Cardno ENTRIX

Shaping the Future

Yamhill County Road Maintenance Activities

Habitat Conservation Plan

March 2012

Prepared For
Yamhill County
Department of Public Works

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Prepared for
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Department of Public Works
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Acronyms

cm	centimeter
County	Yamhill County
EPA	Environmental Protection Agency
ESA	Endangered Species Act
GAP	Gap Analysis Program
GIS	Geographic Information System
GPS	Global Positioning System
GVA	Gopher Valley Area
HCP	Habitat Conservation Plan
HMAC	hot mix asphalt concrete
HUC	hydrologic unit code
kg	kilogram
km	kilometer
NA	Not available
NEPA	National Environmental Policy Act

ORA	Oak Ridge Area
OSU	Oregon State University
ROW	right-of-way
T&E	Threatened and Endangered
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USFWS known locations	USFWS Fender's blue butterfly known locations

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Executive Summary

The Yamhill County Road Maintenance Habitat Conservation Plan (HCP) was developed for the U.S. Fish and Wildlife Service (USFWS) by Yamhill County, Oregon (County) to allow the County to receive an incidental take permit under the Endangered Species Act Section 10(a)(1)(B) for Fender's blue butterfly (*Icaricia icarioides fenderi*) and Kincaid's lupine (*Lupinus oreganus*). These two species, which are listed under the Endangered Species Act, could be affected by the County's road maintenance activities and would be covered under this HCP. An incidental take permit would allow the County to continue to perform its otherwise lawful road maintenance activities, which have the potential to affect the covered species (Fender's blue butterfly and Kincaid's lupine). The incidental take permit, once issued, would be in effect for 30 years.

Covered Species (Chapter 3)

Fender's blue butterfly is an endangered species of butterfly that only occurs in the Willamette Valley, in which Yamhill County is situated. Fender's blue butterfly is dependent on the presence of the threatened Kincaid's lupine, which the butterfly uses as a host plant. In Yamhill County, Fender's blue butterflies lay eggs only on Kincaid's lupine, and the young caterpillars remain on the lupine to feed.

Surveys for the covered species were performed along the County right-of-way at Fender's blue butterfly locations identified by the USFWS (called known locations). Yamhill County also conducted surveys along County right-of-ways within a 2 km (1.24 miles) radius of the known locations. This distance was used because Fender's blue butterfly is known to disperse up to 2 km from their natal locations. This dispersal survey identified the presence of Kincaid's lupine to determine if additional dispersal habitat exists for the Fender's blue butterfly. Botanical surveys were also performed at the USFWS known locations to document the presence of Kincaid's lupine as well as other federally listed plants and native species. These surveys were performed by the surveyor walking each side of the right-of-way; occasional surveying was done into the right-of-way (perpendicular to a road) in wide areas to increase detectability. Fender's blue butterflies were not found at all of the USFWS known locations for Kincaid lupine. Results from these surveys are in Table E-1.

Table E-1 Summary of Survey Results for Kincaid's Lupine at Known USFWS Locations and the 2 km (1.24 miles) Dispersal Zones in Yamhill County in 2011

Site Name	Site (Description)	Fender's Blue Butterfly Observed	Kincaid's Lupine Observed
USFWS Known Locations			
GVA[1] 1	Gopher Valley Rd., vicinity Dupee Valley Rd. N to Agee Lane	No	Yes
GVA 2	Gopher Valley Rd., Yamhill Oaks, The Nature Conservancy Property	Yes	Yes
GVA 4	Intersection Gopher Valley Rd. and Agee Lane	No	No
GVA 5	Deer Creek Park	No	Yes
GVA 6	Muddy Valley Rd.	No	No
Hill Road North[2]	Hill Road North	Not Surveyed	Not Surveyed
Rock Creek	Rock Creek	No	No
Meadow Lake[3]	Meadow Lake	Not Surveyed	Yes
ORA[4] 1	North side Oak Ridge Rd., near intersection with Fairdale Rd.	Yes	Yes
ORA 2	South side Oak Ridge Rd., near intersection with Fairdale Rd.	Yes	Yes
ORA 3	North Oak Ridge Rd.	Yes	Yes
ORA 5	Old Moores Valley Rd.	Yes	Yes
ORA 6	Moores Valley Rd.	Yes	Yes
ORA 7	Hacker Rd.	Yes	Yes
Kincaid's Lupine Documented During the 2 km Dispersal Survey			
Tupper Road	Tupper Rd.	Not Surveyed	Yes
Oak Ridge Road	Oak Ridge Rd.	Not Surveyed	Yes
Beaver Creek Road	Beaver Creek Rd.	Not Surveyed	Yes
Moores Valley Road	Moores Valley Rd.	Not Surveyed	Yes
Gopher Valley Road	Gopher Valley Rd.	Not Surveyed	Yes
Old Moores Valley Road	Old Moores Valley Rd.	Not Surveyed	Yes
Panther Creek Road	Panther Creek Rd.	Not Surveyed	Yes

