelia grows along the coast on sand dunes in close proximity to the fluctuating high tide line. Associated species include coastal sand verbena (*Abronia latifolia*), silver burr ragweed (*Ambrosia chamissonis*), seashore false bindweed (*Calystegia soldanella*), beach evening primrose (*Camissonia cheiranthifolia* ssp. *cheiranthifolia*), sandcarpet (*Cardionema ramosissimum*), orchardgrass (*Dactylis glomerata*), red fescue, beach strawberry (*Fragaria chiloensis*), American silvertop (*Glehnia littoralis* ssp. *leiocarpa*), seashore lupine (*Lupinus littoralis*), seashore bluegrass (*Poa macrantha*), beach knotweed (*Polygonum paronychia*) (ORBIC 2010a).

2.3.2.27 Snake River goldenweed (*Pyrrocoma radiata*)

Federal Status: species of concern
State Status: endangered
Critical Habitat: not designated
Recovery Plan: no

Species Description. Snake River goldenweed is a perennial species in the sunflower family (Asteraceae) that reproduces by seed. Plants are generally 12 to 40 inches (30 to 100 cm) tall arising from a woody taproot, and have yellow flowers. This goldenweed blooms from June through July (Cronquist 1955, Meinke 1982, Bogler 2006).

Range/Distribution. Snake River goldenweed is restricted to the lower Snake River Canyon and adjacent slopes in eastern Oregon (Baker and Malheur counties) and in neighboring Idaho (ORBIC 2010a). In total, populations cover less than 30 by 40 miles (48 by 64 km). Populations occur on the Malheur and Baker Management Resource Areas in the BLM Vale District. Other populations occur on private lands and are afforded no protection (ORBIC 2010a). There are no known populations in ODOT ROW.

Habitat. Snake River goldenweed grows among big sage, bluebunch wheatgrass, and Sandberg bluegrass on moderate slopes between 2,000 and 6,000 feet (610 and 1,830 m). It inhabits open, dry calcareous soils often overlaying shale formations. Associated species other than those mentioned above include common yarrow, bluebunch wheatgrass (*Pseudoroegneria spicata*), bristly fiddleneck (*Amsinckia tessellate*), big sagebrush, Cusick's milkvetch (*Astragalus cusickii*), woollypod milkvetch (*A. purshii*), arrowleaf balsamroot (*Balsamorhiza sagittata*), cheatgrass, whitetop (*Cardaria draba*), tiny trumpet (*Collomia linearis*), largeflower hawkbeard (*Crepis occidentalis*), Great Basin wild rye, rubber rabbitbrush, green rabbitbrush, shaggy fleabane (*Erigeron pumilus*), and wild buckwheat species (ORBIC 2010a).

2.3.2.28 Spalding catchfly (*Silene spaldingii*)

Federal Status: threatened
State Status: endangered
Critical Habitat: not designated
Recovery Plan: yes

Species Description. Spalding catchfly is a perennial in the pink family (Caryophyllaceae). Plants are generally 4.5 to 24 inches (20 to 60 cm) tall with white flowers and green calyces (Morton 2005). Flowering occurs July through August (OFP 2010). Plants reproduce by seed only. Additional information on the life history and ecology of spalding catchfly can be found in its recovery plan (USFWS 2010).

Range/Distribution. Spalding catchfly is known from northeastern Oregon and adjacent eastern Washington and western Idaho, and from northwestern Montana north barely reaching into British Columbia, Canada. This species inhabits five physiographic regions over its range: the Blue Mountain Basins in northeastern Oregon; the Canyon Grasslands associated with the Snake River and its tributaries in Oregon, Idaho, and Washington; the Palouse Grasslands in west-central Idaho and southeastern Washington; the Channeled Scablands in eastern Washington; and the Intermontane Valleys of northwestern Montana and southern British Columbia (Meinke 1982, ORBIC 2010a). There is one known population on ODOT ROW, although most of that total population occurs on adjacent public lands.

Habitat. Spalding catchfly primarily occurs within open, moist bunchgrass grassland communities or sagebrush-steppe communities, and occasionally within open pine forests. It is usually found in deep, rich loess soils in swales or on north facing slopes where soil moisture is higher. Occupied sites range from 1,200 to 5,300 feet (365 to 1,615 m) in elevation. Associated species include Idaho fescue, rough fescue (*Festuca scabrella*), bluebunch wheatgrass, big sagebrush, threetip sagebrush (*Artemisia tripartita*), ponderosa pine, black hawthorn (*Crataegus douglasii*), and common snowberry (ORBIC 2010a).

2.3.2.29 Sterile milkvetch (*Astragalus cusickii* var. *sterilis*)

Federal Status: not listed
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Sterile milkvetch is a perennial species in the pea family (Fabaceae). Plants are generally 2.5 to 6 inches (7 to 15 cm) tall with pale yellow to pink flowers. The pods have a slight translucent appearance that is contrasted with purple mottling. Sterile milkvetch is in bloom from May to late June (Meinke 1982, ORBIC 2010a). It is capable of reproducing both by seed and creeping rhizomes (Gisler and Meinke 2001b).

Range/Distribution. In Oregon, sterile milkvetch is restricted to Malheur County; in particular, it is endemic to the Owyhee Uplands, occurring along the Owyhee River in southeastern Oregon and the Northern Basin and Range Ecoregion of Idaho (ORBIC 2010a). The ORBIC database lists 68 populations of sterile milkvetch, with some having as few as 10 plants (ORBIC 2010a). However, there are also many large populations that contain thousands of plants. Around 90 percent of the populations occur on BLM property (Smithman 1990). No populations are currently known to occur on ODOT ROW.

Habitat. Sterile milkvetch habitat is dry and restricted to sparsely vegetated, gravelly ash bluffs (20 to 45° slopes) with some degree of sand and clay. Sterile milkvetch is found between 2,700 and 4,800 feet (823 and 1,460 m) along with little sage brush (*Artemisia arbuscula*), big sagebrush, several buckwheat species (*Eriogonum* spp.), mountain monardella (*Monardella odoratissima*), and purple sage (*Salvia dorrii*) (Meinke 1982, ORBIC 2010a).

2.3.2.30 Tygh Valley milkvetch (*Astragalus tyghensis*)

Federal Status: species of concern
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Tygh Valley milkvetch is a perennial in the pea family (Fabaceae). Plants have multiple stems ranging from 6 to 22 inches (15 to 55 cm) long and pale yellow flowers. The plant is covered in an abundance of hairs with the highest density occurring on the calyx (Peck 1961, Gisler and Meinke 2001b). Flowering occurs from May to early July (ORBIC 2010a). Tygh Valley milkvetch reproduces by seed and requires scarification for germination to occur (Thorpe and Kaye 2008).

Range/Distribution. This species is endemic to the Tygh Valley in Wasco County, Oregon. Tygh Valley is located within the Columbia Basin Ecoregion and most Tygh Valley milkvetchs are located within an 84-sq miles (218-sq km) area near the confluence of the White River and the

Deschutes River (ORBIC 2010a). The ORBIC database lists 13 populations on Prineville BLM property (ORBIC 2010a). Eleven occurrences of Tygh Valley milkvetch are found on or near ODOT ROW (ORBIC 2010a).

Habitat. Tygh Valley milkvetch occupies ashy clay soils that overlie basalt in generally flat areas (0 to 20° slopes) between 1,100 and 3,000 feet (335 and 915 m). Associated plant species include pale madwort (*Alyssum alyssoides*), woollypod milkvetch, and western burnet (*Sanguisorba occidentalis*) (ORBIC 2010a).

2.3.2.31 Umpqua mariposa-lily (*Calochortus umpquaensis*)

Federal Status: species of concern

State Status: endangered

Critical Habitat: not designated

Recovery Plan: no

Species Description. Umpqua mariposa-lily is a bulbous perennial in the lily family (Liliaceae). Plants are generally 0.8 to 1.2 inches (2 to 3 cm) tall with dark purple-centered white flowers. It blooms from late May to mid-June, and can be distinguished from closely-related species by its larger flower size and different petal colors (Fredericks 1986, 1989).

Range/Distribution. Umpqua mariposa-lily is mainly found in the Umpqua River drainage in Douglas County, Oregon. Approximately 13 extant sites are known to exist in Douglas County. About half occur on BLM property, and the remaining half occur on national forest land. An additional two significant populations occur in the Medford BLM district on land in Josephine and Jackson counties, respectively (ORBIC 2010a, b). Although this species has been known to occur along roadsides, no populations have been found on ODOT ROW.

Habitat. The Umpqua mariposa-lily is often found on serpentine influenced soils in southwestern Oregon. It can occupy a range of habitat, but is often found in the ecotone between grassy hillsides and coniferous woodland. Associated species include incense cedar (*Calocedrus decurrens*), California oatgrass, and Idaho fescue (ORBIC 2010a).

2.3.2.32 Wayside aster (*Eucephalus vialis*)

Federal Status: species of concern

State Status: threatened

Critical Habitat: not designated

Recovery Plan: no

Species Description. Wayside aster is an upright perennial in the aster family (Asteraceae). Plants are generally 2 to 4 feet (0.6 to 1.2 m) tall with yellow disk flowers (ray flowers are usually lacking), blooming from July through September (Bradshaw 1921, Cronquist 1955). This species reproduces sexually and requires outcrossing to produce viable seed (Gisler 2004).

Range/Distribution. Wayside aster ranges from Linn County in western Oregon south to northern California. Most occurrences of this species are found in Oregon, although a few are reported from Del Norte and Humboldt counties in California. Wayside aster occurs within three different ecoregions: Klamath Mountains, Cascade Mountains, and Willamette Valley (ORBIC 2010a). There are two known populations of wayside aster on ODOT ROW.

Habitat. Wayside aster typically occupies mineral soil in woodlands with low leaf litter. Associated species include Douglas-fir (*Pseudotsuga menziesii*), golden chinquapin (*Castanopsis*

chrysophylla), and Pacific madrone. This species has broad habitat associations encompassing open hardwood, dense conifer, rolling grass hills, and rocky serpentine grades. It occupies light gaps on the forest floor when canopy cover is dense. Road cuts often create ideal habitat due to the creation of non-competitive open spaces. Normally, wayside aster is found at lower elevations (490 to 1,480 feet or 150 to 450 m); however, a few populations occur up at 6,680 feet (2,040 m) (Meinke 1982, ORBIC 2010a).

2.3.2.33 Western lily (*Lilium occidentale*)

Federal Status: endangered
State Status: endangered
Critical Habitat: not designated
Recovery Plan: yes

Species Description. Western lily is a perennial in the lily family (Liliaceae). Plants are 23 to 66 inches (60 to 170 cm) tall. The outer lengths of the flower petals and tepals are crimson and reflexed while the inner portions are yellowish green with black spots. Flowering occurs from mid-June through July. This lily can be distinguished from lookalike species by its lack of fragrance, its nodding habit, and non-spreading stamens (Peck 1961, Meinke 1982, ODA 2011). Western lily reproduces primarily by bulb scales or by seed. Pollination is largely facilitated by hummingbirds (Imper 1997). It often hybridizes with other *Lilium* species. Additional information on the life history and ecology of the western lily can be found in its recovery plan (USFWS 1998).

Range/Distribution. The distribution of western lily is limited to a 4 mile (1.2 km) wide section of the Pacific Coast from Coos County, Oregon, south to Humboldt County, California (ORBIC 2010b). The USFWS recognizes approximately 23 small (0.1 to 10 ac or 0.09 to 4 ha) populations as extant (USFWS 2009). There are three known populations occurring on ODOT ROW; one includes hybrids of *L. occidentale* and *L. columbianum*.

Habitat. Western lily is closely associated with coastal fens and bogs from sea level to 400 feet (120 m). Soils often have a high peat content or mineral layer overlaying a hard pan that is saturated for some portion of the year (ORBIC 2010a). Associated species include sword fern (*Polystichum munitum*), evergreen huckleberry (*Vaccinium ovatum*), sundew (*Drosera* spp.), common velvetgrass, and holy grass (*Anthoxanthum odoratum*).

2.3.2.34 Whitetop aster (*Sericocarpus rigidus*)

Federal Status: species of concern
State Status: threatened
Critical Habitat: not designated
Recovery Plan: no

Species Description. Whitetop aster is a full sun to partial shade tolerant perennial herb in the aster family (Asteraceae). Flowering plants are generally 2.5 to 12 inches (10 to 30 cm) tall, and non-flowering plants are roughly half as tall (Cronquist 1955, Semple and Leonard 2006). Flowers are white with purple anthers, and typically bloom from late July through early September (OFP 2010). Whitetop aster reproduces vegetatively by creeping underground rhizomes, as well as from seed. It can be distinguished from lookalike species by its smaller stature and habitat specificity (ODA 2011).

Range/Distribution. Whitetop aster occurs throughout the Willamette Valley, Oregon, with the bulk of the sites located in Lane County (ORBIC 2010a). This species also occurs in Washington and in Vancouver Island, British Columbia. No known populations occur on ODOT ROW.

Habitat. Whitetop aster grows in deep, poorly-drained clay soils in unobstructed, grassy, seasonally moist savannah and prairie from 90 to 1,250 feet (30 to 380 m). This species is occasionally found in partially-shaded areas under Oregon white oak and madrone canopies. Whitetop aster grows with a variety of other forbs, grasses, and shrubs (ORBIC 2010a).

2.3.2.35 Willamette daisy (*Erigeron decumbens*)

Federal Status: endangered

State Status: endangered

Critical Habitat: designated

Recovery Plan: no

Species Description. Willamette daisy is a taprooted perennial species in the aster family (Asteraceae). Plants are generally 6 to 26 inches (15 to 70 cm) tall with blue-purple to pale pink ray flowers; they have low lying to upward arching stems. Flowering occurs from June through early July. This species is capable of vegetative as well as sexual reproduction. Like other asters, pappus bristle ornamented seeds are dispersed by air currents (Cronquist 1947, Nesom 2006).

Range/Distribution. Willamette daisy is restricted to prairie remnants in the Willamette Valley, Oregon, which are scattered across Benton, Lane, Linn, Marion, and Polk counties (OFP 2010, ORBIC 2010b). Historically, it was also found in Clackamas, Washington, and Yamhill counties. Many existing populations occur on private property and are afforded no legal protection. Two populations occurs on ODOT property, although one is comprised of only a few plants. Without other occurrences nearby, it may not be considered a viable population.

Habitat. Willamette daisy inhabits low elevation (240 to 950 feet or 70 to 290 m) prairie remnants with silty clay soils (ORNHIC 2010). The habitat is seasonally wet and composed of many associated species, including fool's onion (*Tritelleia hyacinthina*), sedge, large camas (*Camassia leichtlinii*), California oatgrass, tufted hairgrass, Virginia strawberry, Oregon ash, Willamette Valley gumweed (*Grindelia integrifolia*), Bradshaw's desert parsley, and Oregon white oak (Meinke 1982, ORBIC 2010a).

2.3.2.36 Wolf's evening-primrose (*Oenothera wolfii*)

Federal Status: species of concern

State Status: threatened

Critical Habitat: not designated

Recovery Plan: no

Species Description. Wolf's evening-primrose is an upright branching biennial to a short-lived perennial in the evening primrose family (Onagraceae). Taprooted plants are generally 20 to 59 inches (5 to 15 dm) tall with yellow, four-petaled flowers and red-tinged fruits (Hickman 1993). Flowering occurs from May through July (ORBIC 2010a). This species reproduces by seed.

Range/Distribution. In Oregon, the distribution of Wolf's evening-primrose is limited to Curry County. In addition, it is found in Del Norte and Humboldt counties in California (ORBIC 2010a). One known natural population occurs on ODOT ROW, and there is one introduced population occurring in the ROW as well.

Habitat. Wolf's evening-primrose occupies low elevation, well-drained, sandy soil along stretches of coastal habitat that includes coastal bluffs and roadsides. Native species associated with Wolf's evening-primrose include coastal sand verbena, common yarrow, pearly everlasting, coyote brush (*Baccharis pilularis*), field horsetail, beach strawberry, Coast silk-tassel (*Garrya elliptica*), salal (*Gaultheria shallon*), twinberry honeysuckle (*Lonicera involucrate*), lupine, seep monkeyflower (*Mimulus guttatus*), silver leaf phacelia (*Phacelia argentea*), Sitka spruce (*Picea sitchensis*), beach knotweed, western bracken fern, salmonberry (*Rubus spectabilis*), and dune willow (*Salix hookeriana*) (ORBIC 2010a).

3.0 Project Description/Activities Covered by Permit

3.1 Project Description

This RM-HCP covers routine road maintenance activities conducted by ODOT that have the potential to directly or indirectly impact threatened or endangered butterflies and plants. Routine road maintenance activities are considered ongoing activities as they apply to the state ESA (OAR 603-073-0090(f)) because they occur regularly, although not necessarily every year, for the purpose of maintaining the safety and efficiency of state highways. Road maintenance covered by this RM-HCP includes activities that occur directly on roads (e.g., snow removal) and on the shoulder and ROW area adjacent to roads (e.g., grading, mowing, weed control) from the edge of pavement to the ROW boundary, including interchanges. Activities occurring in stockpile sites, rest areas and maintenance yards are not covered, nor are actions implemented by ODOT Maintenance employees that have a federal nexus.

ODOT owns over 8,000 miles (12,875 km) of highway with more than 50,000 acres (20,234 ha) of ROW. These are managed across 14 Districts within five administrative Regions (Figure 3-1). Road/roadside management in the ROW is divided into three zones, each with specific management objectives (Figure 3-2). Zones 1 and 2 typically combine to form the Operational Roadway discussed throughout this document and described in more detail in Section 3.4.

ODOT manages vegetation in the ROW in a safe and sustainable manner by using a combination of mechanical, cultural, biological and chemical methods to control vegetation along roadsides. Mechanical methods include the use of equipment such as mowers and brush cutters. Cultural methods incorporate using appropriate native or non-native plant species to out-compete unwanted vegetation, application of weed-free mulch and straw, and project design considerations. Biological methods incorporate natural predators to control noxious weeds or unwanted vegetation. Chemical use is restricted to EPA-approved chemicals strictly applied per the product label.

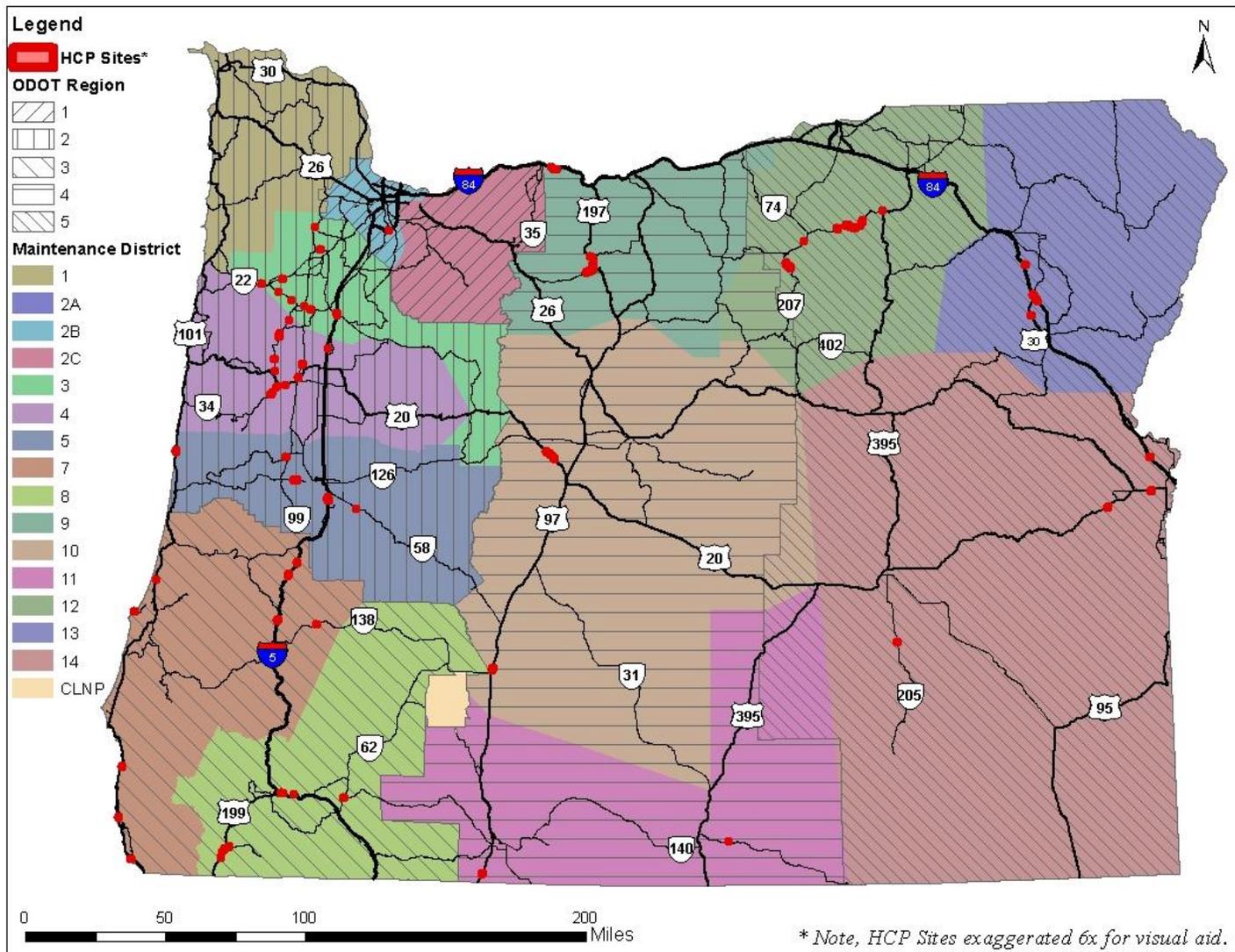
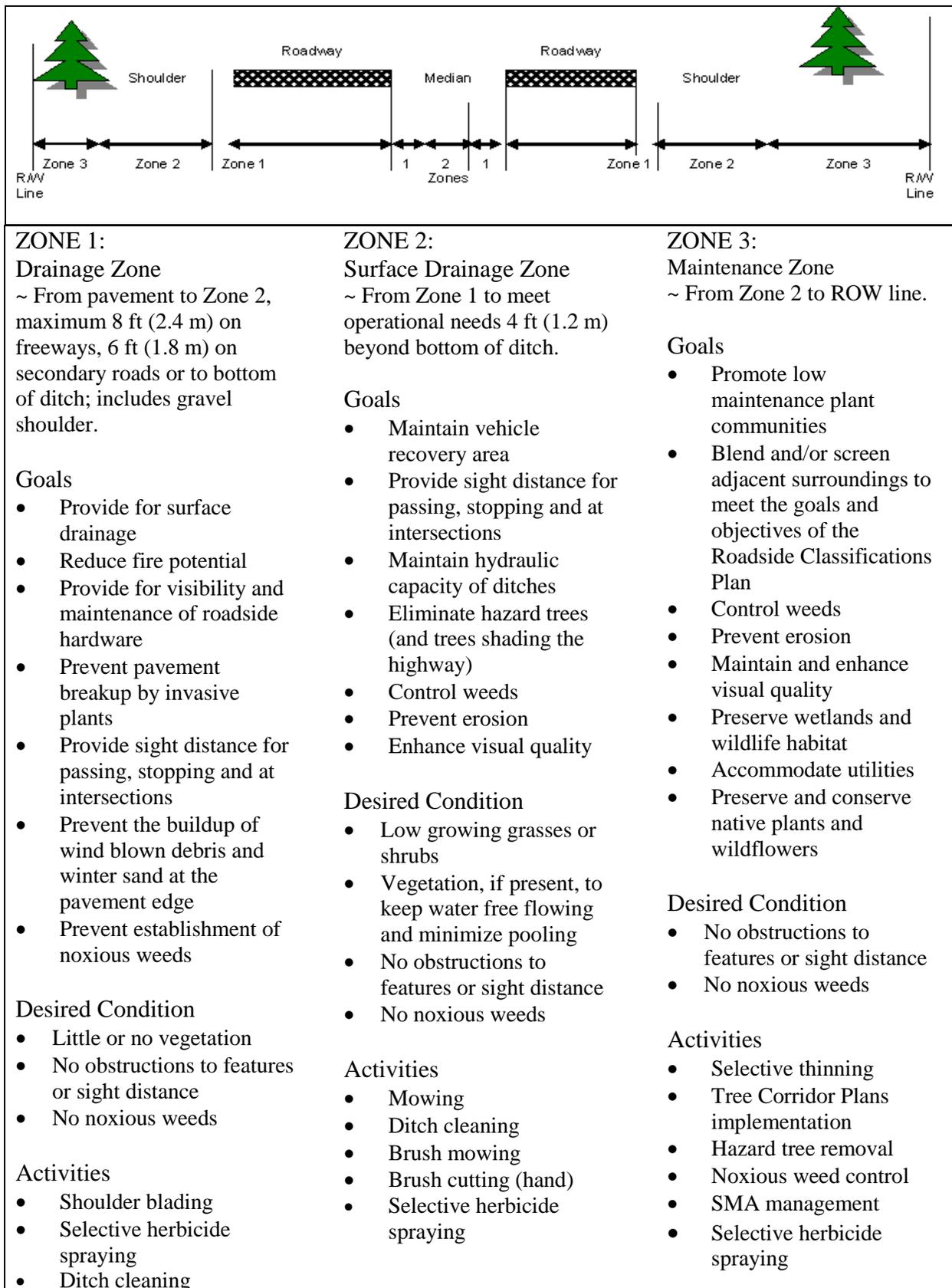


Figure 3-1. Distribution of RM-HCP sites² within ODOT's five administrative Regions and 14 Maintenance Districts. CLNP = Crater Lake National Park; ODOT Maintenance has no transportation maintenance responsibilities CLNP.

² Based on current data; sites to be closed as a result of the RM-HCP are still shown.



ZONE 1:
Drainage Zone
 ~ From pavement to Zone 2, maximum 8 ft (2.4 m) on freeways, 6 ft (1.8 m) on secondary roads or to bottom of ditch; includes gravel shoulder.

Goals

- Provide for surface drainage
- Reduce fire potential
- Provide for visibility and maintenance of roadside hardware
- Prevent pavement breakup by invasive plants
- Provide sight distance for passing, stopping and at intersections
- Prevent the buildup of wind blown debris and winter sand at the pavement edge
- Prevent establishment of noxious weeds

Desired Condition

- Little or no vegetation
- No obstructions to features or sight distance
- No noxious weeds

Activities

- Shoulder blading
- Selective herbicide spraying
- Ditch cleaning

ZONE 2:
Surface Drainage Zone
 ~ From Zone 1 to meet operational needs 4 ft (1.2 m) beyond bottom of ditch.