Source: Ross 2011 and Salix Associates 2011a; 2011b

[1] USFWS designation for Gopher Valley Area

[2]Site provided by USFWS February 20122012, after butterfly and plant surveys were concluded.

[3] Meadow Lake was added as a known location after the surveys were complete. Fender's blue butterfly surveys were not performed at this location.

[4] USFWS designation for Oak Ridge Area

Covered Activities (Chapter 4)

Road maintenance activities analyzed in the HCP are presented in Table E-2. These activities are conducted pursuant to the County's mission to provide essential services to the residents, businesses, and visitors of the County specifically, to maintain county roadways to protect public safety and to enhance the quality of life in Yamhill County. The County right-of-way is divided into two distinct sections based on the activities performed in these sections of right-of-way: 1) the first 1.52 meters (5 feet) from the shoulder of the road to the back of the ditch, referred to as the "Potential Impact Zone" and 2) the remaining 4.57 meters (15 feet) from the back of the ditch to the end of the right-of-way, referred to as the "No Impact Zone.". The Potential Impact Zone represents the area where normal maintenance activities occur. The No Impact Zone represents the area where normal maintenance is not performed (Figure E-1).

Table E-2 Maintenance Activities Occurring on County Roads

Maintenance Activity	Paved County Roads (631 km [392 miles])	Gravel County Roads (459 km [285 miles])
Mowing	•	•
Brush Cutting	•	•
Spraying (hand application and broadcast)	•	•
Large Tree and Shrub Removal	•	•
Snow Plowing	•	•
Sign Posting	•	•
Drainage Maintenance	•	•
Seeding	•	•
Emergency Earth Removal	•	•
Road Improvements	•	•
Soft Spot Dig-Outs	•	•
Grading and Gravel Placement	–	•
Dust Abatement	–	•
Grinding	•	–
Hot Mix Asphalt Concrete (HMAC) Overlay	•	–
Chip Sealing	•	–
Crack Sealing	•	–
Shoulder Preparation and Rocking	•	–
Sweeping and Washing	•	–
Centerline and Fog-Line Striping	•	–
Deicing	•	–
Sanding	•	•

• Activity occurs on this road type

– Activity does not occur on this road type

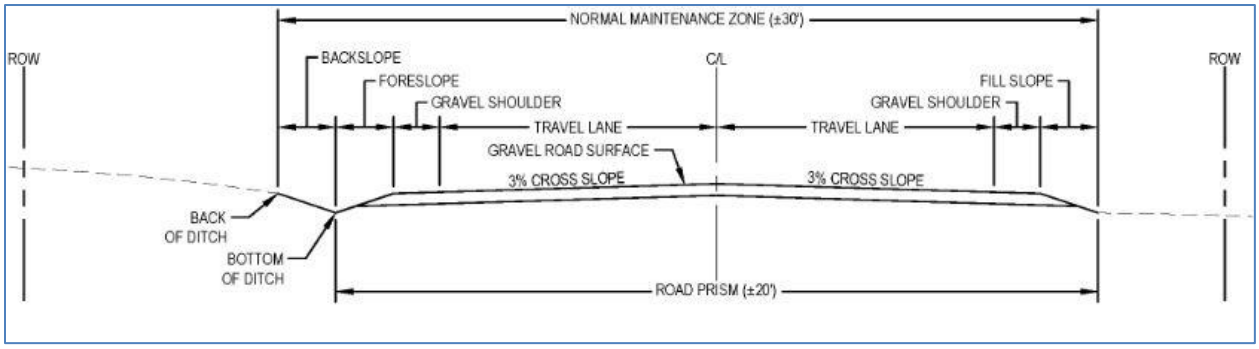

Figure E-1 Typical Section for a Gravel Road

Effects Analysis (Chapter 5)