Goals

- Maintain vehicle recovery area
- Provide sight distance for passing, stopping and at intersections
- Maintain hydraulic capacity of ditches
- Eliminate hazard trees (and trees shading the highway)
- Control weeds
- Prevent erosion
- Enhance visual quality

Desired Condition

- Low growing grasses or shrubs
- Vegetation, if present, to keep water free flowing and minimize pooling
- No obstructions to features or sight distance
- No noxious weeds

Activities

- Mowing
- Ditch cleaning
- Brush mowing
- Brush cutting (hand)
- Selective herbicide spraying

ZONE 3:
Maintenance Zone
 ~ From Zone 2 to ROW line.

Goals

- Promote low maintenance plant communities
- Blend and/or screen adjacent surroundings to meet the goals and objectives of the Roadside Classifications Plan
- Control weeds
- Prevent erosion
- Maintain and enhance visual quality
- Preserve wetlands and wildlife habitat
- Accommodate utilities
- Preserve and conserve native plants and wildflowers

Desired Condition

- No obstructions to features or sight distance
- No noxious weeds

Activities

- Selective thinning
- Tree Corridor Plans implementation
- Hazard tree removal
- Noxious weed control
- SMA management
- Selective herbicide spraying

Figure 3-2. Maintenance areas in the ROW. Figure is for a divided highway.

3.2 Maintenance Activities Covered by Permit

Certain routine maintenance activities and practices are excluded from this RM-HCP because the work is not associated with the ROW or the work will not adversely affect Covered Species within the ROW. Routine maintenance activities covered by the RM-HCP are described in general below and the Best Management Practices associated with these activities are described in ODOT's current version of the document titled 'ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices (aka 'the Blue Book). Activity codes are included with each maintenance activity to allow for cross-referencing between documents.

3.2.1 Stormwater Management

Stormwater management does not have a unique maintenance activity code because water quantity and quality must be considered and addressed during every maintenance activity to reduce or eliminate pollutants of concern, to the maximum extent practicable, from entering the waters of the state. ODOT manages stormwater associated with the transportation system through erosion control, trapping winter sanding materials, developing and maintaining permanent stormwater treatment facilities, managing and maintaining ditches, etc. (See below for more information on related activities.) The highway drainage network is essential for maintaining a safe and effective transportation system. Routine maintenance actions that repair or replace pavement (e.g., inlay projects, pothole patching, shoulder paving) are also covered under this RM-HCP.

3.2.2 Stockpiling (Activity 081)

Stockpiling involves purchasing, manufacturing, preparing, mixing, loading, and storing materials (e.g., rock, sanding material) to be used for ODOT Maintenance activities or ODOT construction projects. Work may include protecting and sheltering the materials at locations where the material is both obtained and stockpiled in the same day. ODOT will stockpile rock and sanding materials on the ROW utilizing methods that ensure that covered species are not affected. Maintenance activities associated with stockpile areas on ODOT property off the ROW or the creation of new stockpile sites off the ROW are not covered under this RM-HCP.

3.2.3 Shoulder Work

3.2.3.1 Shoulder Blading and Repair (Activity 111)

This activity includes blading (e.g., scraping and cutting) and pulling back shoulder materials to the pre-existing dimensions, without adding additional material. The work is conducted to correct rutting and buildup of materials, remove unwanted vegetation, provide a safe surface for vehicle recovery and an adequate clear zone, and drain water away from the road while protecting nearby water bodies. If shoulder material is not properly contained it has the potential to change site hydrology, increase sediment in streams, and degrade water quality.

3.2.3.3 Shoulder Rebuilding (Activity 112)

This activity includes replacing material lost to slumping, compaction or erosion, followed by blading, pulling, and rebuilding the road shoulder to the pre-existing dimensions. Road shoulders are regularly re-built to provide a safe surface for vehicle recovery and an adequate clear zone, and to drain water away from the road while protecting nearby streams, wetlands and other protected areas (including areas with listed species). If shoulder material is not properly contained, it has the potential to change site hydrology, increase sediment in streams, and degrade water quality. This work is done to correct rutting and buildup of materials, for safety,

and to maintain proper drainage, including restoring stormwater treatment features as appropriate. This activity does not modify ditch hydraulic capacity.

Maintenance actions that add shoulder material to widen or increase the existing road prism within the Operational Roadway (further described in Section 3.4.2) are covered by this RM-HCP.

3.2.3.4 Sweeping/Flushing without Pickup (Activity 116)

This activity includes sweeping and flushing dirt and debris from roadways, curbs and bridge decks, and flushing bridge scuppers (weep holes or direct drains on bridges). Scupper cleaning involves unplugging the scuppers with a rod, sweeping excess material away from the scupper, then cleaning with high-pressure water. The purpose is to remove materials such as sanding material, dirt, and non-hazardous debris from the travel lanes and shoulders, while preventing suspended sediment and pollutants from reaching waterbodies and impacting water quality. Scupper cleaning also allows water to drain off bridge decks to prevent vehicles from hydroplaning on standing water. Materials are side-cast (not recovered) under this activity. This activity is performed year round.

3.2.3.5 Sweeping/Flushing with Pickup (Activity 117)

This activity is similar to the above activity, but instead of sidecasting, materials are recovered and disposed of at an approved off-site location. Scupper cleaning is conducted differently if it involves pickup, and they are unplugged with a rod or Vactor (an industrial vacuum that uses high pressure water and pneumatic conveyance), sweeping excess material away from the scupper, then cleaning with high-pressure water. This activity is performed year round.

3.2.4 Drainage Work

3.2.4.1 Ditch Shaping and Cleaning (Activity 120)

This activity includes use of equipment for cleaning and reshaping of ditches, including loading, hauling, and disposing of excess materials. The purpose is to maintain ditches in a manner that allows for efficient stormwater passage, storage and infiltration while minimizing impacts to water quality, and to maintain the functionality of ditches designed with stormwater treatment features. Material is removed to an approved location for disposal or storage. Vegetation located in the ditch is removed during cleaning. This activity is performed in all weather.

3.2.4.2 Culvert/Inlet Cleaning and Miscellaneous Hand/Minor Repair (Activities 121, 129)

This activity is done to restore function and repair damaged water conveyances (including box, concrete, metal, and wood culverts, siphons, catch basins, and drop inlets). The purpose is to provide for adequate hydraulic flow through the culvert to prevent flooding and to aid in providing fish passage upstream and downstream of the culvert, while protecting water quality from sedimentation. This action includes inspection of the culvert including the use of cameras and drills; clearing debris from culvert inlet/outlets, detention ponds, swales, pump stations and wash rack sumps; and cleaning diversions, trash racks, stand pipes and tide gates. Part of this activity involves fish passage retrofits, removing problematic beaver dams and other debris that interferes with water conveyance, and slip lining culverts.

Various types of equipment may be used, including backhoes, spider hoes, Vactor/jet rodders (powerful vacuums with a high-pressure hose), slip chute mechanisms, drag lines, conveyer belts, bobcats, suction devices (dredges), clam buckets, and shovels. Vegetation may be removed

during cleaning. As described in Section 3.4.2, in general, culverts and inlets outside the Operational Roadway but within the bounds of an SMA are in general allowed a 4 foot (1.2 m) unrestricted work area; the work area, access to and from the work area, and any proposed restrictions are developed on a site by site basis to ensure highway maintenance needs are met.

3.2.4.3 Erosion Repair (Activity 122)

This activity involves repairing water damage that has occurred over time to roadways and fill-slopes while minimizing impacts to water quality and fish habitat and emphasizing opportunities to incorporate vegetation into the repair activity. Material may be imported or shaped to restore slope and grade lines. In-water work covered by this action could include, but is not limited to, replacement of riprap or rock which has been removed due to bank erosion and failed gabion (caged riprap) baskets.

3.2.4.4 Culvert/Inlet Repair (Activity 123)

This activity applies to replacement and repair of drainage structures that are less than six feet in diameter. The purpose is to restore function or to prevent failure of a drainage structure while minimizing impact to water quality, aquatic species, and aquatic habitat. This activity includes removing a culvert and re-installing a culvert in the same location, and may include the use of temporary water management.

Some replacement and repairs will require addressing fish passage, fish salvage and temporary water management. Fishway (e.g., ladders, baffles, and simulated steepened stream grades) maintenance will follow the above measures for culvert repair and cleaning. Fishway maintenance may be done as needed throughout the year and generally entails backhoe work from the banks of the drainage. Occasionally additional handwork and weir repair may be required. Vegetation may be removed during cleaning.

3.2.4.5 Channel Maintenance (Activity 124)

This activity includes cleaning and repairing existing stream channels to facilitate culvert inlet and outlet flows to maintain the integrity of the channel structure, improve flow, ensure fish passage, and minimize impacts to water quality and habitat. This activity originates from debris flows, wood and debris jams, landslides, streambed aggradations, etc. It may include placing riprap in kind to restore the line and grade of the channel. Vegetation may be removed during this activity. Although some Covered Species occur in wetland habitats and roadside ditches, none are known to occur within a stream channel.

3.2.4.6 Water Quality Facilities (Activity 125)

This activity includes maintaining permanent water quality structures designed and constructed to treat stormwater runoff from ODOT roads and facilities to ensure that the designed facilities for stormwater treatment function as intended. These structures include detention and retention ponds, grassy swales, and holding vaults, etc. Maintenance activities include removing sediment and vegetation, changing filters, holding periodic inspections, and grading as needed. Equipment used to maintain these structures include backhoes, Vacators/jet rodders, hand tools, etc. Specialty equipment may be used as needed.

3.2.4.7 Horizontal/Vertical Drains (Activity 128)

This activity includes the cleaning and repair of vertical and horizontal drain pipes associated with slides or unstable ground, and the cleaning, repair, or replacement of drain pipes that may be obstructed or not operating properly.

3.2.5 Vegetation Management

ODOT has an Integrated Vegetation Management (IVM) program as required by state law (ORS 634.660) that identifies the most appropriate methods for controlling pests. For ODOT, the “pest” being controlled is unwanted vegetation that may be considered invasive, a noxious weed, or poses a safety hazard. The purpose of IVM is to maintain drainage, sight distance, and clear zone requirements amid other factors associated with a safe transportation system, while maintaining appropriate vegetation and controlling unwanted vegetation. IVM methods typically involve:

- Mechanical: using equipment such as mowers, chain saws, and brushers.
- Biological: using natural predators to control noxious weeds or invasive plants.
- Cultural: incorporating native or appropriate non-native plant species to out-compete unwanted vegetation.
- Chemical: applying herbicides or other chemical pesticides.

Because vegetation management activities can impact species covered under this RM-HCP, ODOT determined the location of the Operational Roadway and possible restricted mowing schedules for each SMA (see Section 3.4.2). ODOT coordinates all vegetation management in wetlands, riparian areas, and water quality facilities according to District IVM Plans. Each IVM plan was developed and is updated according to current guidance to avoid and minimize harm to threatened and endangered species.

The most common IVM activities covered under this RM-HCP are described below. Other IVM activities that are also covered but not described include landscape area maintenance (Activity 136), litter pick-up (Activity 134), and Youth Litter Patrol activities (Activity 135). Rest Area Maintenance (Activity 137) is not covered under the RM-HCP.

3.2.5.1 Mowing (Herbaceous Vegetation; Activity 130)

This activity involves use of mechanical equipment to trim vegetation.

3.2.5.2 Brush Mowing (Activity 132)

This activity involves machine mowing of roadside brush and small trees to maintain adequate clear zone and proper site distance, reduce opportunities for snow drift and fire risk, minimize or control growth of trees outside the clear zone, and promote growth of desirable trees and shrubs. Tractors or other equipment with brush mower attachments are used.

In general, ODOT does not remove vegetation if it does not affect safety or interfere with the operation or maintenance of the highway.

3.2.5.3 Brush Cutting by Hand (Activity 133)

This activity involves removing large trees and brush. Trees that are considered safety hazards are removed from unstable slide areas, fire impacted slopes or otherwise where a hazard tree may fall on the roadway; where shading may cause icy road conditions; to reduce fire or snow drift

danger; and to maintain a safe clear zone. Brush and trees are removed as close to the ground as possible without scalping or otherwise unacceptably disturbing the ground.

3.2.5.4 Spraying (Activity 131)

This activity consists of spraying chemicals to control vegetation growth within the shoulder zone, the growth and spread of noxious weeds and brush within the Operational Roadway, under the label restrictions of the Environmental Protection Agency (EPA) and ODA. Herbicides used include broad-based foliar-active herbicides and soil residual herbicides to maintain bare shoulders for drainage. Herbicides are used in accordance with EPA label requirements. A more detailed list of herbicides and their application are included in Appendix I.

3.2.6 Fence Maintenance (Activity 138)

Fences along interstate highways are the responsibility of ODOT, while those along other state highways may be the responsibility of ODOT or the adjacent property owner. Fencing maintenance involves inspecting, maintaining, repairing, and replacing ODOT-owned ROW and access control fences and cattleguards along roadways to restrict access and control livestock. It also involves any work on gates and gateways in the fence.

3.2.7 Traffic Services Work

Work under this Section includes maintenance, replacement, and new installation of:

- Traffic lines, legends, and pavement markers – Activities 140, 141, and 147.
- Signs – Activities 142 and 143.
- Traffic signals, illumination, and flashers or beacons – Activities 144, 145, and 146.
- Delineators and mailbox supports, maintaining and cleaning guardrail, barrier, and glare screens, and maintaining attenuators – Activities 148, 151, 153, and 154.
- Clean up from crashes and repairing damage – Activity 149.
- Miscellaneous traffic services – Activity 159.

The purpose of these activities is to ensure that the numerous pieces of highway infrastructure are in good repair and are visible and legible, and that signs and markers provide appropriate information to the public. Accident clean-up is necessary to restore the transportation system following unforeseen incidents. Attenuators may need to be serviced, repaired, replaced or realigned and sometimes the releasing fluids (often ethylene glycol) are replaced after impacts. Although these activities mainly involve removal of inert debris, they may include response to hazardous spills. ODOT is responsible for maintaining public safety and for working with DEQ contractors or responsible parties to ensure that cleanup is done in an appropriate manner.

Many of the RM-HCP sites have guardrail. Under this HCP, ODOT may replace or repair existing guardrail Sections, including pouring concrete pads, placing concrete barriers, and cleaning debris from under guardrail and around posts.

3.2.8 Structural Work

This activity covers work to maintain and repair the structural integrity of bridges and large culverts along the highway system in a manner that minimizes impacts to natural resources. Activities covered under this Section include:

- Maintenance of bridges, including protective screening on bridges, general bridge repair and structure painting – Activities 160, 161, 162 and 163.

- Maintaining/repairing drawbridges and other drawbridge operations – Activity 165.
- Cleaning illegal transient camps, including picking up and disposing of litter – Activity 166.
- Removing graffiti – Activity 168.
- Maintaining/repairing other structures – Activity 169.

The two major categories of bridge repair activities covered under this HCP include drift removal and maintenance of bridges and large culverts (over 6 feet in diameter). Maintenance and replacement of structures includes washing, painting, scraping and patching of curbs, rails and deck joints, on wood, concrete and steel bridge components.

3.2.9 Snow and Ice Work

3.2.9.1 Snow and Ice Removal (Activity 170)

This activity includes removal of snow, ice, and slush from roadways, ramps, interchanges and shoulders for safety purposes while protecting terrestrial and aquatic resources. Removal may be by snowplow, grader or snow blower.

3.2.9.2 Sanding and Pre-wetting (Activity 171)

This activity includes applying abrasive material to roadway surfaces to assist with traction. ODOT recycles sanding material into shoulders. ODOT crews estimate that anywhere from 10 to 50 percent of sand applied to the road is trapped or re-used. The majority of sanding material is removed from the road by plows. ODOT captures sand around bridges, guardrails, and near streams, where possible. This activity also includes mixing pre-wetting agents, such as magnesium chloride, with sanding material. Pre-wetting sanding material helps the material bore into the snow and ice. This helps the material improve traction and stay on the road longer, thereby reducing the amount of sanding needed.

3.2.9.3 Anti-icing and Deicing (Activity 176)

This activity includes applying anti-icing and deicing chemicals to road surfaces to prevent snow and ice from bonding to the roadway or to break the bond between snow and ice and the roadway. The use of anti-icing and deicing chemicals is helpful in reducing the need for sanding material. Reducing the use of sanding material will also reduce sanding related impacts to air quality, water quality, and aquatic habitat. Additionally, the use of anti-icing and deicing chemicals has been associated with vehicle accident reduction. Reducing accidents reduces the risk of petroleum and debris entering waterbodies and reduces the opportunity for structural damage to stream systems and habitat.

3.2.10 Emergencies and Extraordinary Maintenance

3.2.10.1 Emergency Maintenance (Activity 180)

This activity includes the repair of roadways, roadsides, and structures that are damaged under emergency or extraordinary circumstances, including damage from storms, floods, wind, fire, and civil disorders. The purpose is to bring the transportation system back to full running order as soon as possible after unscheduled and damaging events. Failure to perform these activities may result in immediate threat to life, limb, or structures. Natural disasters and larger catastrophes may eventually be classified as a federal emergency, which ordinarily would then trigger Section 7 ESA consultation, but that is typically well after the fact. Therefore, ESA consultation for butterflies and plants for the initial response by maintenance crews to respond to

emergencies will not be covered under this RM-HCP. Any possible follow-up repairs that are funded by FHWA emergency funds will be covered under applicable Section 7 ESA consultation.

3.2.10.2 Ground Settlements and Slides (Activity 181)

This activity includes repair of ground settlements and slides affecting the integrity of the roadway by the placement of fill and removal material, to proactively repair and restore the roadway to prevent a catastrophic failure. Settlement/slide repairs are done primarily when a road is in danger of collapse, and to avert an emergency.

3.2.10.3 Extraordinary Maintenance (Activity 189)

This covers a variety of activities that are not common and therefore not identified as distinct activities, but may be necessary following a natural disaster or accident. Examples include emergency military operations, fire response, cleaning/repairing benches, moats or ice flows, repairing broken water lines and follow-up clean-up. The purpose is to maintain the safety and integrity of the transportation system under circumstances that are outside of the control of ODOT.

3.2.11 Miscellaneous Maintenance

Not all routine maintenance work is covered under an activity with an activity code, particularly uncommon activities. Surface and shoulder work not otherwise described may include activities such as slab-jacking Portland cement concrete, flush coating, sanding excess oil and tar on pavement, hand sweeping, truck escape ramp leveling, pavement burning, applying dust palliative, spot patching of Portland cement concrete with asphaltic cement, blading gravel surfaces (e.g., frontage roads, parking areas), and non-roadway surface concrete patches, sidewalks, curbs and retaining walls supporting slopes (but not bridge wing walls).

ODOT also occasionally performs dust abatement on access roads and slide areas to protect air quality by applying dust palliatives to dust generated during routine activities. Dust palliatives may include water or calcium magnesium acetate, magnesium chloride, or lignon sulfonates, applied in a liquid form.

3.4 Covered Property Types

3.4.1 Right of Way

As described in Section 1.6, the RM-HCP covers routine maintenance activities on ODOT managed roads and their associated ROWs throughout the state. The ROW is defined as real property along the state highway system owned by ODOT, between the exterior ROW boundaries, including the paved surface, shoulders, ditches and other drainage facilities. Medians and interchanges associated with the highway system are part of the ROW. The ROW width varies considerably and is often based on property purchased when the highway was constructed. Typically, the ROW boundary is just beyond the top of slopes cut into hills or the bottom of low areas filled for construction of the highway (called cut or fill slopes, respectively). However, wider ROWs are not uncommon, typically where an entire parcel was purchased for developing the highway.

Figure 3-3 depicts a typical ROW situation, where the ROW boundary is the top of the slope. In this figure, ROW features consist of a two-lane highway, paved shoulder, sprayed shoulder,

ditch, slope, and top of slope where the ROW fence is present but obscured by dense brush. The overhead electric line is a permitted easement in the ROW.



Figure 3-3. Typical highway ROW.

Not all ROW boundaries are fenced, particularly in agricultural and open range settings. Furthermore, not all ROW fences delineate legal property boundaries. Fences may have been installed before ODOT acquired a particular Section of highway and subsequent property transactions may have officially set the property boundary at a different location. Property boundaries are often adjusted during highway upgrades. Currently, ODOT does not maintain a central database or regularly update maps of ROW boundaries; rather, electronic and paper files of all deed maps and property descriptions are centrally maintained in each Region.

3.4.2 Operational Roadway

As described in Section 1.2, RM-HCP stakeholders developed the concept of the “Operational Roadway” as the collection of road components required to maintain a safe and functional road. This is the area that Maintenance forces have identified as critical for maintaining the integrity of the highway and the safety of the travelling public, and it typically extends into Zones 1 and 2 of the roadside (Figure 3-2). However, the specific boundary between the Operational Roadway and protected areas is determined on a case-by-case basis, depending on topography, highway features and facilities, and proximity to protected resources. When a roadside ditch is present, the Operational Roadway typically ends 4 feet (1.2 m) beyond the bottom center of the ditch. When

no ditch is apparent, the Operational Roadway boundary is usually 10 feet (3.0 m) beyond the edge of pavement. Figure 3-4 depicts the most typical situations for the Operational Roadway.

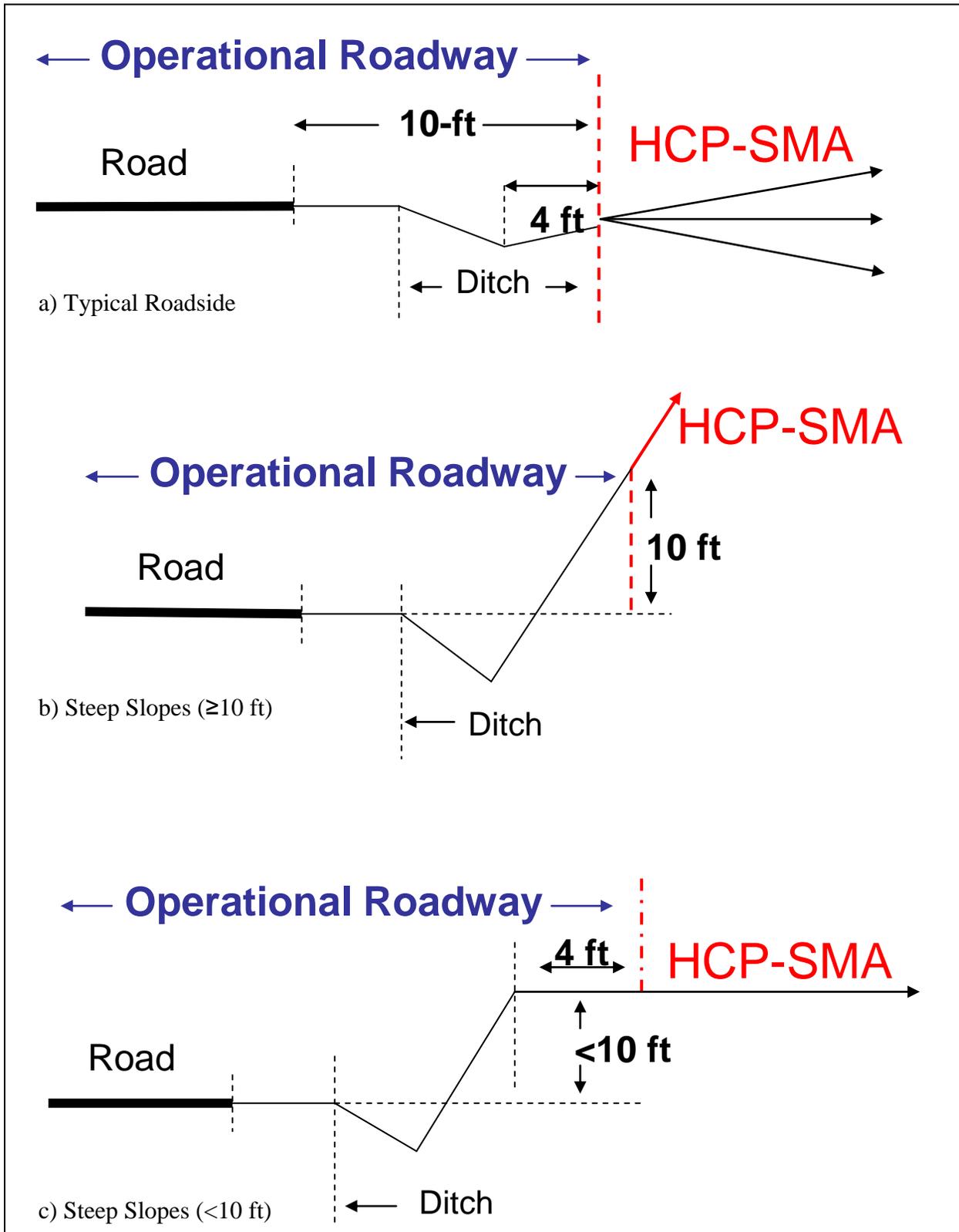


Figure 3-4. Typical examples of the Operational Roadway.

As part of this RM-HCP, ODOT will not protect or manage listed plants or butterfly habitat in the Operational Roadway because of the importance of this area for road safety and functionality. However, ODOT will continue to protect and enhance listed butterflies and plants in the ROW area beyond the Operational Roadway up to the ROW boundary within scope of the RM-HCP (enhancements when feasible and funding available). Most SMAs are also located in this area. In most cases, only periodic maintenance is necessary in SMAs, and as described in Section 7.1, site-specific restrictions have been developed to protect listed species in each SMA. Most of the highway facilities that require routine maintenance are located in the Operational Roadway, particularly those associated with highway drainage. However, other features such as signs and utilities may be located further back from the roadside. To allow for routine maintenance, when these features are within an SMA, the Operational Roadway includes a 4 foot (1.2 m) buffer around ODOT maintained facilities. This means that routine maintenance on these features is unrestricted, although there may be restrictions on driving through SMAs to access the feature.

3.4.3 Other ODOT Properties

ODOT owns other properties that are not a part of the ROW, such as waysides, rest areas, weigh stations, maintenance yards, sand-sheds, material source quarries and pits, and other parcels typically purchased when highways were developed. Most of these off-ROW properties are not covered under the RM-HCP because they are not subject to typical routine maintenance. However, a few off-ROW sites are included in this RM-HCP. These include ODOT-owned properties known to have listed plants or butterfly habitat that are: (1) immediately adjacent to the ROW and the protected species occurs both on the ROW and on the adjacent ODOT property; (2) off-ROW and the property requires some routine maintenance (typically mowing for weed control); and (3) off-ROW ODOT-owned properties used for RM-HCP mitigation.