The effects analysis identifies activities that may result in both direct and indirect effects on the covered species. Fender's blue butterfly and Kincaid's lupine could be affected by Yamhill County maintenance activities. Although Fender's blue butterfly could be directly affected (e.g., death) by encounters with equipment or trampling, most of the effects of the covered activities would likely be indirect effects associated with effects on Kincaid's lupine and other plant species used as nectar sources. Direct effects on the Fender's blue butterfly could result from larger road improvement projects. Depending on project timing, adult Fender's blue butterfly, caterpillars, or larvae could be affected. Mowing and herbicide application have the greatest opportunity to directly adversely affect listed plants and therefore indirectly adversely affect Fender's blue butterfly.

Mowing and herbicide application activities also have the greatest potential to benefit plant species indirectly by removing competition and increasing sunlight on the ground. Brushing can also have positive effects since it allows more sunlight to reach the plants. Selective vegetation management would benefit listed plants and prairie habitat by reducing competition and promoting the expansion of Kincaid's lupine and prairie habitat. This potential expansion of Kincaid's lupine and prairie habitat would indirectly benefit the Fender's blue butterfly.

Other activities, including tree and shrub removal, hand seeding, drainage activities, cleaning or replacing culverts, emergency earth removal, or sign posting operations may affect Kincaid's lupine by trampling or disrupting plants in a confined area where the disturbance occurs. Road improvement projects, such as widening and bike path development, would have effects similar to those described above. However, these effects would encompass a larger footprint. Dust abatement and deicing are conducted at specific locations on County roads. Information on lignosulfonates, used as for dust abatement, indicates that it can be harmful to plants, stunting growth and turning leaves brown (EPA 2002). Only small sections of the road are treated with lignosulfonates. Sanding would be unlikely to result in effects to the listed species due to the very low proportion of salt included in the sand mixture. Deicing and dust abatement may affect listed plants and butterfly habitat near the edge of the shoulder or from the ditch to the road; however, this is not an area where Kincaid's lupine are generally found. As surveys were conducted, some plants were found in this area, but it is not expected to support large numbers of prairie plants or covered species.

Conservation Measures (Chapter 6)

In 2005, the County established Threatened and Endangered Species Special Maintenance Zones (T&E Special Maintenance Zones) and began modifying its maintenance activities to avoid adverse effects on Fender's blue butterfly habitat, including Kincaid's lupine, from road maintenance activities. The County will expand its current T&E Special Maintenance Zones to include the newly identified Kincaid's lupine locations found during the 2011 2 km (1.24 miles) dispersal survey. The maintenance activities described below for the T&E Special Maintenance Zones include practices developed by the County in 2005 as well as additional minimization measures developed for this HCP. These measures will conserve covered species and protect important habitat while allowing the County to maintain its roads and right-of-way to preserve a safe environment for public use.

- The covered activities could potentially affect approximately 1.41 hectares (3.48 acres) of covered species habitat in the County right-of-way. This includes 0.75 hectares (1.86 acres) within the Potential Impact Zone of the T&E Special Maintenance Zones and 0.66 hectares (1.62 acre) outside the T&E Special Maintenance Zones. A total of 22.24 hectares (54.93 acres) of land is available for mitigation; this includes 21.02 hectares (51.94 acres) of land in the T&E Special Maintenance Zones and 1.22 hectare (2.99 acres) of land at Deer Creek Park. A 2:1 mitigation ratio requirement will be met by enhancing a total of 2.82 hectares (6.96 acres); of this, 2.41 hectares (5.96 acres) of habitat will be enhanced in the T&E special maintenance zones and 0.41 hectare (1.00 acre) of Fender's blue butterfly and Kincaid's lupine habitat will be enhanced at Deer Creek Park, a County-owned park. See Table E-3 for mitigation obligations. The mitigation areas will be recommended by the Implementation Committee and provided to the County Commissioners and USFWS for approval.