4.0 Potential Biological Impacts

4.1 Methodology for Assessing Impacts to Covered Species

4.1.1 Overview

In this RM-HCP, the future effects of routine maintenance actions on the Covered Species were evaluated in relation to an environmental baseline. In the case of butterflies and plants, the baseline was developed using information about Covered Species population abundance, distribution and habitat conditions within the RM-HCP planning area. Each site known to contain one of the Covered Species (butterfly or plant) was monitored to collect baseline information. “Known” sites consisted of populations previously identified by ODOT, populations reported by ORBIC as occurring on or very near ODOT ROW, or sites identified through surveys conducted by ODA specifically for this RM-HCP.

4.1.2 Survey Methodology

4.1.2.1 Animals

Oregon Silverspot Butterfly. Oregon silverspot butterfly-occupied ROW habitat is well documented from past observations by ODOT staff and considerable research undertaken by USFWS and the U. S. Forest Service. Consequently, additional Oregon silverspot butterfly surveys were not conducted for this RM-HCP.

Fender’s Blue Butterfly. Because ODOT ROW occupancy by this butterfly is less well known than for the Oregon silverspot butterfly, surveys were conducted in an attempt to locate new populations of Fender’s blue butterfly. Because there is a narrow window of time when adult Fender’s blue butterflies are flying and identifiable, baseline surveys for this species focused on locating host plants (see Section 2.3.1.1 for a description of host habitat) using the methods described below in Section 4.1.2.2. Surveys for Kincaid’s lupine (the primary host species for Fender’s blue butterfly) were conducted along all state highway ROWs within the range of Kincaid’s lupine. Surveys for sickle-keel lupine (*Lupinus albicaulis*) and longspur lupine (*Lupinus arbutus*) were conducted along all state highway ROWs within the range of Fender’s blue butterfly (not the entire range of the lupines). All locations containing potential Fender’s blue butterfly habitat (i.e. populations of host lupines) in the ROW were documented for follow-up survey work.

Local expert Greg Fitzpatrick (Entomologist with Ecological Consulting in Corvallis, Oregon) conducted adult butterfly surveys and egg counts during the summer of 2011 at ODOT sites either known or suspected by ODOT and ODA to be occupied by Fender’s blue butterfly. For sites where Fender’s blue butterfly occupancy was unknown, presence/absence surveys for the butterfly were conducted. Most sites required two visits – the first occurred during the Fender’s blue butterfly flight window to survey for adults. If adult butterflies were not located, a second visit occurred to survey for eggs. The unusually cold, wet spring in 2011 made it a poor year to locate flying adult butterflies, and the egg surveys were done to increase the likelihood of finding Fender’s blue if it was present at a site.

Adult butterfly surveys consisted of walking throughout an area occupied by lupine host plants for a minimum of 30 minutes, and capturing (with a butterfly net) and identifying (to the species level) any blue butterflies that were encountered. Egg surveys consisted of searching the undersides of lupine leaves where Fender’s blue butterfly is most likely to lay its eggs. The

search time for each patch ranged from 11 to 95 minutes depending on the area of the site and the number of lupines present. The number of leaves searched per site ranged from 207 to 1170 leaves. The number of individuals of each life stage observed per site was recorded. Sites previously known to support the Fender's blue butterfly and sites found to contain the butterfly in the 2011 survey are considered occupied Fender's blue butterfly sites for the purpose of this RM-HCP and collectively they constitute the biological baseline (see Section 4.1.3).

4.1.2.2 Plants

ODOT owns and manages over 8,000 miles (12,875 km) of highways and their associated ROW on either side of the road and in the center of divided highways. It was not practicable for ODOT and ODA to thoroughly survey every mile of the extensive ROW, thus the following steps were taken to focus survey efforts in the most probable locations at the most opportune time for each plant species included in the RM-HCP:

1. Known Locations. Known location information was collected for each species from a variety of sources, including the ORBIC database (2010a), the Oregon Flora Project database (2011), ODOT's SMA database, results from surveys conducted in preparation for the Benton County HCP, and BLM and USFWS data. A list of all known or historical populations located on or near the ROW was created and it contained supportive information such as locations, habitat descriptions, dates last seen, and numbers of individuals.
2. Reference Populations. Populations that could serve as reference populations for each species were identified. The appropriate reference populations were visited before beginning surveys for each species to confirm that plants were above ground and identifiable, and to develop a "search image" for the species and its habitat.
3. Species Ranges. The range of each plant species included in the RM-HCP was determined, and location information was mapped and overlaid with the state highway system in a geographic information system (GIS). A polygon encompassing all known populations was drawn on the map and a buffer of several (7-10; distance based on best professional judgment) miles was added at both ends of the polygon along the ROW. All sections of state highways that fell within the buffered polygons were included in the survey routes.
4. Suitable Habitat. Within each buffered polygon, aerial photos, topographical maps (showing elevation) and wetland delineation maps were examined to determine if some of the targeted miles along the ROW could be removed from the survey list due to lack of suitable habitat in those areas.
5. Survey Route Maps. Overview and close-up maps of target survey areas were created. Where known populations or historical records of populations occurred in or near the highway ROW, population locations were included on the map.
6. Survey Schedule. The survey schedule was based on the phenology of each species (i.e., when vegetative parts, flowers, or fruits were present, if needed to correctly identify each species). When phenology and species ranges overlapped, surveys were done for multiple species concurrently.

All targeted highways were surveyed with varying degrees of intensity depending upon the range, habitat specificity, and visibility of the species in question. Initially, the species survey

route was driven to search for potential habitat. For most species, when potential habitat was spotted, the survey crew of two to four botanists walked the ROW for the length of the potential habitat.

With the exception of current ODOT SMAs, survey crews also stopped at all known or historical population sites and attempted to relocate those populations. SMA surveys were not done because baseline monitoring data had been collected in 2009. Global Positioning System (GPS) points were taken at each stop and a detailed survey log was kept for each length of highway surveyed. When a target species was located, habitat and population data were recorded (see Section 4.1.3.2 for more information).

In situations where the range of the species was relatively large, its habitat requirements were quite broad, and/or the species was difficult to see, survey crews were unable to thoroughly survey the entire range of the species. In those cases, crews focused survey efforts on “hotspots” (areas close to known or historical population locations) and the most likely habitat. See Section 4.1.5 for information on the handling of unsurveyed areas.

4.1.3 Baseline Population Estimate Methodology

The biological baseline consists of the abundance and distribution of populations of Covered Species known at the time of RM-HCP development and it is the basis for evaluating RM-HCP impacts and species trends. All known and newly discovered sites covered by this RM-HCP were included in the baseline. Additionally, under USFWS guidance, impacts of routine roadside maintenance on listed butterfly species were based on the loss of nectar/host plant habitat rather than butterfly numbers. Consequently, baseline surveys for listed butterflies focused on nectar/host plant habitat. Data on baseline population estimates were collected between 2009 and 2011.

4.1.3.1 Animals

Fender’s Blue Butterfly. Separate methods were used to determine host versus nectar habitat. Because the majority of Fender’s blue butterfly host plants on ODOT ROW are Kincaid’s lupine, methods for determining host habitat was based on current guidance from USFWS. This consisted of field surveys to search for host plants, and where found, host population estimates were determined by measuring foliar cover or outer perimeter of patches or clusters of plants. Kincaid’s lupine is rhizomatous so it is difficult to distinguish individual plants. Except in uncommonly large populations, the outer perimeter of each distinct Kincaid’s lupine patch was mapped using resource-grade GPS units equipped with a custom ArcPad application to attribute the mapped features. Patches were considered distinct from each other if their separation distance was at least 10 feet (3 m).

Foliar cover was visually estimated as the outer perimeter of leaves projected onto the ground. Belt transect foliar overlap was used to measure leaf area in large patches. While both methods measure cover, the mapping method was typically less precise than estimating leaf area with the belt transect.

Foliar cover was also visually estimated for spur and sickle-keeled lupines. Because of their clumping rather than clonal growth, plants were categorized into five plant radius size classes. Total cover was calculated from the midpoint value of a size class in combination with the number of plants in each class.

Nectar habitat was calculated based on proximity to known host habitat. This area is called the “nectar zone,” and is defined as all land within 0.31 miles (0.5 km) from known host sites or designated critical habitat (Benton County 2010; see example in Figure 4-1). The area of ROW within the nectar zone was estimated by multiplying the length of impacted highway by the average ROW width outside of the paved/gravel zone (20 feet or 6.1 m on each side of road, calculated from ROW maps and highway lane/shoulder widths in GIS databases). However, only a portion of this area actually contains nectar plants. Therefore, using methodology developed for the Benton County, Oregon HCP (Benton County 2010), the ODOT nectar zone was estimated to contain an average cover of 1.36% native nectar species and 1.39% non-native nectar species, for an estimated 2.75% total area occupied by nectar species.

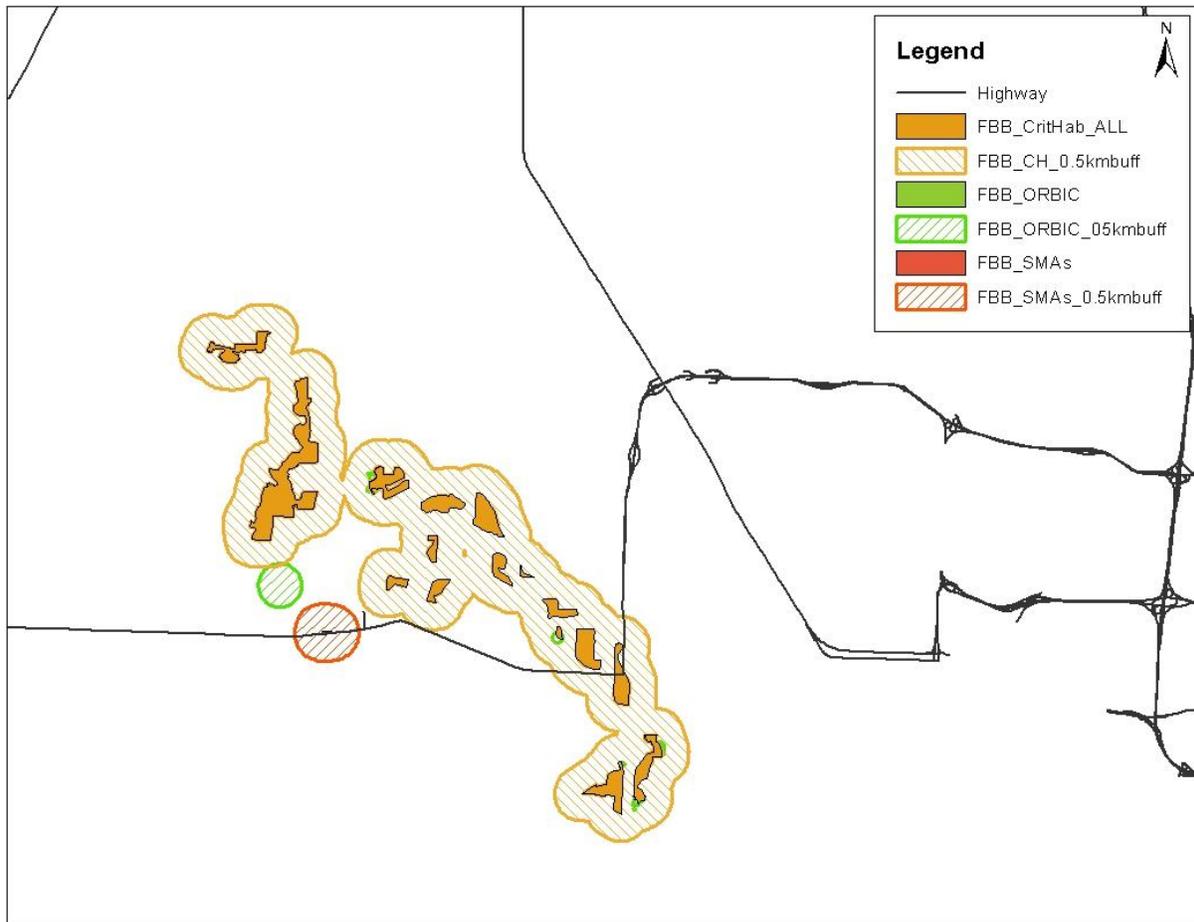


Figure 4-1. Example depicting the overlap of Fender's blue butterfly nectar zone with the ODOT ROW.

Oregon Silverspot Butterfly. As described in Section 2.3.1.2, there is only one location on the ODOT ROW with suitable habitat the Oregon silverspot butterfly. In fact, USFWS indicated that the ROW habitat was only suitable as nectar habitat and that the patches of violet plants were too small to be considered host habitat and would likely only be used as a source of nectar. Resource-grade GPS was used to map all silverspot butterfly nectar habitat patches within that SMA. Habitat patches were considered unique if they were separated by at least 10 feet (3 m). Small patches were mapped as points and their areas were visually estimated. Polygons were

mapped around larger patches using resource-grade GPS if they were accessible by foot. Poorly accessible patches (i.e., on steep slopes) were mapped while in the field using aerial photographs.

4.1.3.2 Plants

All known listed plant populations located in state highway ROWs were monitored in the appropriate season to inventory population size (number of individuals or area of cover), map the population area, describe habitat quality, and document and map ROW features. Populations and ROW features were mapped using resource-grade GPS units equipped with a custom ArcPad application to attribute the mapped features.

Because of the diversity of plant species, population sizes and habitats, it was impossible to use only one method for baseline monitoring. Consequently, a monitoring methodology was developed for each species and site, taking into consideration that the method developed would become the standard for future monitoring efforts. Each method needed to be repeatable, efficient, and sufficiently comprehensive to gain an accurate representation of population abundance, distribution, and trend. Populations were either censused (i.e., every individual is counted) or sampled at larger sites (i.e., a subset of the population is counted and inferences are made about the size of the overall population based on the sample count). See Table 4-1 for a description of counting units and age classes for each species that was monitored.

Table 4-1. Baseline monitoring units counted for each covered plant species.

Species	Units Counted	Age Class Counted
Bradshaw's desert parsley	Distinct plants (1.6 inches or 4 cm apart)	Non-seedlings
Cook's lomatium	Distinct plants (1.6 inches or 4 cm apart)	Reproductive only
Cronquist's stickseed	Distinct plants	Reproductive only
Gentner's fritillary	Distinct plants	Reproductive only
Howell's microseris	Distinct plants	Reproductive only
Howell's spectacular thelypody	Individuals (stems)	Non-seedlings
Kincaid's lupine	Foliar cover ¹	All
Large-flowered wooly meadowfoam	Clumps	Reproductive only
Laurence's milk-vetch	Distinct plants	Reproductive only
Malheur wire-lettuce	Distinct plants	All
Nelson's checker-mallow	Clumps (12 inches or 30 cm apart)	Reproductive only
Oregon semaphore grass	Stems	Reproductive only
Pale larkspur	Distinct plants	All
Peacock larkspur	Distinct plants	Non-seedlings
Peck's milk-vetch	Distinct plants	Non-seedlings
Rough popcornflower	Stems	Reproductive only
Silvery phacelia	Distinct plants	All
Spalding's catchfly	Distinct plants	All
Tygh Valley milkvetch	Distinct plants	Non-seedlings
Wayside aster	Distinct plants	All
Western lily	Distinct plants	Reproductive only
Willamette daisy	Distinct plants (2.7 inches or 7 cm apart)	Reproductive only
Wolf's evening-primrose	Distinct plants	All

1. See Section 4.1.3.1 for foliar cover measurement methodology.

Although the method for population census varied by species and location, for most sites the entire known population area, as well as all adjacent suitable habitat, was searched. Individual plants were flagged when found, then recorded and mapped. Complete survey methodologies were also recorded. Additionally, all information about site-specific monitoring methodologies is included in the individual site management plans.

4.1.4 Calculating Impacts in Known Occupied Sites

Direct impacts by routine maintenance to Covered Species (including butterfly host and nectar habitat) are anticipated mainly in the Operational Roadway, but there may also be impacts in the entire ROW. The latter consists of certain locations on the ROW where ODOT, ODA, and USFWS have agreed to unrestricted maintenance work and likelihood that listed plants or butterfly habitat would be removed or damaged in exchange for mitigation (described below, in this same subsection).

Impacts occurring in the Operational Roadway were estimated for each botanical population (listed plants, habitat for Fender’s blue butterfly and Oregon silverspot butterfly) by mapping the Operational Roadway area and recording the number of target plants there. If sufficiently-detailed information was not available (typically because the Operational Roadway had not been determined by the survey date), impacts at the location were estimated based on the proportion of the population in the Operational Roadway (see Figure 4-2 for an example).

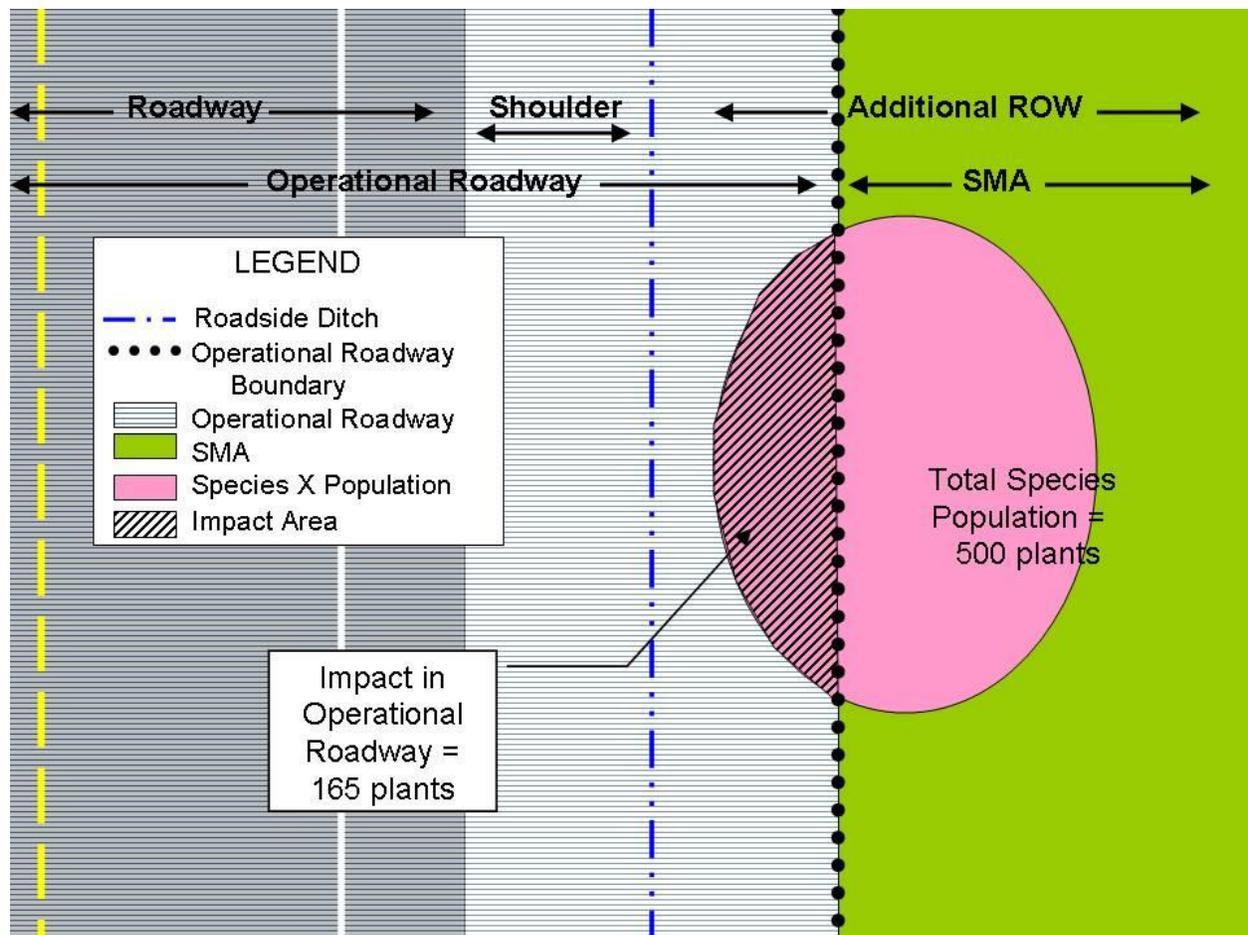


Figure 4-2. Example calculation of amount of impact within the Operational Roadway.

Except for Fender's blue butterfly nectar habitat and a few plant populations (described below), direct impacts are not anticipated in the ROW beyond the Operational Roadway (green area depicted in Figure 4-2). This is due either to the lack of anticipated routine maintenance activities in the locations where species are found, or to measures developed to protect the plants during routine maintenance work (see Minimization Measures in Section 5.3).

Where it is not practicable from a safety or operational perspective to avoid impacts to protected species throughout the ROW, ODOT will not manage some specific areas for resource protection. These include non-host habitat in the Fender's blue butterfly nectar zone and a few listed plant populations where species currently found in low numbers (specifically, two very small and isolated Nelson's checker-mallow populations, two sites with very low abundance of peacock larkspur, and several areas with scattered Peck's milkvetch that are possibly all part of one population). Fender's blue butterfly nectar habitat is expected to be directly impacted throughout the ROW (in the nectar zone as described in Section 4.1.3.1), but avoidance is not considered feasible at that scale. The plant sites have such small population in the ROW that they are considered low viability and not contributing to the recovery or stability of the species. These site "closures" were included in the impact assessment.

There are also four sites on the ROW that previously were thought to contain listed species that actually do not, therefore ODOT will no longer manage these areas as if to protect sensitive resources. These sites were not included in the RM-HCP impact assessment because viable populations are no longer extant on ODOT property and habitat conditions suggest that they will not return. These sites include: two areas with reported Howell's spectacular thelypody individuals (see Section 2.3.2.11), one site with Applegate's milk-vetch (see Section 2.3.2.1), and one site with Oregon semaphore grass (see Section 2.3.2.19).

4.1.5 Methodology for Calculating Impacts in Un-surveyed Areas

ODA botanists reviewed the habitat, range, growth habits and survey data for all 36 plant species included in the RM-HCP. Thorough surveys were conducted for 24 of these species during the 2010 and 2011 field seasons. ODA was unable to sufficiently survey for the 12 remaining plant species and both butterfly species because: 1) these species have large geographical ranges and/or broad habitat requirements, resulting in more potential habitat than could be surveyed with available resources, and/or 2) their non-showiness, small stature or tendency to hide in preferred habitat make them difficult to locate and observe. Furthermore, populations vary in abundance and distribution each year, some species with greater variability than others.

Recognizing the impracticality of surveying all ODOT roadsides to locate all populations of Covered Species in the ROW, a category of "unknown" impacts was included in the impacts analysis. Following the precedence used in the Benton County, Oregon HCP (Benton County 2010), the potential routine maintenance impact to Covered Species in un-surveyed ROW was estimated at three percent of current known population sizes occurring on ODOT ROW. There is no way to calculate "unknown" impacts, but stakeholders involved in developing the Benton County HCP felt that this method yielded an acceptable estimate and it was approved by ODA and USFWS for the RM-HCP.

4.2 Assessed Direct and Indirect Impacts

4.2.1 Overview

Direct impacts from routine roadside maintenance are anticipated for those portions of populations of the Covered Species located within the Operational Roadway (see Section 3.4.2). In most instances, known populations of Covered Species in the ROW beyond the Operational Roadway will be protected to avoid direct impacts (see Sections 4.1.4 and 4.1.5 for exceptions). Impact minimization measures (Section 5.3) were developed for unknown populations of Covered Species in the non-Operational Roadway ROW. Unanticipated impacts (i.e. take) in known populations or areas that were adequately surveyed, such as impacts caused by non-routine maintenance projects or third parties, are not covered under the RM-HCP. Unforeseen impacts such as these will be addressed through consultation with the appropriate regulatory agency on a case-by-case basis.

4.2.2 Habitat Restoration and Enhancement Activities

As described above, known occurrences of listed plants and butterfly resources will be protected in the ROW beyond the Operational Roadway. When maintenance work is needed, it will be timed or coordinated with an ODOT Biologist to avoid impacts to listed species (see Section 5.3 for avoidance and minimization measures). However, as part of mitigation requirements for take in the Operational Roadway, take of several non-viable populations, and unknown take along the ROW, habitat enhancement will be undertaken at some RM-HCP sites with the goal of increasing population size of the listed species.

Habitat restoration and enhancement work itself may result in minor temporary impacts to Covered Species. For example, competing vegetation, invasive species, and excessive thatch are threats to the health and reproduction of many listed plant species in the Willamette Valley, yet their removal may result in incidental take of the species being protected. If enhancement of a RM-HCP site has the potential for take, ODOT will seek specific pre-approval from ODA and USFWS as per RM-HCP conservation measures (Section 5.4) or adaptive management (Section 7.4). In these instances, benefits to the listed species are expected to outweigh the minor impacts incurred during the enhancement activity, and ultimately result in a more stable or increasing population. Accordingly, enhancement activities are not predicted to produce any long-term negative impacts to Covered Species.

4.2.3 Assessed Impacts: Animals

In addition to potential impacts to butterfly host and nectar habitat, routine maintenance activities may directly harm butterflies. For example, if Fender's blue butterflies deposit eggs on lupine plants in the Operational Roadway, they may be negatively impacted if the area is mowed or sprayed with herbicides. Any life stage may be harmed by equipment and vehicles. Fortunately, most of the host and nectar habitat growing within the Operational Roadway is low quality and Fender's blue butterfly is not likely to utilize it often.

Oregon silverspot butterfly tends to require larger clusters of host plants (violets) than are known to occur in the Operational Roadway adjacent to the ODOT SMA for this butterfly. Additionally, the species appears to oviposit and feed in meadow habitats well away from ODOT ROW. However, silverspot butterflies are relatively slow flyers and they may be killed by maintenance equipment and vehicles as the butterflies cross the highway between habitat areas.

Many forms of road maintenance may result in indirect impacts to butterflies by limiting their reproduction and dispersal. Repeated mowing in particular may cause plants to flower at progressively lower heights, which in turn may alter important interactions with pollinators, as well as feeding and reproduction of Fender’s blue and Oregon silverspot butterflies. Table 4-2 summarizes the anticipated impacts of routine roadside maintenance on the two butterfly species covered in the RM-HCP. These impacts may be direct or indirect. Because population abundance of either species of butterfly was not extensively surveyed in the Operational Roadway, impacts to host and nectar habitat are used as surrogates for take.

Table 4-2. Summary of baseline population data and anticipated impacts to listed animals from routine maintenance activities in the ODOT ROW.

Resource	# Sites ¹	Total ODOT Pop.	Known Impacts	Unknown Impacts ²	Total RM-HCP Impacts
Fender's Blue Butterfly (FBB) (host habitat) ³	7	14,647 ft ² (1,361 m ²)	2,446 ft ² (227 m ²)	439 ft ² (41 m ²)	2,885 ft ² (268 m ²)
FBB (nectar habitat) ⁴	16	2.112 ac (0.854 ha)	1.045 ac (0.423 ha)	0.063 ac (0.025 ha)	1.109 ac (0.448 ha)
Oregon Silverspot Butterfly ⁵	1	1.43 ac (0.58 ha)	0.23 ac (0.093 ha)	0.043 ac (0.017 ha)	0.273 ac (0.11 ha)

1. Number of known sites that have covered butterfly species or their habitat.
2. Rough estimate of potential additional impacts, calculated as 3% of total known ODOT populations (see Section 4.1.5 for more information).
3. FBB host habitat is based on foliar cover of lupine plants as described in Section 4.1.3.1
4. See Table 4-3 for more details on nectar habitat calculations.
5. Oregon silverspot butterfly habitat is area of mapped nectar habitat as described in Section 4.1.3.1.

There are seven known host habitat sites for Fender’s blue butterfly on ODOT ROW (Table 4-2). Kincaid’s lupine is the host plant species at five sites, one site has spurred lupine and one has sickle-keeled lupine. All sites but one have confirmed observations of Fender’s blue butterfly (see Sections 4.1.2.1 and 4.1.3.1). Although neither adult butterflies nor eggs were found at one of the sites during baseline surveys, it is considered occupied because the site overlaps with a broader Fender’s blue butterfly record in the ORBIC database and it is part of an important potentially functioning network for species (USFWS 2010a). Nectar habitat was calculated as described in Section 4.1.3.1, and found at sixteen distinct areas of ROW, totaling 76.77 acres of potential habitat in the nectar zone. In the unpaved ODOT ROW, the total population of nectar habitat comes to 2.11 acres of nectar and non-native nectar habitat, but to remain consistent with the Benton County HCP, only native nectar habitat was considered an adverse impact (1.36% of nectar zone habitat, or total of 1.045 of unpaved ROW in the nectar zone).

4.2.4 Assessed Impacts: Plants

Routine maintenance activities within the Operational Roadway may directly or indirectly impact listed plants located there. Entire plants may be killed by herbicide spraying or shoulder pulling, for example, or plant parts may be damaged during mowing or ditch maintenance. Indirect impacts may occur if roadside drainage patterns are altered. Recurring impacts may reduce the viability of species in a population by limiting reproduction, propagation, pollinate and interactions with other populations.

Even though listed plants in the ROW beyond the Operational Roadway are targeted for protection, negative impacts may occur through a variety of unforeseen circumstances (e.g., vehicle accidents, unpermitted plant harvest). Most sites are not fenced for safety, maintenance

accessibility and financial reasons; likewise, ODOT does not “police” the ROW for trespassing. At the request of USFWS and ODA, ODOT does not divulge the locations of listed species to the public to minimize possible malicious harm.

Impacts to listed plants were not calculated for non-ODOT unforeseen events. But as described in Section 5.4, ODOT will implement access controls in sensitive areas with known and recurrent trespass. Impact minimization measures have been developed to reduce the chances and severity of unanticipated impacts (see Section 5.3).

Table 4-3 summarizes anticipated impacts of routine roadside maintenance to all listed plant species included in this RM-HCP. The information reflects both direct and indirect impacts. Species that were not found during RM-HCP surveys but could occur along ODOT ROW are included; they are identified in Table 4-3 with a 0 in the “Sites” columns.

Table 4-3. Summary of baseline population data and anticipated impacts to listed plants from routine maintenance activities in the ODOT ROW.

Species	# Sites ¹	Total ODOT Pop. (# plants) ²	Known Impacts ³	Unknown Impacts ³	Total RM-HCP Impacts
Applegate's milk-vetch	1	0	0	0	0
Arrow-leaf thelypody	0	0	0	0	0
Bradshaw's desert parsley	3	1,269	0	38	38
Cascade Head catch-fly	0	0	0	0	0
Cook's lomatium	4	3,895	1,000	115	1,115
Cox's mariposa lily	0	0	0	0	0
Cronquist's stickseed	3	591	0	18	18
Gentner's fritillary	2	26	0	0	0
Howell's mariposa lily	0	0	0	0	0
Howell's microseris	2	190	5	0	5
Howell's spectacular thelypody	5	200	2	0	2
Kincaid's lupine	10	12,806 ft ² (1,190 m ²)	2,680 ft ² (249 m ²)	384 ft ² (36 m ²)	3,064 ft ² (285 m ²)
Large flowered rush lily	0	0	0	0	0
Large-flowered woolly meadowfoam	1	433	0	13	13
Laurence's milkvetch	8	4,764	21	143	164
Malheur wire-lettuce	1	37	0	0	0
McDonald Mt. rockcress	0	0	0	0	0
Nelson's checker-mallow	11	1,447	109	43	152
Oregon semaphore grass	1	34	0	0	0
Pale larkspur	1	128	0	0	0
Peacock larkspur	6	766	8	23	31
Peck's milkvetch	6	1,336	546	40	586
Point Reyes bird's-beak	0	0	0	0	0
Pumice grape-fern	0	0	0	0	0
Rough popcornflower	4	14,881	0	0	0
Silvery phacelia	2	20	0	0	0
Snake River goldenweed	0	0	0	0	0
Spalding's catchfly	1	1	0	0	0
Sterile milkvetch	0	0	0	0	0
Tygh Valley milkvetch	4	5,881	133	0	133
Umpqua mariposa-lily	0	0	0	0	0
Wayside aster	2	47	1	2	3
Western lily	3	554	0	17	17

Species	# Sites ¹	Total ODOT Pop. (# plants ²)	Known Impacts ³	Unknown Impacts ³	Total RM-HCP Impacts
Whitetop aster	0	0	0	0	0
Willamette daisy	3	1010	0	30	30
Wolf's evening-primrose	1	164	0	0	0

1. Number of known sites containing the species; not additive because sites may have multiple species present.
2. Populations are represented as number of individual plants or foliar cover in the case of Kincaid's lupine.
3. Known impacts are the number of plants in the Operational Roadway or total number of plants in closed sites (see Section 4.1.4); unknown impacts are the potential unknown impacts in un-surveyed Operational Roadway, calculated as 3% of total known ODOT populations (see Section 4.1.5).

4.3 Cumulative Impacts

Cumulative impacts include past, present, and future projects, authorized or under review that are likely to contribute to the cumulative loss of listed species. The purpose of collectively analyzing these impacts is to ensure that the combined consequences of individually minor, but collectively significant, actions taking place over the timeframe of the RM-HCP are considered.

The geographic scope of the cumulative effects analysis area for each Covered Species corresponds with each species' range within the state of Oregon boundaries. The time frame for the cumulative effects analysis corresponds with the 25-year duration of the RM-HCP. Considering the statewide geographic scope and the anticipated 25 year lifespan of the RM-HCP, it is certain that non-federal actions that cumulatively affect the listed species covered in this RM-HCP will occur.

Between 2000 and 2010, the population of Oregon grew from approximately 3.4 to 3.8 million, an increase of 409,675 people. This increase was primarily due to people emigrating from other states (US Census Bureau 2011). Oregon's three most populated counties in the decade before 2000 remained so a decade after, and are all in the greater Portland metropolitan area (Multnomah, Washington and Clackamas). Multnomah County has the largest population (735,334 people; 11.3% increase), followed by Washington County (529,710; 18.9 % increase) and Clackamas County (375,992; 11.1% increase). Over 48% of the state's growth occurred in these three counties (US Census Bureau 2011). Seven out of the 10 counties with the largest populations, all increasing, are within the Willamette Valley (Multnomah, Washington, Clackamas, Lane, Marion, Linn and Yamhill) (US Census Bureau 2011). Deschutes County, however, experienced the largest jump in population by about 37%; but much of that growth, as with much of the state, occurred during the first half of the decade prior to the economic slowdown. Approximately 12% of the state's population lives east of the Cascades and eight of the east side counties lost population over the last decade (Malheur, Harney, Wallowa, Gilliam, Baker, Grant, Wheeler and Sherman). All these eastside counties are primarily rural with a predominant agricultural economic base. Most have a large percentage of federal land.

While the state population is expected to continue to increase, recent economic conditions have slowed the rate of increase. It is anticipated that current growth rates and trends will continue for at least the next five years. Thus, it is assumed that future private and state actions will continue within the action area, increasing as population rises. Increased population pressures are most likely to be felt within the Willamette Valley habitats and tributaries; however, coastal areas may also experience higher recreational pressure due to their proximity to the major metropolitan areas of the state.

The most common land impacting activities reasonably certain to occur in Oregon are agricultural activities, residential development, recreational activities, timber harvest, gravel/rock mining and infrastructure development. Many of these activities are not subject to either federal or state ESA consultation and may result in adverse impacts to federally or state listed species and their habitats. Some of the activities such as timber harvest and development are subject to regulation under state programs and the effects to species and habitat are reduced to varying degrees under these programs. Some of these activities are likely to have adverse impacts on the listed species considered in this RM-HCP, and to result in some degradation of the conservation value of designated critical habitat.

As noted above, much of the state's population growth is within the counties of the Willamette Valley where several of the major activities noted above coincide with a significant portion of the listed plants and one of the two listed butterflies covered in this RM-HCP. Agricultural and urban development and the corresponding infrastructure development have had, and will likely continue to have, significant impacts on the Willamette Valley listed species.

4.3.1 Agricultural Development

Agricultural activities such as large scale crop production, vineyards, orchards, and livestock grazing have variable degrees of impacts to listed plant and animal species. Agricultural development for many crops tends to completely convert native habitats via intensive leveling, water management (e.g., irrigation, draining wet soils), and pesticide use. Activities such as livestock grazing may not remove suitable habitat for listed butterflies and plants but it often results in degraded habitat from trampling, browsing, and introducing and favoring invasive weeds that outcompete native species. The intensity and duration of livestock grazing dictates the magnitude of impacts, and grazing tends to be more intensive on state and private lands than on adjacent federal lands.

4.3.2 Residential Development

In areas of growing human population, cumulative impacts from land uses such as residential development and the water and infrastructure development to support it are anticipated to increase. All types of private, state and county development activities are expected to occur in all five ODOT regions. The anticipated increase in population and development, particularly in the Willamette Valley metro areas, will have a cumulative impact on the listed species associated with the adjacent habitats and watersheds. Willamette Valley upland and wet prairie habitat is already a fraction (less than 1%) of the historical levels and many of the streams have water control structures for municipal water supplies and flood control. Because these municipal areas are anticipated to continue to grow, cumulative impacts from projects that increase capacity will continue.

4.3.3 Infrastructure Development

Large scale roadway projects have been relatively uncommon over the last decade. All recent and current large projects were scaled back from initial proposals due primarily to recent financial shortfalls. Based on the abundance of existing roadways and the current financial climate it is anticipated that large new roadway projects will be less common in the foreseeable future and that the vast majority of transportation projects will focus on repairing and replacing the existing infrastructure.

Roadside maintenance of Oregon's state highway system has been occurring since its inception and will continue to be important in the future, particularly as the infrastructure ages. Current

routine roadside maintenance activities are typically conducted on an annual or an as needed basis to maintain a safe highway system. Large repairs typically have some federal funding and thus Section 7 consultation under the federal ESA is required. Additionally, most land- or vegetation-disturbing actions, including projects not covered under this RM-HCP, require state ESA consultation. Because of safety concerns, roadside maintenance will continue to be conducted and will likely increase gradually into the foreseeable future.

4.3.4 Summary of Cumulative Impacts

Implementation of the RM-HCP (and the Covered Activities within the RM-HCP) will not add to a cumulative adverse effect, either directly or through habitat modifications, on any of the Covered Species. Rather, it is expected that the RM-HCP will benefit the Covered Species through the continuing SMA Program and the implementation of protective site management plans for all known listed species populations in the state highway ROW. By protecting critical populations, managing sites to improve habitat conditions, addressing the life cycle needs of the Covered Species, and by mitigating unavoidable impacts, it is anticipated that cumulative impacts to Covered Species will be well below significant levels.

5.0 Conservation Strategy

5.1 Biological Goals

Biological goals are required for all HCPs (65 FR 35242, June 1, 2000); they are broad, guiding principles for implementation of the HCP based on the conservation needs of the resources covered. Biological objectives are met through the conservation strategy that is designed to achieve the biological goals (see Section 5.2). It is anticipated that some of the implementation details of the ODOT RM-HCP conservation strategy will be modified over the 25 year duration of the HCP as a result of the monitoring and adaptive management program, while goals and objectives of the RM-HCP should remain relatively static.

The primary biological goal of this RM-HCP is to maintain viable populations of Covered Species on ODOT ROWs to assist the overall recovery goals for the species, while simultaneously allowing ODOT to conduct the routine maintenance necessary to ensure highway safety. Recovery goals for the Covered Species are presented below. Each goal will be achieved through avoidance and minimization of impacts, and when impacts are unavoidable, through mitigation that supports biological goals and objectives.

Biological and recovery goals for federal listed species are typically developed for USFWS recovery plans (see Appendix B for a list of recovery plans available for RM-HCP Covered Species). A recovery plan is typically designed to guide the efforts of partners working towards recovery and the eventual downlisting (if endangered) and/or delisting (if threatened) of the species under the federal ESA. Downlisting and delisting criteria are defined in each recovery plan and they are based on the most current available science for the species and its habitat at the time of the plan's development. Also included in a recovery plan is a priority list of recovery actions and supporting tasks needed to achieve the defined recovery goals and objectives. These recovery action lists guided the development of conservation measures for this RM-HCP.

In general, listed butterfly habitat and plant populations on ODOT ROW are relatively small in size and are not typically identified in species recovery plans. However, small habitat patches can support important local populations, particularly from a metapopulation standpoint, and may function as important stepping-stone habitat for dispersal of butterflies and other pollinators, and for species gene flow.

5.1.1 Biological Goals: Animals

5.1.1.1 Fender's Blue Butterfly

Recovery goals for Fender's blue butterfly center around conserving and recovering a specified minimum population size through a combination of functioning networks and independent populations within each of three recovery zones (Salem, Corvallis and Eugene Recovery Zones) over a ten year period (USFWS 2010a); for delisting, the extinction risk threshold is 95% probability of persistence for 100 years. Rather than establish a one-size-fits-all standard for optimal population sizes to achieve the recovery goals, models were developed that allow for a variety of population sizes depending on proximity to other populations (Figure 5-1).

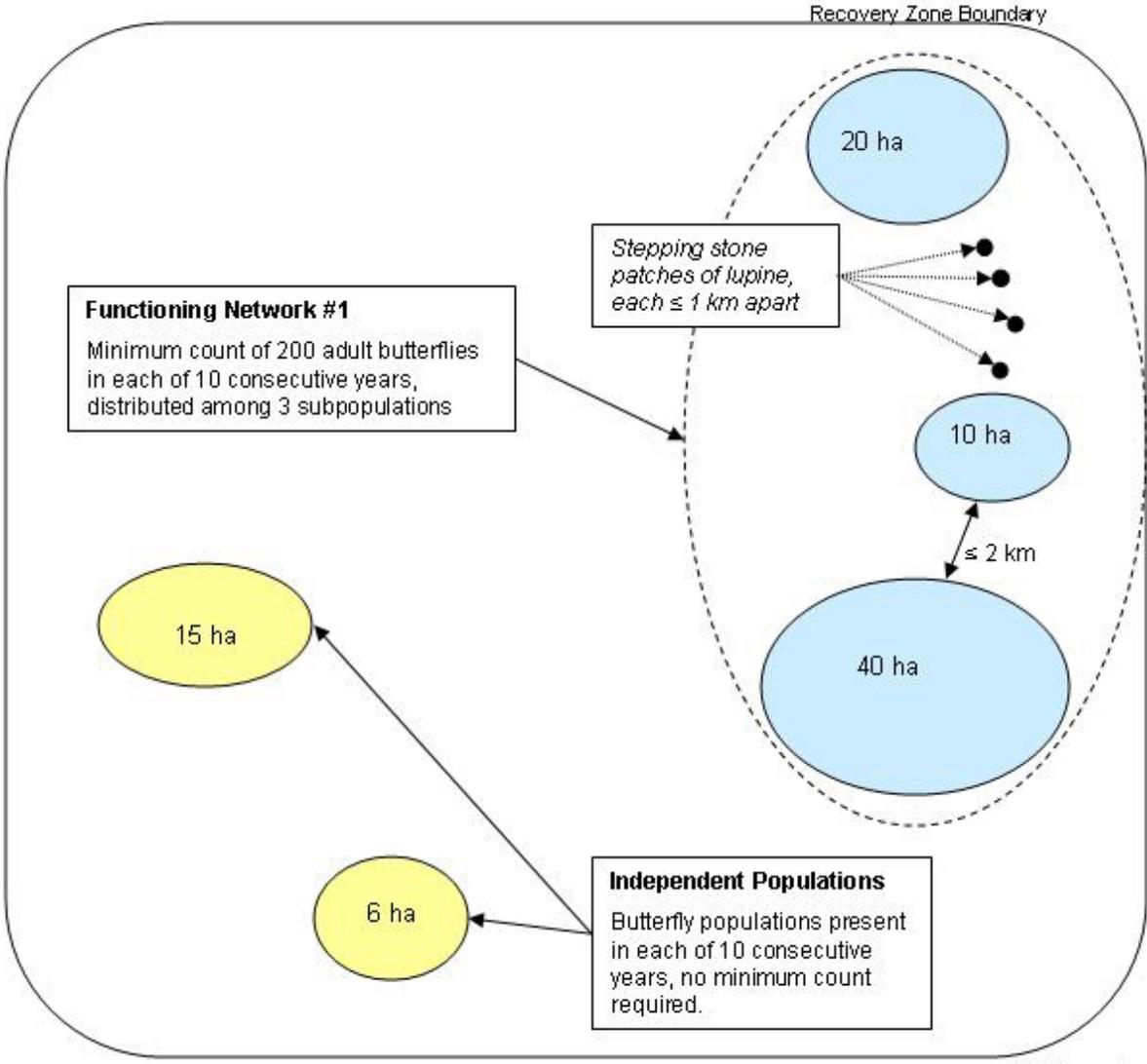


Figure 5-1. Illustration of population size and connectivity targets for recovery of Fender's blue butterfly (from USFWS 2010a).

5.1.1.2 Oregon Silverspot Butterfly

Recovery goals for the Oregon silverspot butterfly in Oregon involve maintaining at least two populations of 200 to 500 butterflies in protected habitat in each of the Coastal Mountains, Cascade Head and Central Coast areas and at least one population on the Clatsop Plains for a period of ten years. Recovery objectives focus on the long-term management of habitats as native, early successional grassland communities by maintaining or enhancing early blue violet abundance, providing a minimum of five native nectar species dispersed abundantly throughout the habitat and flowing throughout the flight period, and reducing the abundance of invasive non-native plants (USFWS 2001).

While habitat restoration and management are the primary actions covered in the recovery plan, the effect of vehicle collisions on butterflies was also identified as a threat at the time of listing

and is addressed in the recovery actions (USFWS 1984, USFWS 2001). The objective of Recovery Action 2.4 is to determine methods to reduce the impacts of impingements of butterflies by vehicles along US-101, and more specifically, Recovery Task 2.4.2 is to determine the best methods for reducing or compensating for the number of butterfly road kills (USFWS 2001). The mitigation measures presented in Section 5.4.1 were developed to contribute to the recovery of Oregon silverspot butterfly primarily through habitat management to reduce vehicle-caused mortalities.

5.1.2 Biological Goals: Plants

There is wide diversity in geography, habitat, life histories and threats to the plant species covered in this RM-HCP. In addition, not all of the Covered Species have recovery plans at this time. These factors make it difficult to list specific recovery objectives for each targeted plant species in this document. However, the basic conservation guidelines recommended in existing recovery plans are fairly consistent and can be applied to all of the plant species in question. With consideration of site conditions, information in recovery plans guided the specific mitigation measures for plants outlined in this RM-HCP (Section 5.4).

5.2 Biological Objectives and General Strategy

Biological objectives were designed to meet the biological goals presented above for animals and plants covered under this RM-HCP. The intent is to conserve Covered Species by minimizing impacts to them from routine maintenance activities and to protect listed plants and butterfly habitat on ODOT ROW where protective measures do not inhibit routine maintenance necessary for highway safety. Biological objectives for the RM-HCP are:

1. Conserve Covered Species populations and their habitat by avoiding or minimizing impacts caused by routine maintenance activities.
2. Mitigate impacts that cannot be avoided and enhance Covered Species populations and their habitat by implementing management actions on ODOT property that support conservation and expansion of Covered Species populations and improvement of their habitat, where appropriate.
3. When on-site conservation of Covered Species and their habitat is not possible, coordinate with appropriate agencies to further mitigate impacts that cannot be avoided.

The three biological objectives outlined above will be achieved through the impact minimization and mitigation measures described in Sections 5.3 and 5.4

5.3 Measures to Minimize Impacts

5.3.1 Measures to Minimize Routine Maintenance Impacts

The following measures will be implemented to minimize impacts to listed species:

- ODOT will coordinate internally and with applicable regulatory agencies to develop site-specific measures to avoid or minimize potential impacts during routine maintenance work to Covered Species that are known to occur outside the Operational Roadway. In most cases, Operational Roadway boundaries have already been defined (see Section 3.4.2) in such a way that direct impacts to Covered Species are completely avoided.

When standard Operational Roadway definitions did not result in avoidance of Covered Species, ODOT minimized the Operational Roadway width whenever feasible.

- Signs will be placed on the roadside to alert maintenance crews to the presence of protected resources when appropriate, as determined by ODOT. In most cases, ODOT already utilizes SMA signs, but as part of this RM-HCP, signs will be updated and placement reviewed for improved effectiveness.
- RM-HCP sites and all high probability ORBIC records (e.g., mapped or last observed within the last 25 years) of listed species are currently shown on ODOT’s Resource & Restricted Activity Zones (RES/RAZ) maps (or other similar tools as new programs are developed). RES/RAZ maps depict ODOT highway and highway features (accesses, signs, etc.) with known sensitive resources graphically depicted along either side of the road; example maps are provided in Appendix C. Sensitive environmental resources are designated and labeled caution or restricted, depending on resource/activity. These are internal resources for maintenance crews and region environmental planners, which can and will be made available to USFWS upon request. ODOT currently updates these maps about every 5 years.

5.4 Mitigation Measures

5.4.1 Mitigation Overview

Mitigation measures have been developed to meet Biological Goals and Objectives described above and offset RM-HCP impacts, and generally consists of the following main types of activities aimed at increasing existing populations: (1) habitat enhancements on ODOT or other protected properties, (2) species augmentation on or offsite, or (3) improved species or habitat protections in HCP sites. Table 5-2 summarizes the general strategy for each of the Covered Species known or potentially occurring on ODOT ROW. Except where noted, the goal of each mitigation strategy is a 1:1 mitigation ratio within 12 years of RM-HCP implementation and to maintain the goal for the life of the program, barring unforeseen circumstances or factors that cannot be controlled by ODOT (e. g., change in adjacent land use or management adversely affects population on ODOT ROW). Additional information on mitigation measures is provided in the following subsections. Implementation details will be described in site management plans. Mitigation measures are not proposed for species for which there are no anticipated impacts.

Table 5-1. RM-HCP conservation strategy for Covered Species.

Species/Resource	Total RM-HCP Impacts ¹	Mitigation Strategy ²
Animals:		
Fender's blue butterfly (FBB) (host habitat)	2,885 ft ² (268 m ²)	3:1 mitigation ratio; habitat enhancement/augmentation at Witham-Gellatly Prairie (ODOT mitigation site) to increase host plants (Kincaid's lupine) to a minimum of approximately 8,700 ft ² (808 m ²) of Kincaid's lupine (see Section 5.4.2.1). In progress
FBB (nectar habitat)	1.109 ac (0.448 ha)	3:1 mitigation ratio; habitat enhancement/augmentation at Witham-Gellatly Prairie to create a minimum of 3.3 ac (1.35 ha) of nectar habitat. In progress.
Oregon silverspot butterfly habitat	0.273 ac (0.11 ha)	Habitat enhancement onsite (annual mowing at appropriate season or other feasible vegetation management).

Species/Resource	Total RM-HCP Impacts ¹	Mitigation Strategy ²
		Continuing.
Plants:		
Applegate's milk-vetch	0	NA
Arrow-leaf thelypody	0	NA
Bradshaw's desert parsley	38	Habitat management at Dillard Road & Fern Ridge SMAs (periodic shrub mowing, possible population augmentations)
Cascade Head catch-fly	0	NA
Cook's lomatium	1,115	Off-site augmentation implemented by ODA. In progress.
Crinite mariposa lily	0	NA
Cronquist's stickseed	18	Site management at SMAs (District coordination)
Gentner's fritillary	0	NA
Howell's mariposa lily	0	NA
Howell's microseris	5	Site management at all SMAs (District coordination)
Howell's spectacular thelypody	2	Habitat management at Rodeo SMA
Kincaid's lupine	3,064 ft ² (285 m ²)	Habitat enhancements at SMAs, augmentation at Witham-Gellatly Prairie. In progress.
Large-flowered rush lily	0	NA
Large-flowered woolly meadowfoam	13	Habitat protections at Agate Desert site (restrict unauthorized access; coordinate with utility to avoid plants)
Laurence's milkvetch	164	Site management at all SMAs (District coordination)
Malheur wire-lettuce	0	NA
McDonald rockcress	0	NA
Nelson's checker-mallow	163	Augmentation at Fort Hill (ODOT mitigation site) (in progress; see Section 5.4.3.9)
Oregon semaphore grass	0	Site management at Ladd Canyon SMA (fencing, District coordination)
Pale larkspur	0	NA
Peacock larkspur	38	Augmentation at Fort Hill mitigation site (in progress) or other (see Section 5.4.3.11)
Peck's milkvetch	586	Offsite mitigation implemented by ODA (in progress)
Point Reyes bird's-beak	0	NA
Pumice grape-fern	0	NA
Rough popcornflower	0	NA
Silvery phacelia	0	NA
Snake River goldenweed	0	NA
Spalding's catchfly	0	NA
Sterile milk-vetch	0	NA

Species/Resource	Total RM-HCP Impacts ¹	Mitigation Strategy ²
Tygh Valley milkvetch	133	Invasive species control research (in progress)
Umpqua mariposa-lily	0	NA
Wayside aster	3	Site management at all SMAs (District coordination)
Western lily	17	Habitat enhancements at Harris and Hauser Bog SMAs (brush mowing & spot spraying as needed)
Whitetop aster	0	NA
Willamette daisy	30	Habitat enhancements at Fern Ridge Reservoir SMA (in progress)
Wolf's evening-primrose	0	NA

1. See Section 4.0 for more information on impacts.

2. Only general strategy provided here; Sections 5.4.2 and 5.4.3 for more details.

5.4.2 Mitigation for Animals

5.4.2.1 Fender's Blue Butterfly

As described in Section 4.2.3, ODOT routine maintenance activities have small impacts on Fender's blue butterflies scattered throughout the Willamette Valley. Offsetting at this scale on roadsides would result in little benefit to the species. Therefore, ODOT and USFWS concurred that all mitigation for this species should occur at a more desirable location located away from the highway. ODOT recently purchased a 20-acre (8 ha) property of upland meadow habitat (called the Witham-Gellatly Prairie) to fulfill a conservation obligation of the OTIA III (Oregon Transportation Investment Act III) Biological Opinion for impacts to Fender's blue butterfly (USFWS 2007). ODOT is proposing habitat enhancements at this site as advance mitigation for total maintenance impacts to Fender's blue butterfly over the 25-year duration of the RM-HCP (summarized in Table 5-2). A site restoration and management plan has been developed (included as Appendix H for this document) and is currently under implementation with the overall goal of creating high quality upland prairie that can contribute to the recovery of Fender's blue butterfly as part a functioning habitat network.