Table E-3 Mitigation Obligation

Affected Area	Affected Hectares (Acres)	Mitigation Requirement Hectares (Acres)
T&E Special Maintenance Zones (Potential Impact Zone)	0.75 (1.86)	1.50 (3.72)
County ROW Outside of the T&E Special Maintenance Zones	0.66 (1.62)	1.32 (3.24)
Total	**1.41 (3.48)**	**2.82 (6.96)**

ROW = right-of-way 18 meters (60 feet)

Conservation measures have been identified to support the long-term viability of the covered species. These measures are compatible with County road maintenance activities and will be implemented to reduce the potential adverse effects of covered activities on the covered species and to mitigate unavoidable adverse effects within the HCP area. These conservation measures are intended to meet the biological goals and objectives described for this HCP, thereby benefiting the covered species and their habitat. Objectives to reach that goal include:

- Conserve covered species populations and habitat.
- Enhance covered species populations and habitat.

The above objectives will be accomplished through the use of conservation measures, including:

- Establishing T&E Special Maintenance Zones at locations within the County right-of-way known to support Fender's blue butterfly and/or Kincaid's lupine.
- Establishing procedures and protocols for maintenance activities occurring within T&E Special Maintenance Zones.
- Implementing avoidance and minimization measures for road maintenance activities in the County right-of-way to reduce potential effects on the covered species and their habitat.
- Mitigation will be identified and completed at sites with appropriate habitat in Yamhill County. Implementation measures will include habitat enhancement or species augmentation at the following sites:
- Enhancing upland prairie habitat within the No Impact Zone of the T&E Special Maintenance Zones in the County right-of-way.
- Restoring and managing Fender's blue butterfly habitat by planting Kincaid's lupine at Deer Creek Park to promote restoration of upland prairie habitat.

Yamhill County will evaluate its progress toward the HCP's goals by monitoring Fender's blue butterfly and Kincaid's lupine populations at the T&E Special Maintenance Zones and at their mitigation sites. Changes or modification to the conservation measures may be made to reach long-term biological goals of the HCP, and contribute to the survival and recovery of the species.

HCP Implementation (Chapter 7)

The County Commissioners have the overall responsibility for the implementation of the HCP. The County Commissioners will appoint an Implementation Committee and an HCP Administrator to assist with HCP tasks. The Implementation Committee will make recommendations to the County Commissioners, who are the ultimate decision making authority. The HCP Administrator will be responsible for assisting the Implementation Committee with the implementation and management of the HCP. The HCP Administrator, in collaboration with the Implementation Committee, will develop an annual work plan that will identify the actions to be taken in the next fiscal year. The HCP Administrator is also tasked with preparing an Annual Compliance Report, which will be reviewed and approved by the County Commissioners and forwarded to the USFWS. The total estimated cost to the County over the 30-year permit term is $949,535 (in 2012 dollars).

Alternatives (Chapter 8)

The County considered a No Action Alternative, which included not pursuing an incidental take permit for road maintenance. Under the No Action Alternative, the County would not be able to perform road maintenance activities along roadsides or complete road improvement projects that could result in potentially adverse effects on the covered species. This alternative was not selected because, over time, lack of maintenance could lead to dysfunctional, unsafe and/or impassable roads.

The County also investigated several mitigation options to benefit Fender's blue butterfly and Kincaid's lupine including:

- Purchasing private land
- Partnering with The Nature Conservancy to assist with habitat maintenance of its property
- Habitat enhancement opportunities for County-owned property:
  - County right-of-way
  - Deer Creek Park
  - Whiteson property
  - Newberg property
  - Powerhouse Hill property

The County identified appropriate mitigation sites on land owned by the County. Habitat enhancement at Deer Creek Park and within the County right-of way was determined to be the best options. Many of the other properties were not in close enough proximity to current Fender's blue butterfly populations to provide a net benefit to the species. Purchasing land or initiating partnerships with non-governmental agencies or private citizens was determined to be unnecessary at this time.

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Chapter 1

Introduction and Background

This Yamhill County Road Maintenance Habitat Conservation Plan (HCP) has been developed as part of the application package for an incidental take permit under Section 10(a)(1)(B) of the federal Endangered Species Act (ESA). The applicant is Yamhill County (permittee). The permit being requested would authorize the potential take of federally-listed species including Fender's blue butterfly (*Icaricia icarioides fenderi*, also known as *Plebejus icarioides fenderi;* referred to as *Icaricia icarioides fenderi* throughout the document for consistency with United States Fish and Wildlife Service [USFWS] nomenclature) and Kincaid's lupine (*Lupinus oreganus*) by Yamhill County road maintenance crews on Yamhill County right-of-way lands within the HCP Covered Area and associated with County roadway maintenance. These species are referred to in this document as the "covered species" (Table 1-1). The proposed length of the permit is 30 years. An incidental take permit has been requested, having demonstrated that the effects of the taking of listed species authorized by the permit will be avoided if possible, minimized and mitigated to the maximum extent practicable, and that the incidental take of Fender's blue butterfly and Kincaid's lupine will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.