Witham-Gellatly Prairie is located in rural Benton County in the Corvallis recovery zone for Willamette Valley prairie species (USFWS 2010a). The site is potentially part of the Greasy Creek functioning network (Table IV-1 in the Recovery Plan; USFWS 2010a). According to the Recovery Plan, stepping stone patches less than 0.6 miles (1 km) apart can help connect subpopulations as part of a functioning network of important stepping stone patches of host lupine habitat (Figure 5-1). There is no minimum patch size for host habitat in a functioning network such as this.

The dry, open meadow habitat at Witham-Gellatly Prairie has been used for cattle grazing for at least the past decade. As part of OTIA III mitigation, a fence was constructed around the property to exclude cattle (completed May 2012). The site is surrounded by coniferous forest to the north, and open meadow/grazing and rural residential properties on the remaining sides. ODOT completed a baseline plant community survey for the prairie in June 2012, and measured 253 ft² (23.5 m²) of Kincaid's lupine in 12 patches scattered throughout the site. Non-native, annual grasses dominated the site (e.g., six-weeks fescue [*Vulpia microstachys*], bristly dogstail grass [*Cynosurus echinatus*] and medusahead [*Taeniatherum caput medusae*]) and only three different native nectar species were located (Kincaid's lupine, narrowleaf onion, and woolly sunflower) covering less than half of one percent of the site.

Existing site information, background research, and the conservation strategy shown in Table 5-2 were considered to develop the following three to five year restoration objectives for this site:

1. Maintain the meadow habitat by preventing encroachment of woody species. A preliminary target³ is to have less than 15% cover of woody species.
2. Reduce dominance of non-native and invasive plants. A preliminary target is to have less than 60% cover of non-native vegetation.
3. Increase cover of native nectar plant species for Fender's blue butterfly (see Crone and Kallioniemi 2009 or current guidance from USFWS on acceptable species). The preliminary target is to offset routine maintenance direct and indirect impacts to nectar habitat at a 3:1 ratio. This translates into a minimum of 3.3 acres (1.35 ha) of native nectar species cover. This target will be met if 16.5 acres (6.7 ha) of the site achieves 20% cover of native nectar species, or if 11 acres (4.5 ha) of the site achieves 30% cover of nectar species.
4. Increase the cover of Kincaid's lupine, the primary host plant species for Fender's blue butterfly. The target is to offset routine maintenance direct impacts to Fender's blue butterfly host habitat at a 3:1 ratio. This translates into a minimum of approximately 8,700 ft² (808 m²) foliar cover of Kincaid's lupine.

A technical advisory committee comprised of biologists from the ODOT, USFWS, ODA, and the Institute for Applied Ecology (a 501(c)(3) nonprofit organization with the mission to conserve native species and habitats through restoration, research, and education) is guiding the development of management objectives and restoration plans for Witham-Gellatly Prairie (see stakeholders in Appendix A). To meet the biological objectives of this RM-HCP for Fender's blue butterfly, the proposed plan consists of an aggressive herbicide treatment program, regular mowing, native seeding, and possibly prescribed burns⁴. The timing of cattle exclusion, invasive species control treatments, and seeding must be coordinated to optimize native species recovery (Stanley et al. 2010; Boyer 2010). Biologists with the Institute for Applied Ecology (Stanley et al. 2010) are considered experts in upland prairie restoration in the Willamette Valley, and they stress the need for repeated and aggressive weed control treatment prior to seeding with natives to address invasive plants in the seed bank. The management plan will involve three to five years of intensive enhancement activities, monitoring each year, and modification of the strategy based on effects. Part of adaptive management involves reconsidering the objectives and targets if it appears that they are unrealistic or inconsistent with new information. Habitat enhancements will focus on weed control and native seeding in the areas surrounding the larger of the existing Kincaid's lupine patches to optimize interactions between host and nectar habitat.

Within three to five years, ODOT is interested in transferring the Witham-Gellatly Prairie property deed to a more suitable land steward with the requirement that the site must be retained in conservation status and maintained as part of the functioning habitat network for Fender's blue butterfly in perpetuity. The USFWS Willamette Valley Refuge Complex is working on protocols for purchasing and managing conservation lands in the Willamette Valley, and ODOT's Witham-Gellatly Prairie property is one of the target sites. However, as long as ODOT owns this property, ODOT will manage the site in a manner consistent with the BMPs in USFWS (2010a)

³ To be further developed by technical advisory committee.

⁴ Note: the original plan to utilize fire as a short-term restoration tool has been curtailed at this time due to limitations on partnership opportunities with the USFWS Willamette Refuge Complex and Oregon Department of Forestry.

to maintain the restoration objectives. This will include periodically mowing and spot spraying weeds in a manner that does not adversely impact Fender's blue butterfly host or nectar plants, cooperating with the USFWS or others to conduct periodic prescribed burns (as feasible given local burning constraints), and continuing site effectiveness monitoring efforts as per Section 7.2.

5.4.2.2 Oregon Silverspot Butterfly

ODOT's SMA on US-101 crosses through one of the most robust populations of the Oregon silverspot butterfly that is not in decline (Butterfly Conservation Initiative 2006) and in the only location of designated critical habitat. Recovery of the butterfly requires at least two viable populations in protected habitat in each of the following areas in Oregon: Coastal Mountains, Cascade Head, and Central Coast (USFWS 2001).

The USFWS and others (including The Nature Conservancy and the Oregon Zoo) are already supplementing the Oregon silverspot butterfly population with captive bred individuals, but this is an expensive venture and long term effectiveness may be limited given the ever-present threat of road-kill. Recent research on Oregon silverspot movement patterns at the Central Coast recovery area identified butterflies feeding in highway verges, and vehicle caused mortality can be high while crossing the highway (Bennett 2010, Zielin et al. 2011, ODFW 2011). Habitat management has been recommended to reduce or eliminate the risk of vehicle caused mortality. Mowing along road shoulders will minimize the abundance of nectar flowering plants adjacent to the highway during the peak butterfly flight period (mid-July to early-September). Zielin et al. (2011) also identified characteristics of sites where butterfly collisions with vehicles are most likely. They recommend developing screening measures via vegetation management, barriers to divert butterflies away from the roadway, or obstructions to encourage butterflies to fly across the highway at greater heights. The USFWS has requested that ODOT pursue these management recommendations to mitigate for the limited amount of Oregon silverspot butterfly impacts associated with routine road maintenance.

In response to information in the Zielin et al. (2011) study and guidance from USFWS, ODOT will implement a program to mow just under a mile of herbaceous flowering plants alongside US 101 in the central Coast, timed for early Summer before peak butterfly activity occurs between mid-June and mid-July. The mow area will coincide with the Operational Roadway, up to 8 feet (2.4 m) from the edge of pavement. The mower height will be set as low as possible to discourage herbaceous plants from bolting and flowering at heights that would attract the butterflies. Additional recommendations involve increasing nectar and larval food plants in meadows distant from the road, and adding hedgerow or forest fringe shelter to meadows on both sides of the highway so butterflies will not have to cross the road to access resources. These measures need additional study, and may turn out to be impracticable for ODOT's narrow ROW. ODOT will explore other vegetation management options on the ROW if additional research by USFWS or others concludes that another vegetation management solution is warranted, but only if the treatment would not compromise public safety (e.g., obscure sight distance at corners or accesses).

5.4.3 Mitigation for Plants

5.4.3.1 Bradshaw's Desert Parsley

ODOT will implement modified maintenance and habitat enhancement efforts at Dillard and Fern Ridge SMAs which are anticipated to result in an increase to the existing populations on portions of the ROW well away from the Operational Roadway. At both sites, Himalayan

blackberry (*Rubus armeniacus*), willow (*Salix* spp.) and other shrubs are encroaching into the wet meadow habitat where Bradshaw's desert parsley is growing. Transportation and agricultural developments in both areas likely have altered natural hydrologic cycles that would otherwise promote more natural flooding/scour cycles, and natural fire cycles that historically reduced forest cover are now largely suppressed in the Willamette Valley. In order to mimic these lost disturbance factors, ODOT will regularly mow and cut shrubs and trees in the SMAs as needed to maintain open meadow habitats required by this species. It should be noted that federal grant-funded augmentations have occurred in other portions of the Dillard Road SMA. Those actions are not being included as mitigation under this HCP.

5.4.3.2 Cook's Lomatium

ODOT and ODA have an agreement for ODOT to fund ODA to implement off-site enhancement activities to offset routine road maintenance impacts to Cook's lomatium. The proposed plan involves the transfer of funds from ODOT to ODA to pay for the establishment of a new, self-sustaining population of Cook's lomatium, located in the Illinois Valley on administratively protected lands that are already being managed for this species and its habitat. ODA and others have conducted introduction studies following a protocol developed by Parkins (2004), and preliminary results indicate that Cook's lomatium can be introduced using both directly-sown seed and greenhouse-grown transplants (ODA in-house data). ODA's prior experience cultivating and outplanting Cook's lomatium should enhance the prospects for establishment success. ODA will collect approximately 5,000-6,000 seeds for direct sowing and transplants. Because of the low establishment rates for direct-seed sowing and the highly valuable nature of the collected seed, ODA will limit direct-sowing to a small number of experimental plots. Most of the collected seed will be used to start approximately 4,000 plants in the greenhouse, which will then be outplanted at the introduction site in the Illinois Valley. This work is underway, with thousands of seeds collected, stored and ready for outplanting Fall 2015..

5.4.3.3 Cronquist's Stickseed

ODOT will offset potential routine maintenance impacts to Cronquist's stickseed by improving protections at the sites that were discovered during surveys completed for this RM-HCP; this will result in an increase of populations in protected SMAs. ODOT will coordinate with Maintenance crews and install cautionary signs as appropriate to ensure that maintenance activities avoid impacting Cronquist's stickseed plants at known sites.

5.4.3.4 Howell's Microseris

ODOT will offset the minor amount of anticipated routine maintenance impacts to Howell's microseris by improving protections at the sites that were discovered during surveys completed for this RM-HCP; this will result in natural population increases. ODOT will coordinate with Maintenance crews and install cautionary signs as appropriate to ensure that maintenance activities avoid and minimize most impacts to Howell's microseris.

5.4.3.5 Howell's Spectacular Thelypody

Due to the minor amount of anticipated routine maintenance impacts to Howell's spectacular thelypody, the proposed conservation strategy for this species is to improve protections at known sites. Most of ODOT's populations of Howell's spectacular thelypody are far enough back from the Operational Roadway such that impacts by routine maintenance can be avoided. However, one population is located in a narrow section of ROW which has, in the past, been used for

public parking during an annual fair. Recently, ODOT began coordinating with fair organizers to prohibit parking within the SMA during the event to better protect the thelypody. If determined by ODOT staff to be needed during annual site checks, ODOT will install boulders, fencing, or other barriers or use other means (such as “Tow-Away Zone” signs) to further discourage trespass.

5.4.3.6 Kincaid’s Lupine

ODOT will offset routine maintenance impacts to Kincaid’s lupine plants that grow within the Operational Roadway by implementing vegetation management at sites with greater ecological significance. The goal of these habitat enhancements will be to increase the amount of Kincaid’s lupine. These measures will be implemented at the Mill Creek SMA in Polk County, Lafayette SMA in Yamhill County, and Fisher Road SMA in Lane County.

ODOT will also augment existing Kincaid’s lupine populations at the Witham-Gellatly Prairie (Section 5.4.1.1). The Institute for Applied Ecology (IAE) has had success with direct seeding of Kincaid’s lupine, and is continuing seeding plant establishment research with the Eugene District BLM (BLM 2011). ODOT has been working with IAE on this project for several years and progress is being seen. Re-seeding of the site will begin Fall 2015.

5.4.3.7 Large-flowered Woolly Meadowfoam

ODOT will offset potential routine maintenance impacts to large-flowered woolly meadowfoam by improving protections at the Agate Desert site; it is anticipated that this will result in an increase to the existing population. The vernal pool habitat of large-flowered woolly meadowfoam at the site has routinely been disturbed by unauthorized off-road vehicles, private fence construction, and somewhat haphazard access for private utility maintenance. ODOT will install property signs and/or other barriers to prevent trespass, and coordinate with the existing utility companies to designate a specific access road that best avoids the vernal pools.

5.4.3.8 Laurence’s Milkvetch

Surveys during development of the RM-HCP resulted in identification of thousands of Laurence’s milkvetch plants on ODOT ROW along OR-74 and OR-207, most of which were previously unknown to the Maintenance District and Region Biologist. As described in Section 5.3.1, ODOT has substantially reduced potential impacts to this species by minimizing the Operational Roadway width. The remaining minor impacts to this milkvetch will be offset by improving protections at all known ROW sites containing Laurence’s milkvetch, anticipating that this will result in an increase to the existing populations. Only two of the ODOT sites currently have SMA signs. ODOT is in the process of obtaining and installing new signs, including “continued” signs in the longer sites for better protection.

5.4.3.9 Nelson’s Checker-mallow

Routine maintenance impacts to Nelson’s checker-mallow are similar to those for Kincaid’s lupine because the plants also grow in the Operational Roadway. Most of the mitigation offsetting has already occurred for this species at ODOT’s 30-acre (12.1 ha) Fort Hill mitigation site (Polk County), originally developed to mitigate for impacts to the nearby interchange reconstruction (USFWS 2007). ODOT undertook extensive site preparation at Fort Hill to convert the agricultural pasture (jurisdictional wetland) to native wet prairie. Prior to construction, 400 Nelson’s checker-mallow plants were salvaged from the project area and temporarily relocated to the Natural Resources Conservation Service (NRCS) Plant Material

Center in Corvallis. The Plant Material Center propagated these plants over two growing seasons, resulting in more than 50 pounds (22.7 kg) of seed and 3,000 rhizome cuttings. ODOT planted the checker-mallow seeds and cuttings into the Fort Hill mitigation site between 2008 and 2009 along with other native forb seeds, and undertook weed control efforts.

In 2010, ODOT separated the original 400 checker-mallow plants into 2,000 cuttings, and added these to the site. The original Biological Opinion for the site required no net loss of Nelson's checker-mallow plants (USFWS 2007). Estimates from the first year of monitoring suggested the presence of approximately 100,000 plants at the site. Although some plants will undoubtedly die off, ODOT anticipates an increase in thousands of Nelson's checker-mallow plants to the population, resulting in extra mitigation "credits" available as advance mitigation for this RM-HCP and other ODOT projects. ODOT is continuing to manage invasive plants at the Fort Hill site, and once the original mitigation obligations are met, ODOT will continue to protect and manage the site and monitor the population according to the RM-HCP. If the property is ever transferred to an outside entity, the transfer will require the site to be retained in conservation status with protection of the listed plants in perpetuity.

In addition to the offsetting mitigation described above, ODOT already engages in habitat enhancement efforts when feasible in many of the Nelson's checker-mallow SMAs, i.e., mowing in the fall to minimize encroachment of woody plants. In the future, ODOT may also use weed control to enhance the Santiam Interchange SMA and other SMAs for Nelson's checker-mallow. The Santiam Interchange currently contains one of ODOT's largest population of Nelson's checker-mallow, but growth and reproduction of the species may eventually become limited there by invasive species. Non-native, perennial grasses and vetch are extremely dense in portions of the site, and competition and dense thatch may be limiting seedling growth. Prescribed burning is the best method to control non-natives while protecting native forbs in the Willamette Valley, but burning is likely infeasible at the Santiam Interchange site due to its highway proximity. At this time, other cost-effective solutions are not known, but ODOT will coordinate with USFWS, ODA or other stakeholders to implement other management strategies if it becomes necessary at this or other sites.

5.4.3.10 Oregon Semaphore Grass

ODOT does not anticipate routine maintenance impacts to Oregon semaphore grass, but ODOT has protected semaphore grass that occurs on ODOT property by installing a fence. The majority of the semaphore grass occurs on the adjacent private property and is impacted by grazing, but ODOT has no control over activities on private properties. Construction of this fencing has been completed.

5.4.3.11 Peacock Larkspur

Peacock larkspur is known from five ODOT ROW sites, one where the plant may be extirpated, and two which ODOT will no longer manage because the populations are small and non-viable. ODOT will offset these impacts with habitat enhancements and augmentation.

ODOT has already partnered with local botanists on peacock larkspur seed collection and grow-out trials. In 2009, Heritage Seedlings, Inc. collected seed at ODOT's Greenwood Road SMA and additional non-ODOT sites in the middle Willamette Valley and grew the plants in a nursery for two seasons. The nursery effort was successful, and in 2011 ODOT planted 2,000 propagules at its Fort Hill mitigation site (Polk County; see additional description of this site in Section

5.4.2.9). The Fort Hill plantings were voluntary enhancement and not part of any mitigation requirement, although this increase in population does benefit the species status as a whole.

Transplanting peacock larkspur is still considered experimental. ODOT is regularly monitoring transplant efforts at this site to track effectiveness. In the event that the Fort Hill transplants are not sufficiently successful to offset the routine maintenance impacts covered in this RM-HCP, ODOT will undertake habitat enhancements at other peacock larkspur SMAs to increase population sizes. One of the optional enhancement sites is the Greenwood Road SMA. This site contains ODOT's largest population of peacock larkspur, but growth and reproduction of the species is currently limited by invasive species. Non-native, perennial grasses and vetch are extremely dense at this site, not only restricting pollinator access to the larkspur plants but also limiting seedling growth. Prescribed burning is the best method to control non-natives while protecting native forbs in the Willamette Valley, but this may be infeasible at the Greenwood site due to its proximity to a busy highway. ODOT is working with ODA and other appropriate stakeholders to test and implement management solutions at this site. A second site with potential for larkspur enhancement is the Decker Road SMA. Here, brush mowing and tree trimming will be implemented to reduce the encroachment of woody plants that threaten the viability of this population. As enhancement and augmentation efforts are implemented and monitored at all sites, results will be reported as required under this RM-HCP and adaptive management implemented as needed (see Section 7.2), based upon the annual and Triennial population monitoring.

5.4.3.12 Peck's Milkvetch

ODOT and ODA have an agreement for ODOT to fund ODA to provide off-site enhancement to offset routine maintenance impacts to Peck's milkvetch. The proposed plan involves the establishment of a new, self-sustaining population of Peck's milkvetch, located on administratively protected lands that are already managed for this species and its habitat. ODA has considerable prior experience propagating Peck's milkvetch and this should enhance the prospects for successful mitigation. ODA will collect Peck's milkvetch seeds from ODOT ROW and additional sites if needed to start approximately 2,000 plants in the greenhouse. Survivors will be transplanted to suitable sites in central Oregon. Research completed indicates seedlings require a sand bed for viability against fungal damping-off.

5.4.3.13 Tygh Valley Milkvetch

To address serious weed control problems in Tygh Valley milkvetch areas and to offset routine maintenance impacts to milkvetch growing in the Operational Roadway, ODOT hired the Institute for Applied Ecology to research weed control methods. They are testing the effectiveness of various weed control methods for reducing cover of annual grasses and noxious weeds, while avoiding or at least minimizing impacts to native flora, particularly Tygh Valley milkvetch. The Institute for Applied Ecology worked with ODOT and ODA to develop the study design, and experimentation began in 2011. The combination of treatments and monitoring will take several years to complete. ODA has stated that the research project is sufficient mitigation for this plant (Tygh Valley milkvetch is not federally listed).

5.4.3.14 Wayside Aster

ODOT will offset anticipated minor routine maintenance impacts to wayside aster by improving habitat conservation measures through installation of Special Area Management signage and

species-specific maintenance activities. In particular, this species flowers late in the summer, setting seed late and therefore requiring minimal disturbance until seed is ready for dispersal (late fall). Maintenance prescriptions will observe this seasonality.

5.4.3.15 Western Lily

ODOT does not anticipate routine maintenance impacts to western lily. However, ODOT has periodically conducted habitat enhancements at the two SMAs with the healthiest populations (Harris and Hauser Bogs) and these enhancements should increase the target populations. Western lily naturally thrives in the edge between shrubby bogs and upland forest. Under natural events, bogs and upland forests cycle through periods of flooding and eutrophication. If not regularly maintained, larger trees and shrubs grow into the bog habitat and crowd out the western lily. ODOT may periodically mow and cut woody vegetation in the fall and spot spray Scotch broom (*Cytisus scoparius*) and Himalayan blackberry plants.

5.4.3.16 Willamette Daisy

ODOT will offset anticipated minor routine maintenance impacts to Willamette daisy with habitat improvements at the Fern Ridge Reservoir SMA; habitat improvement should increase the existing Willamette daisy population. The wet prairie habitat favored by this daisy has problems with the encroachment of both native and non-native shrubs and trees. Himalayan blackberry is invading the largest ODOT Willamette daisy patch and needs control to avoid substantive losses to the population. ODOT will periodically mow in the fall to maintain the meadow habitat and spot spray blackberry plants.

6.0 The “No HCP” Alternative

Section 10(a)(2)(A)(iii) of the federal ESA states that “No permit may be issued by the Secretary authorizing any taking [of ESA listed species]...unless the applicant therefore submits to the Secretary a conservation plan that specifies what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized.” The mission of ODOT is to provide a safe, efficient transportation system that supports economic opportunity and livable communities for Oregonians. The ODOT Maintenance and Operations Branch develops and implements programs to ensure the efficient, effective and consistent maintenance and operation of Oregon's transportation infrastructure.

In the course of maintaining and operating Oregon State Highways for safety and efficiency, ODOT Maintenance may impact listed species, particularly listed butterflies and plants associated with the ROW. As described in Section 3 of this RM-HCP, ODOT owns more than 50,000 acres (20,234 ha) of ROW, and a combination of mechanical, cultural, biological and chemical methods are used to control vegetation along roadsides. Roadside vegetation is managed for a multitude of safety and operational reasons including, but not limited to, providing for safe sight distances, and road surface drainage, maintaining the hydraulic capacity of ditches and vehicle recovery areas, reducing fire potential, and preventing the establishment and spread of noxious weeds. If these vegetation controlling activities along the highway were eliminated, this could prevent the incidental take by ODOT Maintenance of listed butterflies and plants in the ROW, but it would also severely compromise highway integrity and create a serious safety hazard for the traveling public.

Recognizing that listed butterflies and plants are sometimes located in the highway ROW, ODOT Maintenance considers the needs of listed species when developing IVM plans and adjusts ROW maintenance schedules, when possible, to protect and conserve listed species. Additionally, ODOT has a SMA Program that limits maintenance activities in locations where listed plants (and other sensitive resources) are known to reside. But despite these ongoing efforts to protect listed species along the ROW while simultaneously providing critical roadside maintenance, incidental take of listed butterflies and plants cannot always be avoided.

If ODOT Maintenance continues business as usual without an ITP (by means of an HCP), incidental take of listed butterflies and plants in the ROW will still have the potential to occur but without the benefit of HCP-required mitigation approved by the Secretary. Further, effective dialogue with ESA regulators at both state and federal levels is compromised when incidental take occurs in the absence of a permit, and conservation opportunities that may arise from that dialogue may be lost. For the reasons noted above, the “No HCP” alternative for ODOT Maintenance is not a viable operational strategy either for the conservation of listed butterflies and plants that reside in the ROW along state highways or for the maintenance activities that occur there.

7.0 Implementing the RM-HCP

7.1 Site Management

7.1.1 Current Sites

As described in Sections 2.3 and 4.2, there are over 90 geographically distinct sites on ODOT properties with Covered Species (see Appendix D for the site list). Each site has unique natural and transportation-related conditions resulting in management requirements for Covered Species that are site specific. Rights-of-way widths vary considerably, and in a few instances, the listed species population is more than 100 feet (30.4 m) from the highway in a location that requires little to no ROW maintenance. Alternatively, some listed butterflies and plants inhabit the ROW directly adjacent to the highway and special precautions are required to protect the resource while simultaneously ensuring highway safety.

Currently, if sections of ODOT ROW require unique or modified maintenance actions to protect sensitive environmental resources, they are managed under the ODOT SMA Program. The Resource Protection Area (RPA) designation is reserved for ODOT properties with sensitive environmental resources that do not require unique or modified maintenance activities. The ODOT SMA Program provides a mechanism and process by which Region Environmental Units and Maintenance Districts, with input from appropriate regulatory agencies as needed, collectively determine the designation of a sensitive resource site (either SMA or RPA) and the need for cautionary signs to alert Maintenance crews to the presence of a protected resource. State and federal ESA regulatory requirements are the same regardless of site designation, with the exception that under this RM-HCP, impacts to Covered Species will be allowed in the Operational Roadway, an important roadside maintenance area for public safety.