Table 1-1 Yamhill County Prairie Species HCP Covered Species and Their Status Under the State and Federal Endangered Species Acts

Scientific Name	Common Name	Federal Status	State Status
Icaricia icarioides fenderi	Fender's blue butterfly	Endangered	None
Lupinus oreganus	Kincaid's lupine	Threatened	Threatened

This HCP document includes the following chapters:

- **Chapter 1**, Introduction and Background, describes the scope of the HCP and its regulatory framework.
- **Chapter 2**, Covered Area, describes the area to which the HCP applies.
- **Chapter 3**, Covered Species, describes the two species covered under this HCP: Fender's blue butterfly and Kincaid's lupine.
- **Chapter 4**, Covered Activities, describes activities covered under this HCP. Generally, covered activities are County road maintenance activities conducted in the interest of public health and safety.
- **Chapter 5**, Effects Analysis, describes the potential effects of covered activities on covered species.
- **Chapter 6**, Conservation Measures, describes modifications to covered activities, as well as new conservation measures, that the County is willing to implement in the interest of protecting covered species and their habitats. This chapter includes measures the County will use to monitor, minimize, and mitigate impacts.

- **Chapter 7**, HCP Implementation, describes how the plan will be implemented. This chapter also describes funding made available to undertake the conservation measures and the procedures to deal with unforeseen circumstances.
- **Chapter 8**, Alternatives, describes the No Action Alternative to implementing County road maintenance activities; and options considered to meet mitigation requirements.
- **Chapter 9**, References, lists literature cited in the HCP.

Yamhill County is located within the northwestern portion of the Willamette Valley ecoregion (Figure 1-1). Prior to Euro-American settlement in the mid-1800s, native grassland prairie and savanna habitats occupied an estimated 700,000 hectares (1.7 million acres) of western Oregon's Willamette Valley (Alverson 2005). Almost all native upland and wet prairies and oak savanna habitats have vanished in the Willamette Valley ecoregion, with less than 0.5 percent remaining (Figure 1-2 [Kiilsgaard 1999]).

Much of the habitat loss in the Willamette Valley has occurred due to conversion of native habitats to agricultural crops and urbanization, introduction of invasive species, and elimination of fire regimes that historically kept woody vegetation (trees and shrubs) from dominating the habitat (Oregon Department of Fish and Wildlife 2006). The majority of remaining prairie habitat is located on privately owned lands (Alverson 2005), where protection of the native prairie habitat important to covered species is limited or absent.

Yamhill County will work cooperatively with the USFWS and an HCP Implementation Committee (described in Chapter 7) to balance the conservation of rare native prairie species and their habitats with road maintenance services that are essential for the citizens of Yamhill County (Chapter 4, Covered Activities).

Yamhill County is committed to reducing impacts on sensitive species and promoting recovery of these species. The County has been consulting with USFWS since 2005 to modify its road maintenance activities in areas known to support Fender's blue butterfly and/or Kincaid's lupine populations. The County established a program designating "Threatened or Endangered Species Special Maintenance Zones" for these areas. County road maintenance protocols were created for these zones in coordination with USFWS that limited or modified how mowing, brush cutting, spraying and grading was performed to help protect the species. These protocols have been updated annually since 2005 in cooperation with USFWS and the Yamhill County Soil and Water Conservation District. This HCP adds or modifies conservation measures in these areas. The County installed signs in these areas to mark the extent of sensitive habitat zones. The sensitive habitat zones are called Threatened and Endangered Special Maintenance Zones (T&E Special Maintenance Zones) and each one includes a 0.5 km (0.3 mile) buffer around each end of the sensitive areas. Maintenance protocols and conservation measures to be followed in these areas are described in the County Public Works Department's 'Take Avoidance Manual,' also called 'The Blue Book.' The Blue Book includes photo identification of Kincaid's lupine, maps and Global Positioning System (GPS) coordinates for identification of these sensitive areas. County equipment is equipped with a GPS tracking system that facilitates monitoring of road maintenance activities within the T&E Special Maintenance Zones.