For current SMA and RPA sites, ODOT has developed site-specific maintenance summaries that include a map showing the current extent and distribution of the protected population, a description of the Operational Roadway location when applicable, a description of restricted maintenance activities to avoid impacts when applicable, and resource protection or enhancement measures, in particular when required for mitigation/compliance with the RM-HCP. The summaries are consistent with allowances for impacts and mitigation commitments in this RM-HCP. The maintenance summaries are finalized when signed by the Region Environmental Manager and the District Manager. The District Manager is responsible for ensuring commitments in the plan are met. ODOT will expand on these documents to create site-specific management plans that more fully describe implementation activities to meet and track biological objectives in Section 5.2 and the mitigation strategy in Section 5.4. Regulators will be provided opportunities to review and input on the site management plans. The site maintenance summaries and management plans are available to Maintenance personnel for planning, and are to be reviewed prior to implementing routine roadside maintenance work.

ODOT has also determined if cautionary signs are warranted at SMA and RPA sites to ensure compliance during routine maintenance work, and will install signs at the sites upon completion of the RM-HCP.

7.1.2 New Sites

New populations of Covered Species may be discovered on ODOT properties during environmental review for future highway projects or by other means during the 25 year duration

of the RM-HCP. When new ROW populations are discovered, ODOT will initially coordinate internally to determine maintenance needs and resource protections, identify the Operational Roadway (as applicable), and then involve USFWS and ODA as we prepare appropriate site management documents, as described above. Except for emergency actions, ODOT will avoid maintenance work on or near a newly discovered Covered Species population until site management information is developed whenever feasible. Provided that the maintenance work falls within the scope of this RM-HCP and the level of take does not exceed that allowed under the permit, additional ESA consultation for routine maintenance impacts would not be needed for RM-HCP Covered Species.

7.1.3 Data Management

ODOT currently has a statewide geodatabase of RM-HCP Covered Species. Currently, this geodatabase depicts the boundaries of SMA and RPA sites, results of population monitoring (spatial distribution and abundance), and important site management features (e.g., location of the Operational Roadway, ROW fencing, ditches, signs). This geo-database is available to ODOT staff and other approved public agencies (for example, ODA and USFWS) for their use as needed to coordinate monitoring efforts, to collaborate internally, and to share resource information. Other data management systems may be used in the future with the intent of supporting site and program management.

7.1.4 Incident Reporting

The monitoring and site checks described in Section 7.2 below provide opportunities for ODOT to remain informed of the status of Covered Species and to determine if there have been unanticipated impacts to the sites. In the event an unanticipated impact occurs, ODOT will coordinate internally and externally; coordination will include ODOT managers, ODA and USFWS, as appropriate for the resource.

7.2 Monitoring

7.2.1 Site Monitoring

ODOT will monitor all Covered Species sites under this RM-HCP that have ongoing maintenance activities (see Section 3.1). Detailed population monitoring will occur every three years (see protocols below). Status site checks will occur each year in between, and will consist of brief visits to confirm the sites have not been substantially disturbed, need repair, or need maintenance actions.

Population monitoring or status site checks will occur at ODOT's discretion on RM-HCP sites that have no ongoing actions. Generally this means that SMAs will be regularly monitored, but RPAs will not. Additionally, ODOT will not regularly monitor mitigation sites if enhancement activities are complete and once mitigation objectives and strategy goals have been achieved. We will, however, perform site checks and detailed monitoring for long-term tracking and management, adjusting mitigation strategies as necessary (see Section 7.4), as resources and opportunities allow. If periodic ROW maintenance is needed in a managed site (SMA or RPA) such as weed control, the population will be checked the following flowering season.

7.2.2 Population Monitoring Procedures

Population monitoring will be completed by a qualified Biologist as per OAR 703-073-0900(5i). The monitoring Biologist will complete monitoring/site check reports every visit according to

current templates (shown in Appendix E, although these may be periodically updated as part of program improvements and adaptive management).

Population monitoring will be completed at the appropriate season to most effectively determine population abundance for that year. In general, this will be at peak flowering for plants, although for some species, census is most accurate if done early in the growing season before other vegetation hides the target species. Rather than limit all species/sites to one specific monitoring method, monitoring methods are case-specific, developed to ensure an accurate representation of population abundance, distribution, and trend, while also being efficient and repeatable (see Section 4.1.3), and as ODOT budget and schedules allow. Each monitoring site visit will include a complete census of individuals of the target species, if feasible, and a map of the observed distribution. Sampling may be implemented in areas with larger populations, using a repeatable method that is sufficient to estimate total population abundance. ODOT will document the site-specific method utilized in the monitoring report, and strive to use the same survey methodology, including the counting units presented in Table 4-1, each monitoring period. Population trends will be evaluated by comparing abundance and distribution with previous monitoring periods. Sites with highly variable populations may require several monitoring years to observe a trend.

7.2.3 Effectiveness Monitoring

Effectiveness monitoring links collected data to some management action as an explicit test of the action's effect on population status or trend. Typically, ODOT is only interested in the status and trend of a regulated population, not what the effects of a particular maintenance activity are on a population. However, if site-specific effectiveness monitoring becomes necessary, ODOT will coordinate with applicable regulatory authorities to develop the monitoring methodology. For example, ODOT has already initiated weed control experiments in the Tygh Valley milkvetch SMAs. Sample plots and a sampling methodology were developed to test the effectiveness of various herbicide treatments on reducing cover of invasive weeds. Because Tygh Valley milkvetch is state but not federally listed, ODOT worked with ODA to develop the study design.

7.3 Program Coordination and Reporting

Implementation of the RM-HCP and coordination roles and responsibilities are described in Section 7.7 below. As part of overall program coordination, ODOT will execute the following to ensure compliance with the RM-HCP:

- Monitoring and reporting as described in Section 7.2; monitoring reports and database records will be available to regulators upon request.
- Maintenance of a central filing system for monitoring/site check reports and the statewide geo-database.
- Quality assurance and quality control of monitoring reports and the geo-database.
- Submittal of population updates to ORBIC, or whichever organization maintains statewide biological data in the future.
- Statewide tracking of population abundance and trend using data management described in Section 7.1.3.

The RM-HCP annual report to stakeholders will include a summary of incidents, associated impacts, and corrective measures; a list of the monitored sites; population abundances and trends for monitored sites; information about newly discovered sites with Covered Species; summary of

results for research projects or mitigation efforts; and program updates. The annual summary report will be provided to regulators by March 1 the following year.

ODOT will facilitate regular program review meetings with regulators and key stakeholders (see Section 7.7). ODOT will coordinate with appropriate internal staff to develop a summary of successes, challenges, and issues to discuss at the meetings. Stakeholders (ODA and USFWS, for example) will guide meeting frequency.

7.4 Adaptive Management

7.4.1 Purpose of Adaptive Management

Adaptive management in regard to natural resources is a systematic approach to improving resource management through testing and monitoring existing management practices (Gregory et al. 2006). Adaptive management is often used when there is uncertainty about the response to management actions and future conditions (Williams et al. 2009). In the case of this RM-HCP, some of the Covered Species have a considerable amount of research that has been completed, and a fairly large body of knowledge pertaining to best management practices available, but others have next to none. In all resource management actions there is some level of risk and because natural systems are not static, some change is anticipated.

Some form of an adaptive management process is needed so that a long-term management strategy, such as this RM-HCP, can retain some flexibility to address threats that may arise in the future or adjust management practices when the status of a population is not progressing as desired.

7.4.2 RM-HCP Adaptive Management Strategy

This RM-HCP uses adaptive management to adjust and improve habitat management for target species conservation (Figure 7-1). In most of the ROW sites with Covered Species the objective is to maintain or increase the abundance of listed butterflies (or their suitable habitat) and plants within the context of the site boundaries and limitations.

1. Discovery and baseline data collection. When new populations are discovered, basic population and site information will be collected. This has already been completed for the current, known RM-HCP sites.
2. Intra/Interagency coordination and site management. ODOT will coordinate internally to identify maintenance needs at the site, and confer with applicable regulators and experts for guidance on species protection. As described in Section 7.1.1, site designations and the need for cautionary signs will also be determined at this time.
3. Implementation. ODOT will implement protections and maintenance practices identified in the site management guidelines, and monitor the site as described in Section 7.2.
4. Status Assessment. As described in Section 7.2.2, ODOT will track the status and trend of each population under the RM-HCP. During this review, activities and processes that are not producing desired results will be discussed and modified as needed. At the site level, this may result in modifications to site management plans. At the program level, this may result in changes in data management or monitoring and reporting standards. If any of these changes has the potential to affect listed plants or animals covered by the RM-HCP, they will be discussed during program review meetings, or on a case-by-case basis if the modification is site-specific.

5. Adjust or revise management as necessary. Status assessments may result in new management decisions. Guidance documents will be updated or amended to document management decisions that will alter site management protocols. As per the “no surprises policy,” additional mitigation will not be required if the site has been managed as presented in this RM-HCP (see Section 1.4.1).

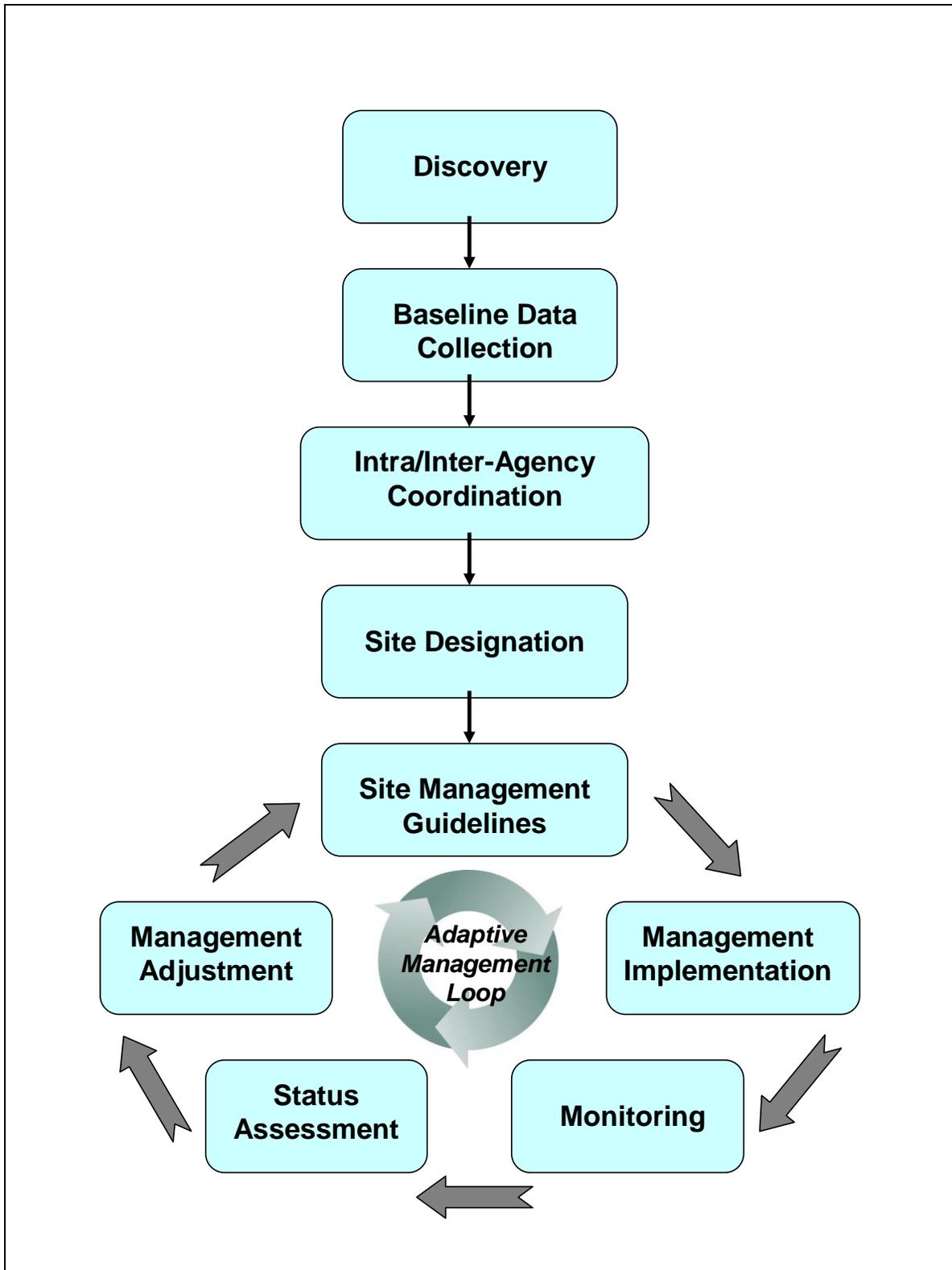


Figure 7-1. Identification and adaptive management of species covered under the RM-HCP for routine roadside maintenance.

7.5 Emergency Response

As one of Oregon’s designated emergency response agencies, ODOT has an important supporting role in emergency response and disaster recovery. A functional transportation system is crucial for getting emergency responders and life-saving supplies where they need to go, and for helping to promote economic recovery after a disaster. ODOT is obligated to respond to emergencies regardless of the presence of protected resources. As described in Section 4.2.4, maintenance activities associated with emergencies may adversely impact listed species, both in documented and undocumented populations

The standard procedure during emergencies is for ODOT to coordinate with applicable regulatory authorities about impacts to protected resources as soon as is feasible after the emergency. If time is not critical, ODOT will defer follow-up emergency response (e.g., repairing guardrail or fences) until after regulatory coordination, and implement resource protections whenever possible. However, public safety is always the first priority and it will dictate the timing and type of follow-up emergency response.

7.6 Roles and Responsibilities

This RM-HCP was developed by an inter-agency committee comprised of managers and program leaders in ODOT’s Maintenance and Operations Branch and Geo-Environmental Section, representatives from ODOT’s Maintenance Leadership Team and Environmental Leadership Team, and representatives from the USFWS Portland Field Office and ODA Native Plant Conservation Program. A similar committee will participate in the program review meetings described in Section 7.3. Stakeholders involved with the development of the RM-HCP are found in Appendix A.

The RM-HCP is coordinated by ODOT’s Highway Division, Technical Services Branch, Geo-Environmental Section. The Maintenance and Operations Branch, also in the Highway Division, initiated and oversaw development of the RM-HCP and is providing funding for some key mitigation measures. ODOT will coordinate internally with applicable stakeholders to ensure that the commitments in this RM-HCP are fulfilled (Table 7-1).

Table 7-1. Summary of ODOT’s roles and responsibilities implementing the RM-HCP.

Activity	Timing
Maintain files of annual reports and geo-database.	Update yearly
Complete Triennial monitoring/Annual Status site check reports.	Monitor every three years; perform Status site checks years in between
Prepare annual program report.	Submit to regulators by March 1 yearly
Hold annual program review meetings.	Determined by RM-HCP Committee
Develop site management guidelines for SMA and RPAs with Covered Species.	For current sites, by completion of RM-HCP; for new sites, within one year of site discovery
Develop and maintain site management plans for SMA and RPAs with Covered Species, reflecting population status and trend, mitigation strategies, and adaptive management.	Ongoing
Implement site protections, mitigation and/or enhancements, as per RM-HCP or as agreed upon in site management documents.	As needed

Activity	Timing
Coordinate to report incidents, including emergency impacts.	As needed

7.7 Funding

Funding for implementation of the RM-HCP falls into four main program areas: administration, site management, mitigation, and monitoring. ODOT forecasted the estimated cost of implementing the RM-HCP for 25 years according to current practices to ensure that appropriate funding remains available.

Administration of the RM-HCP includes staff time to prepare for and attend review meetings, to review site management plans, and to develop annual summary reports. Associated travel expenses may also be necessary. Site management includes time and expenses to implement enhancements at SMA and RMA sites as described in Section 5.4. Monitoring costs include time and expenses for ODOT Region environmental staff to conduct monitoring and site checks, oversee site management, update GIS databases, and prepare site monitoring reports.

Conservation activities and monitoring / management of the RM-HCP sites will be funded from Maintenance and Operations monies, which are almost entirely state dollars.

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APPENDIX A
RM-HCP Stakeholders (through July 2013)

RM-HCP Technical Advisory Committee

Frannie Brindle, ODOT Geo-Environmental Section Technical Services Branch, Natural Resources Unit Manager (until Jan. 2011)

Molly Cary, ODOT Region 2 Tech Center, Environmental Unit Manager

Patti Caswell, Environmental Manager, ODOT Office of Maintenance and Operations, Maintenance Environmental Program Manager (June 2010-current)

Sue Chase, ODOT Office of Maintenance and Operations, Maintenance Environmental Program Manager (until Jan. 2009)

Rebecca Currin, ODOT Native Plant Conservation Program,

Mark Hanson, ODOT Region 5 Tech Center, Bridge-Geo-Hydro-Environmental Manager

Will Lackey, ODOT Office of Maintenance and Operations, Vegetation Management Coordinator

David Leal, U.S. Fish and Wildlife Service Portland Office, Wildlife Biologist and ODOT Liaison

Dr. Christine Maguire, ODOT Geo-Environmental Section Technical Services Branch, Terrestrial Biology Program Coordinator

Dr. Robert J. Meinke, ODA Native Plant Conservation Program, Program Lead

John Raasch, ODOT Geo-Environmental Section Technical Services Branch, Natural Resources Unit Manager (April 2011-current)

Timothy Swift, ODOT Maintenance District 3, Assistant District Manager

Mindy Trask, ODOT Geo-Environmental Section Technical Services Branch, Botany and Monitoring Program Coordinator

Joe Zisa, U.S. Fish and Wildlife Service Portland Office, Land & Water Conservation District, Division Supervisor

ODOT Maintenance Managers

Dan Bacon, ODOT Maintenance District 2C, Assistant District Manager

Michael Buchanan, ODOT Maintenance District 13, District Manager

Patrick Cimmiyotti, ODOT Maintenance District 9, District Manager

Ace Clark, ODOT Maintenance District 12, Assistant District Manager

Ramona Cline, ODOT Maintenance District 5, Assistant District Manager

Patrick Creedican, ODOT Maintenance District 10, District Manager

Thomas Davis, ODOT Maintenance District 14, Assistant District Manager

Robert Ebeling, ODOT Maintenance District 2B, Assistant District Manager

Richard Garrison, ODOT Maintenance District 2B, Assistant District Manager

Richard Garrison, ODOT Maintenance District 2B, Assistant District Manager

Jeremiah Griffin, ODOT Maintenance District 8, Assistant District Manager

Dennis Hackney, ODOT Maintenance District 13, Assistant District Manager

Marilyn Holt, ODOT Maintenance District 12, District Manager

Chris Hunter, ODOT Maintenance District 7, Assistant District Manager

Donald Jordan, ODOT Maintenance District 3, District Manager

Jerry Marmon, ODOT Maintenance Region 3, District Manager

Darrin Neavoll, ODOT Maintenance Region 3, District Manager

David Neys, ODOT Maintenance District 1, District Manager
Larry Olson, ODOT Maintenance District 2C, District Manager
Jacob Peters, ODOT Maintenance District 2B, Maintenance Manager
Joseph Squire, ODOT Maintenance District 4, District Manager
Michael Stinson, ODOT Maintenance District 11, District Manager
Michael Strauch, ODOT Maintenance District 2B, District Manager
David Sutkowski, ODOT Maintenance District 3, Assistant District Manager
Timothy Swift, ODOT Maintenance District 3, Assistant District Manager
David Warren, ODOT Maintenance District 5, District Manager
Kendal Weeks, ODOT Maintenance District 4, Assistant District Manager
Richard Williams, ODOT Maintenance District 10, Assistant District Manager
Paul Woodworth, ODOT Maintenance District 14, District Manager

ODOT Region Environmental Managers

Teresa Brasfield, ODOT Region 4 Tech Center, Environmental Team Leader
George Bornstedt, ODOT Region 5 Tech Center, Bridge/Roadway Unit Manager
Molly Cary, ODOT Region 2 Tech Center, Environmental Unit Manager
Jim Collins, ODOT Region 3 Tech Center, Geo/Environmental Unit Manager
Becky Crockett, ODOT Region 1 Tech Center, Environmental Unit Manager
Randy Davis, ODOT Region 4 Tech Center, Br/Geo/Hydro/Environmental Unit Manager
Mark Hanson, ODOT Region 5 Tech Center, Bridge/Geo/Environmental Unit Manager
Howard Postovit, ODOT Region 5 Tech Center, Environmental Team Leader

Technical Assistance

Jordan Brown, ODA Native Plant Conservation Program, Conservation Biologist
Mikki Collins, U.S. Fish and Wildlife Service, Portland Field Office, Wildlife Biologist
Cash Chesselet, ODOT Geo-Environmental Section Technical Services Branch, Assistant
Biologist
Sam Friedman, U.S. Fish and Wildlife Service, Roseburg Field Office, Botanist
Jennifer R. Getty, ODOT Geo-Environmental Section Technical Services Branch, Assistant
Biologist
Steve Gisler, ODOT Region 2 Technical Center, Region Biologist
Kevin Halesworth, ODOT Region 4 Geo/Br/Environmental Unit, Region Biologist
Jared Jebousek, U. S. Fish and Wildlife Service, Willamette Valley NWR Complex, Fish and
Wildlife Biologist
Christian Jilek, ODOT Region 5 Tech Center, Region Biologist
Dr. Thomas Kaye, Institute for Applied Ecology, Executive Director
Jacob Kercher, ODOT Region 3 Geo/Environmental Unit, Region Biologist
Pamela Porter, ODOT Region 1 Tech Center, Region Biologist
Doug Sharp, ODOT Region 3 Tech Center, Region Biologist
Devin Simmons, ODOT Region 1 Tech Center, Region Biologist
Ian Silvernail, Institute for Applied Ecology, Restoration Ecologist
Steven P. Smith, U. S. Fish and Wildlife Service, Willamette Valley NWR Complex, Private
Lands Biologist
Nicholas Testa, ODOT Region 2 Tech Center, Region Biologist

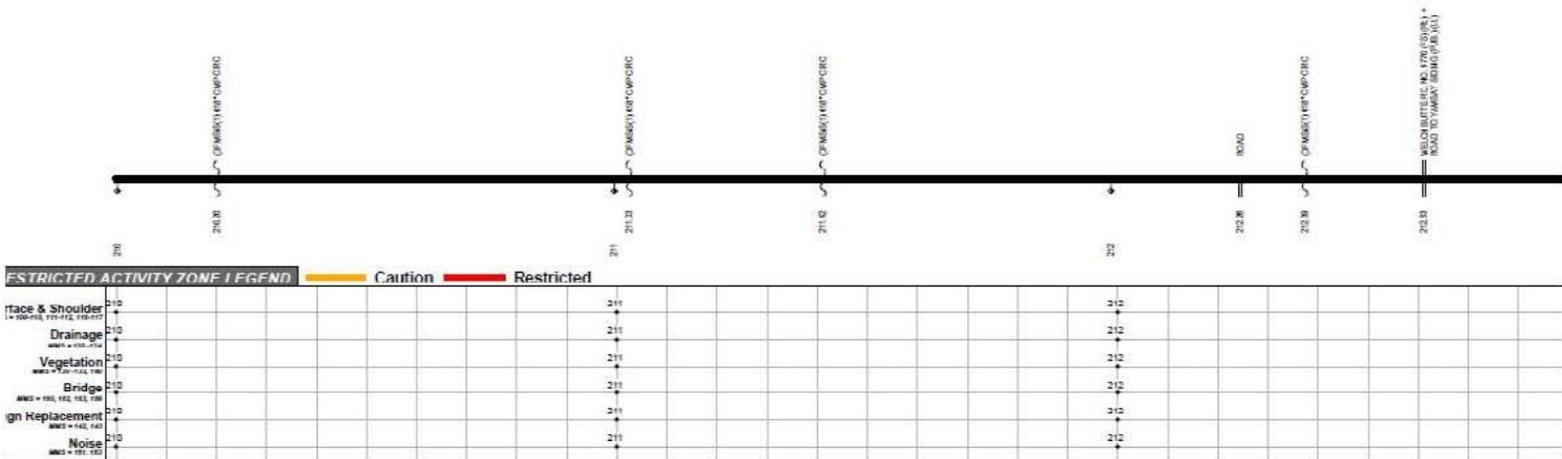
Elizabeth Urand, ODOT Geo-Environmental Section Technical Services Branch, Intern
Biologist
Ryan Woolverton, ODA Plant Conservation Program, Biological Technician
Julie Worsley, ODOT Region 3 Geo/Environmental Unit, Region Biologist

APPENDIX B
References for Available Recovery Plans

Species	Reference
Animals	
Fender's blue butterfly	USFWS. 2010 . Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. USFWS, Portland, OR.
Oregon silverspot butterfly	USFWS. 2001 . Oregon silverspot butterfly (<i>Speyeria zerene hippolyta</i>) revised recovery plan. USFWS, Portland, OR.
Plants	
Applegate's milk-vetch	USFWS. 1998 . Applegate's milk-vetch (<i>Astragalus applegatei</i>) recovery plan. USFWS, Portland, OR.
Bradshaw's desert parsley	USFWS. 2010 . Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. USFWS, Portland, OR.
Cook's lomatium	USFWS. 2012 . Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems. Region 1, Portland, OR.
Gentner's fritillary	USFWS. 2003 . Recovery plan for <i>Fritillaria gentneri</i> (Gentner's fritillary). USFWS, Portland, OR.
Howell's spectacular thelypody	USFWS. 2002 . Recovery Plan for Howell's Spectacular Thelypody (<i>Thelypodium howellii</i> ssp. <i>Spectabilis</i>). USFWS, Portland, OR.
Kincaid's lupine	USFWS. 2010 . Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. USFWS, Portland, OR.
Large-flowered woolly meadowfoam	USFWS. 2012 . Recovery Plan for Rogue and Illinois Valley Vernal Pool and Wet Meadow Ecosystems. Region 1, Portland, OR.
Malheur wire-lettuce	USFWS. 1990 . <i>Stephanomeria malheurensis</i> (Malheur Wirelettuce) Recovery Plan. USFWS, Portland, OR.
McDonald's rockcress	USFWS. 1990 . McDonald's Rock-cress, (<i>Arabis mcdonaldiana</i> Eastwood), Recovery Plan. USFWS, Portland, OR.
Nelson's checker-mallow	USFWS. 2010 . Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. USFWS, Portland, OR.
Rough popcornflower	USFWS. 2003 . Recovery Plan for the Rough Popcornflower (<i>Plagiobothrys hirtus</i>). USFWS, Portland, OR.
Spalding's catchfly	USFWS. 2007 . Recovery Plan for <i>Silene spaldingii</i> (Spalding's Catchfly). USFWS, Portland, OR.
Western lily	USFWS. 1998 . Recovery Plan for the Endangered Western Lily (<i>Lilium occidentale</i>). USFWS, Portland, OR.
Willamette daisy	USFWS. 2010 . Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. USFWS, Portland, OR.

APPENDIX C

Example of ODOT RES/RAZ (Resources / Restricted Activity Zone) Maps



The Restricted Activity Zone (**RAZ**) chart identifies maintenance activities, by Maintenance Management System (**MMS**) code, that are potentially affected by natural resources like stream crossings, wetlands, sensitive species, Special Management Areas, Biology Mitigation and Wetland Mitigation sites. Maintenance staff are advised to focus on Caution and Restricted labeled activities within the RAZ chart. Caution and Restricted activities have been discussed and confirmed during RES/RAZ workshops. Information on the maintenance codes and the associated level of potential restrictions are contained in this document.

Resource Map

Resource Maps (RES) depict natural resource data for inventory and scoping use. The maps are prepared by ODOT Geographic Information Services from data provided by subject matter experts. Resource Map data is comprised of nine layers:

- Bridge structure
- Stormwater Facilities
- Fish Presence
- Fish Presence within 303(d) listed waters
- Sensitive Species
- Wetlands (Within 100' of centerline)
- Wetland Mitigation Sites
- Biology Mitigation Sites
- SMA (Special Management Areas)

The information from these nine layers provides natural resource and maintenance an inventory of features requiring consideration in protecting and orientation for the Restricted Activity Zone map.

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- Fish Presence
- Fish Presence within 303(d) listed waters
- Sensitive Species
- Wetlands (Within 100' of centerline)
- Wetland Mitigation Sites
- Biology Mitigation Sites
- SMA (Special Management Areas)

The information from these nine layers provides natural resource and maintenance an inventory of features requiring consideration in protecting and orientation for the Restricted Activity Zone map.

Restricted Activity Zone Charts

Restricted Activity Zone (RAZ) are maintenance-oriented charts derived from the Resource (RES) Maps, features represented in the Straight Line Chart, input from maintenance personnel and a team of environmental specialists. The RAZ charts show areas of environmental concern and associated restrictions on road maintenance activities. Specific restrictions are discussed and referenced to each highway mile point. The charts are used by maintenance personnel to provide two levels of potential restrictions among six different maintenance activities (see full descriptions of maintenance activities on page five).

Level of Potential Restriction:

- Caution (See RAZ legend for more information on page five)
- Restricted (See RAZ legend for more information on page five)

Routine Road Maintenance Activities:

- Surface & Shoulder (MMS: 100-110, 111-112, 116-117)
- Drainage (MMS: 120-124)
- Vegetation (MMS: 130-133, 160)
- Bridge (MMS: 160, 162, 163, 169)
- Sign Replacement (MMS: 142, 143)
- Activities with potential concern from Noise (MMS: 151, 153)

 - **Sensitive Species** Original dataset is ORNHIC, circa 06/15/2009, and has been clipped to the transportation corridor (500 ft buffer from centerline). Sensitive species includes only those records that are identified in the attribute table as state and/or federally listed threatened, and/or endangered.

 - **SMA** The Special Management Area (SMA) program was developed to protect threatened and endangered species or resources occurring on ODOT-owned lands, statewide. ODOT is working in coordination with ODA in tracking and evaluating SMA features. The SMA boundary, which is the feature used on these maps, is the GPS delineation of the management boundary.

RAZ (Restricted Activity Zone) chart Legend

 **Caution** Potential resource of concern in the area. Proceed according to the IPM Plan or MMS manual. If concerns arise, please contact the Regional Environmental Coordinator.

 **Restricted** Maintenance activities will require some consultation and or clearance from other staff/agencies. This could include, but is not limited to: permit application, biological assessment, or archeological survey prior to work and ground disturbance. Restricted activities could also occur due to seasonal restrictions such as in water work periods. Special Management Areas (SMA's) often result in restricted areas.

APPENDIX D
Current List of RM-HCP Sites

Protected Sites:

Site ID	Site Name	ODOT District	Route	Resource
sm00010	Santiam Interchange	3	I-5	Nelson's checkermallow, cultural
sm00131	Fort Hill	3	OR 22	Nelson's checkermallow, peacock larkspur
sm00011	Ballston Interchange	3	OR-18	Fender's blue butterfly, Kincaid's lupine
sm00012	Ballston West	3	OR-18	Kincaid's lupine
sm00003	Greenwood Road	3	OR-22	Nelson's checkermallow, peacock larkspur
sm00002	Lowes	3	OR-22	Nelson's checkermallow
sm00004	Mill Creek	3	OR-22	Fender's blue butterfly, Kincaid's lupine, Willamette daisy
sm00009	Van Well Road	3	OR-22	Nelson's checkermallow
sm00054	Lafayette	3	OR-99W	Fender's blue butterfly, Kincaid's lupine
sm00006	Rickreall	3	OR-99W	Nelson's checkermallow
sm00020	Kings Valley Hoskins	4	OR-223	Kincaid's lupine
sm00016	Labare Road	4	OR-223	Kincaid's lupine
sm00017	McTimmons North	4	OR-223	Nelson's checkermallow
sm00015	McTimmons South	4	OR-223	Fender's blue butterfly
sm00014	Decker Road	4	OR-34	Peacock larkspur
sm00056	Rock Cr	4	OR-34	Fender's blue butterfly
sm00111	Stouder Way (Bounds)	4	OR-34	Fender's blue butterfly, Kincaid's lupine
sm00112	Westwood	4	OR-34	Peacock larkspur
sm00129	Witham	4	OR-34	Kincaid's lupine
sm00013	Corvallis Bike Path	4	OR-99W	Peacock larkspur
sm00019	Peavy Arboretum	4	OR-99W	Nelson's checkermallow
sm00021	Camas Swale West	5	I-5	Bradshaw's lomatium
sm00024	Fern Ridge Reservoir	5	OR-126	Bradshaw's lomatium, Willamette daisy
sm00028	Fisher Road	5	OR-126	Fender's blue butterfly, Kincaid's lupine
sm00029	Hacienda	5	OR-36	Kincaid's lupine
sm00025	Dillard Road	5	OR-99	Bradshaw's lomagium, Willamette daisy
sm00027	Big Creek	5	US-101	Oregon silverspot butterfly
sm00117	Curtis Creek	7	I-5	Wayside aster
sm00055	Wilbur	7	I-5	Rough popcorn flower
sm00033	Yoncalla 1 (south)	7	I-5	Rough popcorn flower
sm00064	Yoncalla 2 (interchange)	7	I-5	Rough popcorn flower
sm00065	Yoncalla 3 (north)	7	I-5	Rough popcorn flower

Site ID	Site Name	ODOT District	Route	Resource
sm00118	East Glide	7	OR-138	Wayside aster
sm00130	Cape Arago	7	OR-540	Western lily
sm00031	Harris Bog	7	US-101	Western lily
sm00030	Hauser Bog	7	US-101	Western lily
sm00113	Ophir	7	US-101	Silvery phacelia
sm00032	Pistol River North	7	US-101	Wolf's evening primrose
sm00040	Pistol River South	7	US-101	Silvery phacelia
sm00034	Grants Pass	8	I-5	Gentner's fritillary
sm00039	Rogue River	8	I-5	Gentner's fritillary
sm00036	Agate Desert	8	OR-140	Woolly meadowfoam, agate desertparsely
sm00108	Rough & Ready 1 (north)	8	OR-199	Howell's microseris
sm00126	Rough & Ready 2 (south)	8	OR-199	Howell's microseris
sm00038	Caves Hwy	8	OR-46	Agate desertparsley
sm00035	Danna Lytjen	8	US-199	Agate desertparsley
sm00109	Fred Ashley	9	OR 141	Tygh Valley milkvetch
sm00043	South Juniper	9	OR-216	Tygh Valley milkvetch
sm00041	North Juniper	9	US-197/OR-216	Tygh Valley milkvetch
sm00042	Wapanita Rd	9	US-197/OR-216	Tygh Valley milkvetch
sm00128	Diamond Lake Junction	10	US-97	Peck's milkvetch
sm00121	Donaldson	12	OR-206	Laurent's milkvetch
sm00120	Hardman	12	OR-207	Laurent's milkvetch
sm00123	Dixie	12	OR-74	Laurent's milkvetch
sm00061	Franklin Hill	12	OR-74	Laurent's milkvetch
sm00122	Hog Hollow	12	OR-74	Laurent's milkvetch
sm00125	Jones Hill	12	OR-74	Laurent's milkvetch
sm00060	Lena	12	OR-74	Laurent's milkvetch
sm00062	Nye Junction	12	OR-74	Laurent's milkvetch
sm00050	Bidwell	13	I-84	Howell's spectacular thelypody
sm00070	Ladd Canyon	13	I-84	Oregon semaphoregrass
sm00051	N Powder River	13	I-84	Howell's spectacular thelypody
sm00051	N Powder River	13	I-84	Howell's spectacular thelypody
sm00052	Rodeo	13	US-30	Howell's spectacular thelypody
sm00106	Moores Hollow	14	I-84	Cronquist's stickseed
sm00116	Narrows	14	OR-205	Malheur wirelettuce
sm00105	Vale	14	US-20	Cronquist's stickseed
sm00104	White Settlement	14	US-26	Cronquist's stickseed
sm00001	Willamette Falls	2B	I-205	White rock larkspur

Decommissioned Sites:

Site ID	Site Name	District	Route	Resource
sm00053	Yamhill	3	OR-47	Nelson's checkermallow ¹
sm00063	Fern Creek	4	OR-223	Nelson's checkermallow ¹
sm00110	Newton-Marys	4	OR-34/20	Peacock larkspur ¹
sm00100	Great Cats	8	US-199	Agate desertparsley ¹
sm00047	Tumalo 1	10	US-20	Peck's milkvetch ¹
sm00066	Tumalo 2	10	US-20	Peck's milkvetch ¹
sm00067	Tumalo 3	10	US-20	Peck's milkvetch ¹
sm00068	Tumalo 4	10	US-20	Peck's milkvetch ¹
sm00069	Tumalo 5	10	US-20	Peck's milkvetch ¹
sm00049	Mud Creek	11	OR-140	Oregon semaphoregrass ²
sm00048	Warden	11	US-97	Applegate's milkvetch ²
sm00058	S Powder River	13	I-84	Howell's spectacular thelypody ²
sm00057	Warm Springs	13	US-30	Howell's spectacular thelypody ²

1. Population too small and/or site too disturbed to be valuable for species recovery. ODOT will offset with mitigation.

2. Species not present on ODOT right-of-way.

APPENDIX E Current Template Monitoring/Site Check Report



Rare Plant Monitoring Data

Print Form

Env. Site ID:

Site Name: Survey Date(s):

Species Monitored (Scientific Name or CODE):

Data Collector (Name/Title): Contact Info. (Phone or E-mail):

Other Surveyors (Name/Title/Agency):

Species Found? Check if Yes. If No, Reason:

Site Location *(complete only if new site or Env. Site ID not provided)*

Route/Road: MP (start): MP (end): Side:

County: ORBIC EO_ID:

Directions to Site or other Access Info:

Monitoring Methods Same as Baseline?

Overall Method: Census Visual Estimate Sampling Other:

What was the Unit Measured? *(i.e., what does the count unit represent)* Distinct Plants Stems Clumps or Clusters Leaf Area

What Life Stages Were Included? All Individuals Reproductive Only All But Seedlings

Source of Species Identification:

Other Methodology Info:

Results *(if different data or more rows needed, attach additional data form and summarize here)*

Plot or Patch ID	Count	Units	% Cover (optional)	Plot Dimensions (& units)	Notes
		<input style="width: 40px;" type="text"/>			
		<input style="width: 40px;" type="text"/>			
		<input style="width: 40px;" type="text"/>			
		<input style="width: 40px;" type="text"/>			
		<input style="width: 40px;" type="text"/>			
		<input style="width: 40px;" type="text"/>			
Site Total (required)		<input style="width: 40px;" type="text"/>			

Population Monitoring Notes:



SMA Inspection Report

Print Form
Env. Site ID:

Observation Date:

Data Collector (Name/Title): Contact Info. (Phone or E-mail):
 Other Surveyors (Name/Title/Agency):

Site Information

Site Name: County:
 Route/Road: MP (start): MP (end): Side: Both
 Species1 (Scientific Name or CODE):
 Observed? Check if Yes. If No, Reason:
 Species2 (Scientific Name or CODE):
 Observed? Check if Yes. If No, Reason:

Observations

Feature (circle which apply)	SMA Proximity	Magnitude	Suspected Cause	Recommended Action	Date Addressed
Browse/Herbivory or Other Animal Disturbance	<input type="text"/>				
Clearing/Grading	<input type="text"/>				
Drainage/Water Problems	<input type="text"/>				
Erosion	<input type="text"/>				
Fence or ROW Breach	<input type="text"/>				
Herbicide Spray	<input type="text"/>				
New/Expanded Access	<input type="text"/>				
Noxious Weeds or Other Invasives	<input type="text"/>				
SMA Sign Problems	<input type="text"/>				
Vehicle Tracks	<input type="text"/>				
Other: <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments:

Weed Information (optional)

Species	Weed List	Relative Abundance	% Cover (optional)	Recommended Action
<input type="text"/>				
<input type="text"/>				
<input type="text"/>				
<input type="text"/>				

APPENDIX F
ODOT Routine Road Maintenance Water Quality and Habitat Guide
Best Management Practices (aka Blue Book)

http://transnet.odot.state.or.us/hwy/mob/Shared%20Documents/pdf/blue_book.pdf

APPENDIX G
IGA with Oregon Department of Agriculture

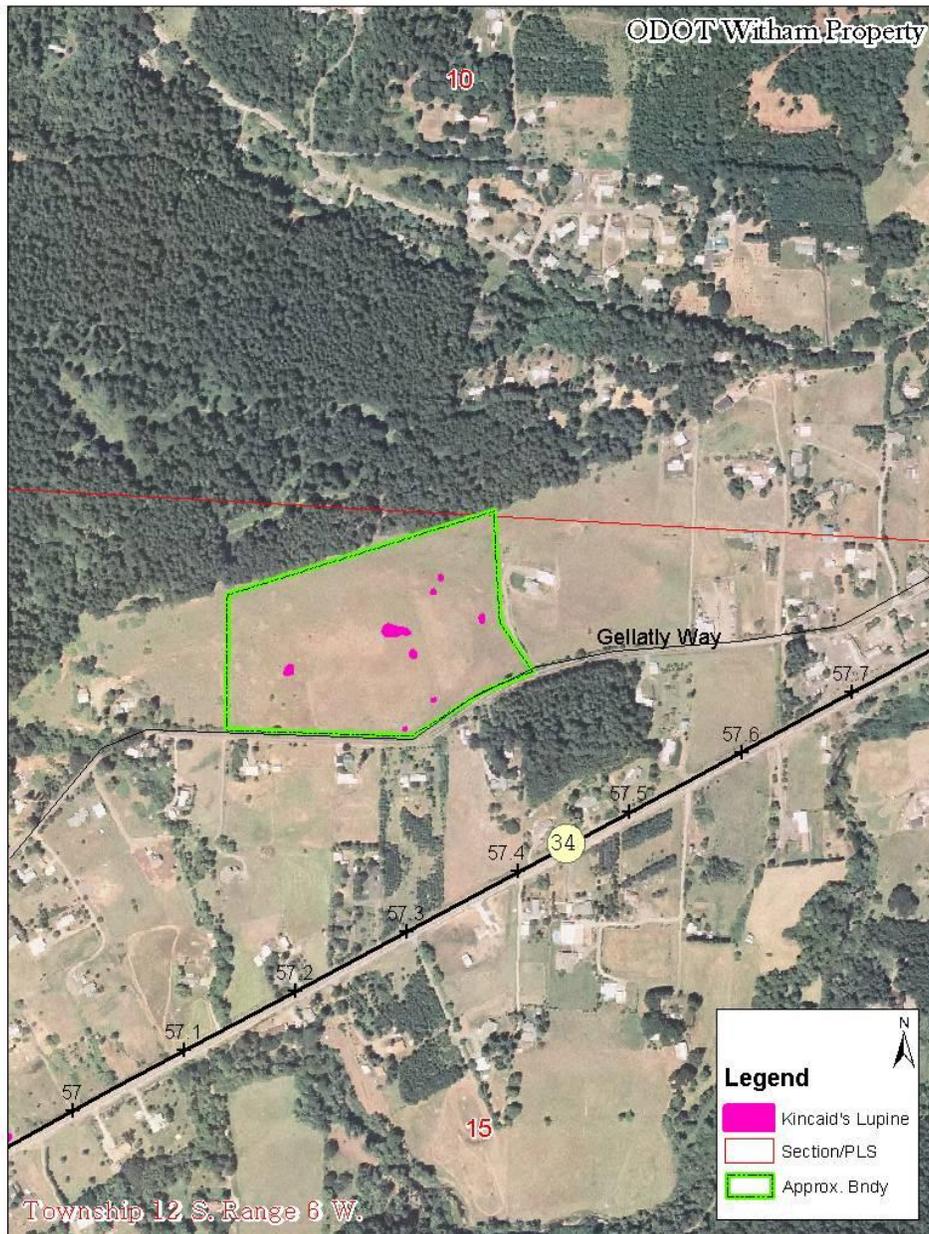
APPENDIX H
Witham – Gellatly Prairie Site Restoration Plan

Oregon Department of Transportation
Management Plan for Witham-Gellatly Prairie

Background

The Witham-Gellatly Prairie was purchased by ODOT to fulfill a conservation obligation of the OTIA III Biological Opinion for the Fender's Blue Butterfly (FBB; USFWS #8330.2233(04) as amended). The 8.17 hectare (20.2 acre) property is located in Benton County, off of OR-34 (see Figure 1). In a letter to USFWS (May 3, 2011), ODOT indicated that they met the OTIA III Program's conservation obligation through the purchase and permanent conservation of the property and the commitment to install fencing to exclude livestock grazing. However, the site is in need of restoration to function as FBB habitat (described below).

Figure 2. Location of the Witham-Gellatly Prairie.



ODOT is proposing habitat restoration as advance mitigation for impacts to Kincaid’s lupine and FBB due to maintenance activities covered by the ODOT Maintenance Habitat Conservation Plan (MHCP; under development). We anticipate the need to mitigate for direct impacts to FBB host habitat, indirect and direct impacts to its nectar habitat, and direct take of Kincaid’s lupine plants (Table 1). The short-term goal of the proposed habitat restoration is to increase the cover of Kincaid's lupine (FBB host plant) and nectar species. In the longer-term, if the lupine population becomes large enough, the site could support FBB, possibly with the help of augmentation.

Table 1. Known Fender’s blue butterfly (FBB) and Kincaid’s lupine habitat on ODOT right of way, and potential MHCP impacts (Benton, Lane, Polk, and Yamhill Lane Counties).

Resource	Amount	Notes
Known Populations & Habitat		
Total Known Host Population	2,070 m ² (22,267 ft ²)(foliar cover); 2.35 ha (5.80 ac) of occupied habitat	5 SMAs (Mill Creek/Buell, Balston Interchange, McTimmons 1, Bounds, Fisher Rd.); foliar cover (leaf area) of LUORKI, LUAR, LUAL and total polygon area of mapped lupine populations.
Total Nectar Zone	31.1 ha (76.8) acres of ROW	ODOT ROW within 0.31 mile buffer around known FBB occupied SMAs, ORNHIC FBB sites, and FBB critical habitat.
Total Kincaid’s Lupine Populations	1,391 m ² (14,974 ft ²); 2.12 ha (5.24 ac)	9 SMAs (Mill Creek/Buell, Balston Interchange, Balston West, Lafayette, La Bare, Hoskins, Bounds, Fisher, Hacienda); none are within Critical Habitat.
Potential HCP Impacts		
Direct Impacts to FBB Host Plants	400 m ² (4,304 ft ²)(foliar cover); 0.30 ha (0.73 ac) occupied habitat	Known anticipated impacts within operational roadway of above SMAs plus potential unknown (3% of total ODOT population).
Indirect Impacts to FBB Native Nectar Habitat	0.45 ha (1.11 ac) occupied habitat	Known anticipated, calculated as 1.36% average nectar species occupancy in ODOT unpaved ROW in nectar zone (0.5 km from known FBB sites), plus potential unknown (3% of total ODOT population); based on Benton County HCP method.
Direct Impacts to Kincaid’s Lupine	290 m ² (3,129 ft ²)(foliar cover); 0.44 ha (1.09 ac) occupied habitat	Known anticipated impacts within operational roadway plus potential unknown (3% of total ODOT population).

The main goal for this site is to create high quality upland prairie that can contribute to the recovery of FBB as part of the Greasy Creek functioning network in the Corvallis recovery zone (Table IV-1 in the Recovery Plan; USFWS 2010), by increasing the cover of the butterfly's host plant (Kincaid's lupine) and nectar species. Existing site information, background research, and mitigation goals were all considered to develop the following short-term restoration objectives for this site (3-5 years):

1. Maintain the meadow habitat (prevent encroachment woody species). The target is less than 15% cover of woody species.
2. Reduce dominance of non-native and invasive plants. The target is less than 60% cover of non-native vegetation.

3. Increase cover of native nectar plant species for FBB (see Crone and Kallioniemi 2009 or current guidance from USFWS on acceptable species). The target is to offset MHCP direct and indirect impacts to FBB nectar habitat at a 3:1 ratio (as requested by Mikki Collins, USFWS). This translates to at least 1.35 ha (3.3 ac) cover of native nectar species; this target will be met if 6.7 ha (16.5 ac) of the site achieves 20% cover of native nectar species, or if 4.5 ha (11 ac) of the site achieves 30% cover of nectar species. (Note, current guidance is at least 20 mg/m² nectar habitat; targets and standard practices for measuring nectar habitat may be adjusted depending on guidance from USFWS.)
4. Increase the cover of FBB host plant species, Kincaid's lupine. The target is to offset MHCP direct impacts to FBB host habitat at a 3:1 ratio (as requested by Mikki Collins, USFWS). This translates to a combined total of at least 0.9 ha (2.19 ac) of habitat occupied by Kincaid's lupine, 1,200 m² (13,000 ft²) of foliar cover. (Note, current guidance is an average of at least 30 leaves / m² (=2.8 leave/ft²) to support FBB; target and standard practices for measuring Kincaid's lupine and FBB host habitat may be adjusted depending on guidance from USFWS.)

Although the targets described above are to offset MHCP impacts to FBB, increasing the host plant will also offset some of the MHCP impacts to Kincaid's lupine. The remainder of MHCP impacts to Kincaid's lupine will be mitigated at existing SMAs (primarily Fisher Road, Lafayette, and Mill Creek), through habitat enhancements that are expected to increase the cover of the species. Part of adaptive management involves reconsidering the objectives and targets if it appears that they are unrealistic or based on new information on FBB habitat.

If the site achieves these targets, it will be an important stepping stone and component of the Greasy Creek functioning network (USFWS 2010, Appendix D). According to the Recovery Plan, 6 ha (15 ac) is the suggested minimum patch size to support an independent population of FBB. Smaller patches less than 1000 m (0.6 mi) apart can be part of a functioning network of important stepping stone patches of host lupine habitat. This site is located in the Greasy Creek functioning network in the Corvallis recovery zone (Table IV-1 in the Recovery Plan; USFWS 2010). To allow for restoration work to take effect and plant growth, these targets are best evaluated at least five years after seeding. However, as described below, they can be reviewed earlier to evaluate progress (best professional judgment of whether or not the site is approaching the targets). Nectar habitat is measured based on amount of sugar available for the butterfly, which can be estimated from percent cover (Crone and Kallioniemi 2009).

Site Information

The 8.17 ha (20.2 ac) Witham-Gellatly Prairie is located in rural Benton County southwest of the city of Philomath, Oregon. The southern boundary of the parcel is along Gellatly Way, to the north of OR-34 (Township 12 S, Range 6W, S of Sec. 10 and N of Sec. 15; see Figure 1). The dry, open meadow habitat has been intensively grazed by cattle for many years. It is surrounded by coniferous forest to the north and open meadow/grazing and rural residential properties on the remaining sides. The native topsoil is silty clay loam to clay loam, with moderate to high water holding capacity (USDA 2012). ODOT biologists surveyed the site in spring 2011 and mapped 10.6 m² (115 ft²) of Kincaid's lupine. The eastern half of the site appears to have a fair composition of native forbs, while the western half is dominated by invasive annual grasses, particularly (e.g., medusahead [*Taeniatherum caput-medusae*], bristly dogstail grass [*Cynosurus*

echinatus], and sixweeks fescue [*Festuca myuros*]). Prior surveys by FWS and others have never detected FBB at the site, and presence is doubtful in the current situation because of the low quantity of host plants.

Background and Literature Review

The plan by ODOT (OTIA III Program) to fence and excluding cattle grazing are necessary to protect Kincaid's lupine, allow native plants to become established. In fact, the USFWS has indicated that this is their most important short-term objective due to the potential impact to FBB, if present in the area (it was not found at this site in two years of searches, but Steve Smith with the USFWS speculates that may in part be due to the presence of cattle; email communication with M. Trask, 9/20/2011). Removing grazing without a restoration strategy may have adverse consequences for the existing Kincaid's lupine and FBB habitat. Although the agricultural use of the property has fostered the spread of some very invasive annual grasses (e.g., medusahead, bristly dogstail grass, sixweeks fescue), the grazing is effectively keeping down the inevitable encroachment of woody plants and even noxious weeds. The site is currently dominated by non-native and invasive species that would likely spread and out-compete native forbs and probably also Kincaid's lupine if not controlled. Therefore, to meet the objectives listed above, the proposed management program consists of aggressive initial treatments for weed control, native plantings, and regular mowing.

The timing of excluding cattle, weed control treatments, planting and mowing must be coordinated to optimize native species recovery (Stanley et al. 2010; Boyer 2010). Institute for Applied Ecology (IAE; Stanely et al. 2010) and Lynda Boyer are considered experts in upland prairie restoration in the Willamette Valley, and they stress the need for repeated and aggressive weed control treatment before native seeding to address invasives in the seed bank.

The best approach to retain native species and remove non-natives is a combination of burning, herbicide treatment and seeding. However, if burning is not feasible, IAE found that Sethoxydim (a grass-specific herbicide) combined with fall mowing reduced non-native grasses and increased native plant abundance, but only with seeding (Stanley et al. 2010). However, Boyer stressed that using a grass specific herbicide alone where there is an existing problem with non-native forbs will result in greater density of the non-native forbs than previously (Boyer 2010). In sites with very little native component, Boyer recommends herbicide (glyphosate) for at least two seasons and three times per year (early spring, summer, fall) to kill all existing vegetation. IAE found that mowing was ineffective at reducing weed abundance, and negatively impacted some natives depending on timing. However, this may be initial site preparation only, because Wilson and Clark (2001) found that mowing at the appropriate season and height can work to control tall oatgrass, an aggressive non-native perennial grass. In areas without Kincaid's lupine, they recommend late spring mowing, but when Kincaid's lupine and FBB are present, mowing should be delayed until the plant has gone dormant (late-summer/early fall).