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Figure 1-1 Yamhill County and the Willamette Valley Ecoregion and Prairie Habitat

Figure 1-2 Prairie Habitat in Yamhill County

1.1 Purpose and Need for Action

The purpose of this HCP is to set forth conservation measures (Chapter 6) the County agrees to undertake for the protection and enhancement of covered species to offset potential effects resulting from the covered activities (Chapters 3 and 4). These conservation measures outline how the County can avoid, minimize, and mitigate for its impacts on covered species.

The ESA makes it illegal to "take" a listed animal species. The USFWS defines take as: "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." Listed species may be affected by carrying out other lawful activities. For authorization to take a listed species incidental to pursuing an otherwise lawful activity, an incidental take permit from USFWS is required. Adverse effects on the species' habitat can also result in violation of the ESA. An incidental take permit can be issued to the County that allows a limited amount of take, if the following criteria are satisfied: (1) take is incidental, (2) the impacts of such taking are minimized and mitigated to the maximum extent practicable; (3) the County ensures funding for the HCP and procedures to deal with unforeseen circumstances; and (4) take does not appreciably reduce the likelihood of the survival and recovery of the species in the wild (USFWS 1996).

Despite best efforts, avoiding all impacts on listed species or their habitat during the County's performance of otherwise lawful activities (such as road maintenance) is difficult. Yamhill County conducts road maintenance activities to protect public safety and well-being. The County is voluntarily seeking an incidental take permit from the USFWS to perform these otherwise lawful activities that have the potential to impact listed species. The County is not required by law to obtain an incidental take permit from the USFWS; it is only required to comply with the ESA. Therefore, if the appropriate authorization is not obtained, all impacts must be avoided. As a condition of the incidental take permit, Yamhill County agrees to perform conservation measures spelled out in this HCP. The HCP identifies how the County intends to avoid, minimize, and mitigate to the maximum extent practicable, impacts on covered species from covered activities identified in the incidental take permit.

Yamhill County is requesting "take" of a listed animal (Fender's blue butterfly) under this HCP. In addition, one federally-listed plant species (Kincaid's lupine) is included that currently has no take prohibition under the ESA. By including this species, Yamhill County is voluntarily assuming responsibility to avoid, minimize, and mitigate for impacts to these species resulting from activities it conducts or authorizes on lands within its road right-of-way, even though the ESA does not require such actions. Including the plant species ensures that the terms and conditions of the incidental take permit and the HCP do not change over time if there is a change in the law regarding the take of listed plant species.

1.2 Proposed Action and Permit Duration

The proposed action is issuance of an incidental take permit to cover activities associated with routine road maintenance activities (described in Chapter 4, Covered Activities) conducted within the HCP Area, which is composed of Yamhill County roads and right-of-ways. The HCP Area is further described in Chapter 2, Covered Area. Yamhill County is seeking a 30-year permit term.

1.3 Conservation Planning Process

The conservation planning process is described in the following section.

1.3.1 Evaluation Process

Throughout the HCP development process, Yamhill County considered whether it was in the County's and its citizens' best interests to seek an incidental take permit from the USFWS. During the HCP planning process, the County evaluated the following topics: covered species; essential services required to provide for maintenance and safe passage over Yamhill County roads; the County road right-of-way; incidental take permit term; and conservation measures to avoid, minimize, and mitigate for impacts to the covered species. The proposed action is the result of the County's analysis of these topics.

1.4 Technical Advisory Committee

The USFWS and Xerces Society were engaged with the Yamhill County Road Improvement Advisory Committee early in the planning process to assist in formulating the HCP and in identifying avoidance, minimization, and mitigation measures to offset potential effects of conducting road maintenance activities. In the first meeting, the biologists conducting surveys participated in the meeting to describe the survey locations and protocol. USFWS provided feedback regarding the survey process. In an August meeting, the biologists discussed preliminary results of surveys. In September, landowners were added to this advisory group, and it was renamed the Technical Advisory Committee. The Technical Advisory Committee has continued to meet to discuss covered activities and potential mitigation options.

The role of the Technical Advisory Committee has been to aid in the planning process and assist in identifying avoidance, minimization, and mitigation measures to offset potential effects of conducting road maintenance activities during the writing of the HCP. Once the plan is complete, the County will create a HCP Implementation Committee to address additional actions and track implementation.