Proposed Site Restoration Plan

On January 30, 2012, ODOT met with local restoration experts Tom Kaye (Ecologist with IAE) and Steve Smith (USFWS Willamette Valley Wildlife Refuge Complex [WVRC] manager) to discuss options and finalize the site restoration plan, and with WVRC's fire specialist Frank Conner and biologist Jarod Jebousek on May 11, 2012. Rather than timely experimental

treatments, the proposed strategy involves five years of intensive restoration activities, monitoring each year, and modifying the strategy based on effects. The restoration is focused on weed control and native seeding. Even though annual grasses appear to be the most significant problem, non-native and potentially highly invasive forbs may become a problem in the absence of grazing. Since cattle exclusion is the most important objective to USFWS, the restoration activities are scheduled around the cattle exclusion/removal in May 2012.

Table 2 presents the proposed schedule of activities to achieve mitigation goals, along with cost estimates. The budget of the 3-5 year mitigation effort is approximately \$120,000. In general, original costs of mitigation will be funded by the Office of Maintenance while monitoring will be funded by the Geo-Environmental SMA monitoring budget. Once original mitigation is complete, annual site management (e.g., mowing and spot spraying weeds, corrective work as needed) will be funded as all other ODOT natural resource mitigation site maintenance, with statewide funds managed by the Geo-Environmental Section.

Table 2. Witham-Gellatly Prairie restoration plan & budget. (updated 12/2013)

Action	Schedule	Cost Estimate	Notes
Fence and property boundary survey	Spring 2012 (Complete)	\$150,000	Completed by OBDP managed by OTIA III.
Broadcast spray western 10-acres, broad-spectrum herbicide	Fall 2011 (Complete)	\$800	Too late in season so not very effective. Flagged Kincaid's lupine for avoidance. Herbicide, Glyphosate in a 1.5% solution with surfactant (crop oil) (Stanley et al. 2010).
Spot spray H. blackberry	Fall 2011 (Complete)	\$400	Existing large patches.
Install fencing & exclude cattle (entire parcel)	May 2012 (Complete)	see above	Wildlife friendly fence (3-strand wire) & access gate; part of OTIA III mitigation.
Baseline vegetation surveys & Coordination	June 4-8, 2012 (Complete)	\$5,000	Sampled 1-m ² plots randomly located in each 0.1 ac grid cell. In each plot, estimated percent cover of species groups (e.g., annual forbs) and recorded frequency of all species observed. In each grid cell, counted flowering units of native nectar species (per recent USFWS guidance) and mapped locations.
Develop planting contract	2012 (Complete)	\$500	ODOT contract with IAE for restoration support and implementing planting activities.
Summarize and evaluate baseline data & Coordination	2012 (Complete)	\$5,000	Determine if there are hot spots for invasive or nectar species, species diversity and richness, and update species list.
Update site restoration plan	2012 (Complete)	\$500	ODOT, IAE, other stakeholders
Complete IAE restoration contract	Fall 2012 (Completed Jan. 2013)	\$72,000	Primarily acquire and plant native seeds.

Action	Schedule	Cost Estimate	Notes
IAE restoration contract contingency	Fall 2012 (Contingency approved 10/7/2013 &)	\$13,500	Optional contingency for site preparation, flame torch, and herbicide treatments.
Transplant certain natives	Feb. 2013 (Complete)	\$1,000	Wyethia, Lomatium, Potentilla. Move from Treatment areas B and C to A.
Demarcate Treatment Areas B-1 and C	Feb. 2013 (Complete)	\$250	All LUORK, most Eriophyllum, and other areas to be protected from Treatments in A and B. Mark with stakes and GPS.
Grass-specific herbicide* treatment in Areas C; Broad spectrum herbicide treatment** in Areas A and B	Early Spring 2013 (Completed in April 2013)	\$1,800	To be completed by ODOT or under contract; *Poast and Metholated Seed Oil (MSO), **Aquaneat or Glyphosate and MSO. ODOT covered LUORK plants with cardboard to protect plants from spray.
Monitoring and Coordination	Summer 2013 (Completed in July 2013)	\$5,000	For effectiveness of treatments and need for erosion control.
Erosion control (potential)	Late Summer 2013 (Not needed/not conducted)		Erosion control as needed (hydromulch or blue wildrye straw); need and locations depend on conditions. To be completed by ODOT or under contract.
Gopher control	Fall-Winter 2013	\$2,000	ODOT to contract with Wildlife Services (Chris Lulay). Unique species (Camas gopher), so Wildlife Services is collecting/freezing specimens; up to 24 to go to Dr. Clint Epps, OSU. Chris is flagging locations of trap holes & ODOT will GPS map for subsequent evaluation of LUORK impacts.
Additional treatment for all Areas	Fall 2013 (Completed Nov. 2013)	See contingency	Spot spray native reveg. Units, targeted spot spray broad spectrum herbicide in blackberry, rose and field bindweed patches. To be completed by IAE.
Remove brush piles	Fall-Winter 2013	\$500	Burn and/or clearing. To be completed by IAE.
Grass-specific herbicide treatment in Areas C; Broad spectrum herbicide treatment in Areas A and B	Early Spring 2014	See contingency	To be completed by IAE; mixture TBA. ODOT to coordinate protection of LUORK and possible ODA permit.
Gopher control	As needed 2014	\$2,000	ODOT to contract with Wildlife Services. Unique species (Camas gopher), so Wildlife Services is collecting/freezing specimens; up to 24 to go to Dr. Clint Epps, OSU.
Broad spectrum herbicide treatment in Areas A and B (potential)	Early Summer 2014	See contingency	As needed for re-growth; To be completed by IAE; mixture TBA. ODOT to coordinate protection of LUORK and possible ODA permit.

Action	Schedule	Cost Estimate	Notes
Monitoring & Coordination	Summer 2014	\$5,000	For effectiveness of treatments and need for erosion control and additional treatments. This monitoring will determine if seeding to occur in 2014 or if to be delayed and another year of herbicide treatment needed.
Erosion control (potential)	Late Summer 2014	not anticipated	Erosion control as needed (blue wildrye straw); need and locations depend on conditions. To be completed by ODOT or under contract.
Review IAE's planting plan	Summer 2014	\$200	Due 2 months prior to initial planting (see Amendment 1)
Additional treatment for all areas (potential)	Fall 2014	See contingency	Spot spray native reveg. Units, targeted spot spray broad spectrum herbicide in blackberry, rose and field bindweed patches. To be completed by IAE.
Native forb/grass planting (potential)	Nov-Dec 2014	See contract	IAE contract. Amount/locations TBA. Possibly delay until same time 2014. ODOT to obtain ODA take permit.
Additional herbicide treatment (potential)	Early Spring 2014	See contingency	Depends on site conditions. To be completed by IAE; mixture TBA. ODOT to coordinate protection of LUORK and possible ODA permit.
Gopher control	As needed 2015	\$2,000	ODOT to contract with Wildlife Services. Probably no longer need to save specimens.
Monitoring & Coordination	Summer 2015	\$5,000	For effectiveness of treatments and adaptive management.
Spot spray problem areas	Summer/Fall 2015	See contingency	As needed, by IAE.
Native forb/grass planting	Nov-Dec 2015	See contract	ODOT-managed contract for seed procurement/drill seeding and/or planting. Amount/locations TBA.
Mowing, controlled burn, spot spray weeds, and planting as needed	TBA		For effectiveness of treatments and adaptive management.
Monitoring	Summer 2016 and yearly up to 4 yrs after final seeding	\$25,000	Effectiveness monitoring, community species composition, entire site, at peak flowering season.
Transfer site to a land steward	Unknown		Must require permanent conservation and continued site management to maintain objectives.

The duration of the proposed habitat enhancement work is two to three years of intensive site restoration, with adaptive management that may extend the duration another year or two. Part of adaptive management involves reconsidering the objectives and targets if it appears that they are unrealistic or based on new information on FBB habitat. The ODOT Geo-Environmental Section and/or the Office of Maintenance will oversee contracts for herbicide treatment services and professional botanical services for acquiring and installing native plant materials. The Geo-Environmental Section will also oversee a technical advisory committee to help implement the best possible restoration activities and adaptive management.

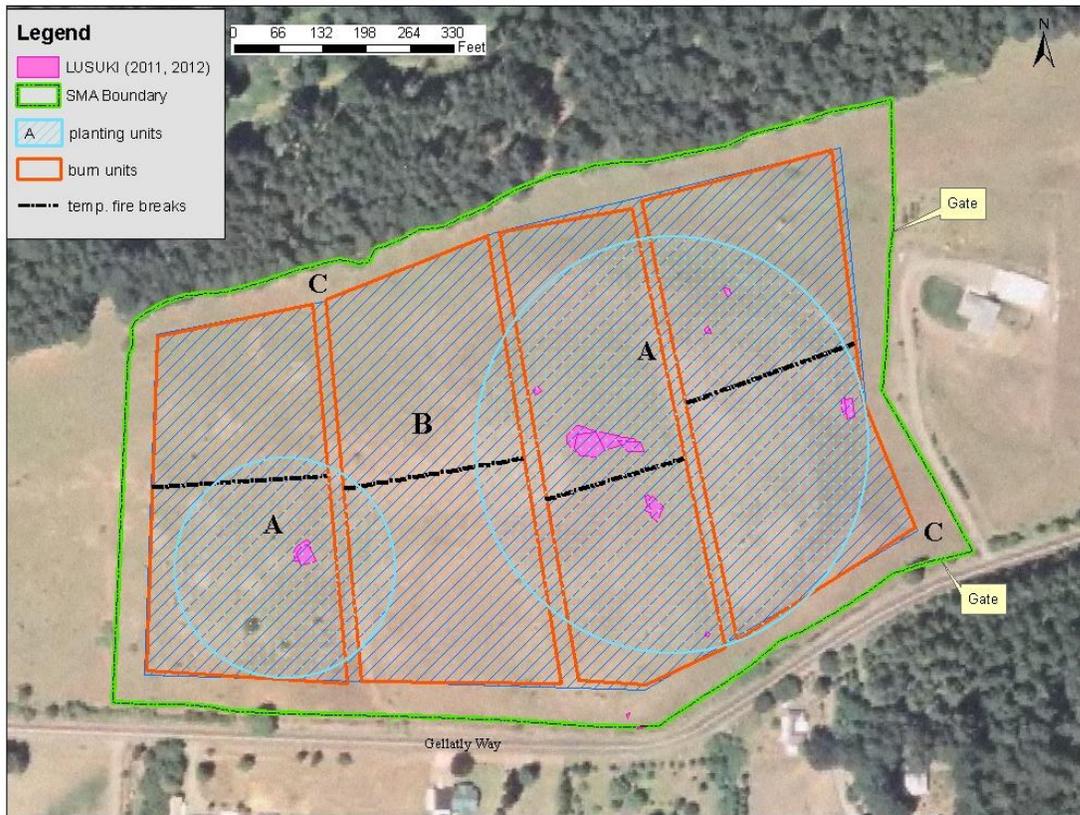
ODOT is interested in transferring the deed of the property to a more suitable land steward with the requirement that the site must be retained in conservation status and maintained as functional network for FBB, in perpetuity. The USFWS WVRC is working on protocols for purchasing and managing conservation lands in the Willamette Valley, and ODOT's Witham-Gellatly property is one of the target sites. However, as long as ODOT owns this property, we will continue to manage the site to retain the site objectives. That will include mowing and spot spraying weeds at least every two years, cooperating with the USFWS to conduct prescribed burns or raking (timing TBA based on results during initial site restoration), and after the initial site restoration/effectiveness monitoring efforts, ODOT will monitor the FBB habitat and Kincaid's lupine population every three years.

Planting Units

In cooperation with stakeholders, ODOT will identify planting units, revegetation goals, planting rates and planting establishment success criteria, and hire a specialist to develop a detailed planting plan and install the plant materials. For contract scoping purposes, the planting plan will assume the following revegetation goals and objectives (to be modified based on consultant's planting plan and stakeholder feedback):

- Planting in the late fall after herbicide treatments.
 - Establishment success evaluated 6 months after planting.
- Burn treatments no longer feasible options during mitigation work.
- Three main planting units to be developed, likely associated with nectar habitat located within proximity to host habitat (50-m from Kincaid's lupine; see Figure 2):
- Unit A - Fender's blue butterfly nectar habitat (2 areas, total approx. 4.0 ha [10 ac])
 - Seed and/or plugs.
 - Revegetation goal: At least 60% diversity local/native forbs and grasses, of which at least 5 species are nectar species for Fender's blue butterfly; at least 20 mg/m² nectar habitat 4 years after final planting.
 - Application rate: Total seed coverage, 450-550 PLS/m² (~40-50 per ft²); if plugs are used, total plug density, 45-65 plants/m² (~4-6 per ft²); rates to be adjusted if both are used.
 - Contract success criteria: Avg. established plant density 25-35 plants/m² (2-3 per ft²); at least 50% diversity of natives that includes at least 5 nectar species and at least 10 mg/m² nectar habitat.
- Unit B - Upland meadow (approx. 3.2 ha [8 ac])
 - Seed only.
 - Revegetation goal: At least 40% relative cover local/native forbs and grasses.
 - Application rate: Total seed coverage, 350-450 PLS (30-40 per ft²).
 - Contract success criteria: Avg. established plant density 15-25 plants/m² (1-2 per ft²), at least 40% natives.

Figure 3. Preliminary site plan.



Monitoring Plan

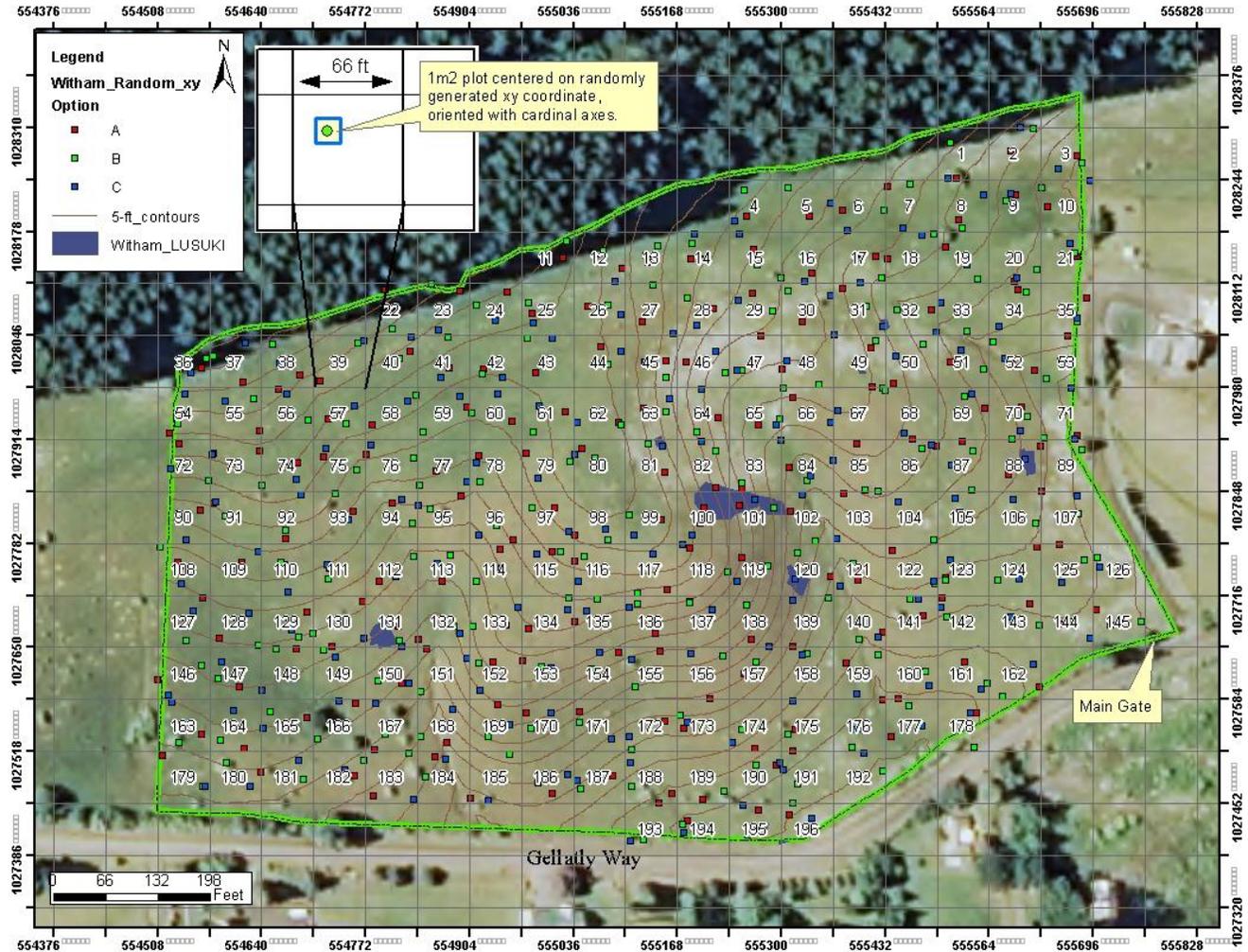
During the site restoration and plant establishment period, vegetation composition will be monitored each year to evaluate effectiveness and re-evaluate the proposed management strategy. A modified version of the USFWS standard method approved for Safe Harbor Agreements will be used (entails establishing a grid in GIS, using GPS to locate each cell, and estimating vegetation cover within each cell). This will be set-up before the 2012 baseline surveys and implemented at monitoring periods at the peak flowering season.

The overall monitoring strategy involves measuring vegetation composition in each of 400 m² (0.1 ac) grid boxes (dimension of each full sized box is 20 m [66 ft] on each axis). The 400 m² (0.1 ac) grid method was recommended by Steve Smith, USFWS Willamette Valley Refuge Complex Manager because it is a common plant community inventory method utilized by USFWS and ODOT may ultimately transfer ownership of this site to the USFWS. The USFWS recommends visually estimating percent cover of each species within the grid, but since this method is highly subjective and would be difficult to evaluate change over time, the proposed methodology involves a modification utilizing both cover and frequency sampling.

There are approximately 170 full-sized grid-boxes onsite, plus 25 that are at least ½ the area of a full-sized box (Figure 3). Actual number of grid-boxes will be adjusted after final fence survey. A meter-square (3-ft 3-in on each side) plot will be randomly located within each grid-box,

selected based on random generation of lat/long xy coordinates. A minor amount of subjectivity will be necessary to re-select a random location if the first location is not considered representative (e.g., within one of the few highly eroded swales, almost completely dominated by an uncommon species such as Himalayan blackberry, Douglas fir, wood's rose, etc.). Alternate random points are shown on Figure 3.

Figure 3. Lay-out for monitoring grid and sample plots.



Although the grid is a permanently located feature (based on the NAD 1983 Oregon Statewide Lambert Feet Intl coordinate system), the location of sampling plots will not be permanently marked. This is because of the physical challenges marking and re-locating permanent plots on a site that will be undergoing manipulation (fire, drill seeding, etc.). Permanent plots are typically used to track change over time. However, random plots can also adequately record change over time in fairly uniform sites such as this and provided evaluation of a sufficient number of sample plots. At least with the baseline monitoring, there should be no problem meeting a minimum sample size for analysis because of the overall uniformity of the site and high number of grid boxes. Additional sampling plots can be added within each grid-box as needed to track treatment effects if sample size becomes a problem in the analysis.

Variables recorded within each sampling area include cover estimates of major vegetation groups, bare ground and litter, frequency of each plant species observed, and any other prominent features (vehicle tracks, logs, etc.) (data forms to be developed). Nectar habitat sampling will also be conducted, following current guidance by USFWS. Cover is the main parameter for evaluating effectiveness, but measuring cover for each species would be extremely time consuming and not necessary for most of the restoration goals. Frequency (presence/absence) will be recorded to track diversity, identify locations of specific invasives, locations of beneficial species, all of which will help guide restoration efforts.

Methods for Data Collection:

1. Bring enough 1 m² plot frames, GPS equipment and data forms for each team, such that each team has at least one person qualified for species identification and one for data entry.
2. Using randomly generated xy coordinates within each grid-box (randomly generated xy coordinates for project area, in lat/long using coordinate system NAD 83 Oregon Statewide Lambert Feet Intl, generated in advance) and resource-grade GPS, locate plots centered on the point, placing the plot frame with center at the xy coordinate and the axes roughly matching cardinal directions. Note, three random coordinates were generated for each cell. Monitors should use Option A, and only switch to B or even C if previous ones are problem sites (e.g., outside of site boundary, within one of the few highly eroded swales, almost completely dominated by an uncommon species such as Himalayan blackberry, Douglas fir, wood’s rose, etc.).
3. Within each plot, visually estimate and record absolute percent cover of each of the main vegetation groups (native grasses, non-native grasses, native nectar species, native forbs, non-native forbs, shrubs), foliar cover of Kincaid’s lupine, bare ground, and litter. Absolute cover is the total outer perimeter of the parameter measured; the sum of all parameters may exceed 100% due to overlap. Also record any other prominent features (vehicle tracks, logs, etc.).
4. Collect frequency data for all plant species, recording a “1” each time the species is observed rooted within the plot frame.
 - Only one record is made for each species per plot, regardless of the number of individual plants of a species that occurs within the plot.
 - Only record herbaceous plants (grasses/forbs) rooted in the plot; shrubs with canopy in the plot.
 - Record all life stages and all species assumed alive the monitoring year (e.g., withered/post reproductive OK); no need to differentiate life stage.
 - To save time keying in the field, specimens of the plants that are unknown should be collected and marked for later identification (record/mark as Unk Forb 1, Unk Forb 2, Unk Grass 1, etc.).
5. In addition to the sampling data, count the number of flowering units of each native nectar species in the entire grid for those grids located within 50 m of Kincaid’s lupine patches (map will be provided), using a clicker counter as necessary.

Table 3. Native nectar species to be inventoried in each sample plot.

Common Name	Scientific Name	Unit Counted
Narrowleaf onion	<i>Allium amplexans</i>	Head
Tolmei's mariposa lily	<i>Calochortus tolmiei</i>	Flower

Common Name	Scientific Name	Unit Counted
Small camas	<i>Camassia quamash</i>	Stalk
Clearwater cryptantha	<i>Cryptantha intermedia</i>	Flower
Woolly sunflower	<i>Eriophyllum lanatum</i>	Head
Oregon geranium	<i>Geranium oreganum</i>	Flower
Toughleaf iris	<i>Iris tenax</i>	Flower
Sickle-keeled lupine	<i>Lupinus albicaulis</i>	Stalk
Longspur lupine	<i>Lupinus arbustus</i>	Stalk
Kincaid's lupine	<i>Lupinus oreganus</i> ssp. <i>kincaidii</i>	Stalk
Dward checkermallow	<i>Sidalcea virgata</i>	Stalk
American vetch	<i>Vicia americana</i>	Branch

Summary and Analysis:

Monitoring results will be tabulated in a MS Excel spreadsheet (see Table 4). The mean and variation among sample plots can be calculated. The data can be compared before and after treatments to evaluate if/when we meet restoration targets and decide future treatments. Also, by using GIS, the grids can be converted to a raster data set and values mapped to create a course geographic representation of relative diversity of any of the parameters (see Figure 4). Key effectiveness parameters are overall % cover of shrubs, native herbaceous vegetation, non-native vegetation, native nectar species, and Kincaid's lupine. The frequency data can be used to evaluate species richness, and combined with the geographic analysis of cover groups, used to identify areas in need of additional restoration. The nectar data will help determine if the site is potentially functional as FBB habitat, particularly in relation to distance from host plants.

Table 4. Example tabular results (not all parameters and species not shown).

Cover Estimates:			Frequency Data:			Nectar Species:		
Plot	Parameter	% Cover	Plot	Species	Frequency	Plot	Species	Count
1	native grasses	5	1	AGAL	1	1	ALAM	0
1	non-native grasses	80	1	CAQU	1	1	CAQU	5
1	native forbs	5	1	CYEC	1	1	CRIN	0
1	non-native forbs	20	1	DACA	1	1	ERLA	0
1	shrubs	0	1	ERLA	1	1	GEOR	0
1	bare ground	2	1	HYRA	0	1	LUOR	0
1	litter	5	1	WYAM	0	2	ALAM	0
2	native grasses	0	2	AGAL	1	2	CAQU	0
2	non-native grasses	75	2	CAQU	0	2	CRIN	5
2	native forbs	5	2	CYEC	1	2	ERLA	20
2	non-native forbs	20	2	DACA	0	2	GEOR	0
2	shrubs	0	2	ERLA	1	2	LUOR	0
2	bare ground	2	2	HYRA	1	3	ALAM	0
2	litter	5	2	WYAM	1	3	CAQU	0

Figure 4. Rough geographic representation how a cover value can be depicted.



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APPENDIX I
Description / Listing of Herbicides Used for Routines Maintenance

HCP Pesticide Use

May 2015

Pesticides

As part of the ODOT integrated vegetation management program, ODOT routinely applies herbicides to roadsides to control unwanted vegetation and meet desired roadside conditions. Herbicides are applied as needed according to product's EPA label instructions by ODOT employees or contractors certified and licensed according to Oregon Department of Agriculture standards. ODOT herbicide applications can generally be placed into two categories, shoulder spray and spot spray.

Shoulder spray

The road shoulder extends from the edge of pavement to six feet on secondary highways and eight feet on interstate highways or to the bottom of the ditch. The desired condition for the road shoulder is little or no vegetation. To obtain this level of service herbicides are typically applied annually (or as needed), in combination with mechanical methods such as shoulder blading and mowing to remove sod buildup. Shoulder applications are made using computerized truck mounted, broadcast sprayers. Typical herbicides include Milestone®, Roundup Custom™, Esplanade™ and Perspective®; these or similar products will be used in the future.

Spot Spray

Herbicide spot treatments are made to control noxious weeds and unwanted vegetation beyond the bare shoulder. ODOT is required under ORS 569 to control state listed noxious weeds. Unwanted vegetation is vegetation that blocks or limits visibility of signs and other features, impedes drainage and may include hazard trees. Spot applications are made using truck and atv/utv mounted sprayers and backpack sprayers. Typical herbicides for spot applications include Garlon 3A®, Milestone®, Escort®XP, Habitat® and Roundup Custom™; these or similar products will be used in the future.