1.5 Regulatory Framework

1.5.1 Federal Endangered Species Act

The ESA (16 U.S.C. 1531 et seq.) was passed by Congress in 1973 and amended multiple times between 1976 and 2004. The stated purpose of the ESA is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and to act on specified relevant treaties and conventions"(16 U.S.C. 1531 (b)).

Section 9 of the ESA and regulations pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species by annoying them to such an extent as to significantly disrupt normal behavioral

patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Pursuant to Section 11(a) and (b) of the ESA, any person who knowingly violates Section 9 of the Act or any permit, certificate, or regulation related to Section 9, may be subject to civil penalties of up to $25,000 for each violation, or criminal penalties up to $50,000, and/or imprisonment of up to one year.

Individuals and state and local agencies proposing an action that is expected to result in the take of federally- listed species are encouraged to apply for an incidental take permit under Section 10(a)(1)(B) of the ESA to be in compliance with the law. Such permits are issued by the USFWS when take is not the intention of and is incidental to otherwise legal activities. An application for an incidental take permit must be accompanied by a habitat conservation plan, commonly referred to as an HCP. The regulatory standard under Section 10(a)(1)(B) of the ESA is that the effects of authorized incidental take must be minimized and mitigated to the maximum extent practicable. Under Section 10(a)(1)(B) of the ESA, a proposed project also must not appreciably reduce the likelihood of the survival and recovery of the species in the wild, and adequate funding for a plan to minimize and mitigate impacts must be ensured.

There are no federal prohibitions under the ESA for the take of listed plants on non-federal lands, unless taking those plants is in violation of state law. However, the USFWS analyzes the effects of the permit on listed plant species because Section 7 of the Act requires that issuing an incidental take permit may not jeopardize any listed species, including plants.

1.5.1.1 Section 7 Consultation

Section 7 of the ESA requires federal agencies to ensure that their actions, including issuing permits, do not jeopardize the continued existence of listed species or destroy or adversely modify listed species' critical habitat. "Jeopardize the continued existence of…" pursuant to 50, CFR 402.2, means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. Issuance of an incidental take permit under Section 10(a)(1)(B) of the ESA by the USFWS is a federal action subject to Section 7 of the ESA. As a federal agency issuing a discretionary permit, the USFWS is required to consult with itself (i.e., conduct an internal consultation) on the potential effects on listed species from the act of issuing the incidental take permit. Section 10(a)(1)(B) permit application initiates the Section 7 consultation process within the USFWS.

The requirements of Section 7 and Section 10 of the ESA substantially overlap. Elements unique to Section 7 include analyses of impacts on designated critical habitat, analyses of impacts on listed plant species, if any, and analyses of indirect and cumulative impacts on listed species. Cumulative effects are effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area, pursuant to Section 7(a)(2) of the Act. The HCP area is defined by the influence of direct and indirect impacts of covered activities. The action area may or may not be solely contained within the HCP boundary. These additional analyses are included in this HCP to meet the requirements of Section 7 and to assist the USFWS with its internal consultation.

1.5.1.2 Section 10 Habitat Conservation Plan Requirements and Guidelines

The Section 10(a)(1)B process for obtaining an incidental take permit has three primary phases: (1) the HCP development phase; (2) the formal permit processing phase; and (3) the post-issuance phase.

During the HCP development phase, the project applicant prepares a plan that integrates the proposed project or activity with the protection of listed species. An HCP submitted in support of an incidental take permit application must include the following information:

- Covered activities.
- Impacts likely to result from the proposed taking of the species for which permit coverage is requested.
- Measures that will be implemented to monitor, minimize, and mitigate impacts; funding that will be made available to undertake such measures; and procedures to deal with unforeseen circumstances.
- Alternative actions considered that would not result in take.
- Additional measures the USFWS may require as necessary or appropriate for purposes of the plan.

The HCP development phase concludes and the permit processing phase begins when a complete application package is submitted to the appropriate permit-issuing office. A complete application package consists of 1) an HCP, 2) an Implementing Agreement if applicable, 3) a permit application, and 4) a $100 fee from the applicant (Yamhill County).

The USFWS must then publish a Notice of Availability of the HCP package in the Federal Register to allow for public comment. The USFWS also prepares an Intra-Service Section 7 Biological Opinion, and prepares a Set of Findings, which evaluates the Section 10(a)(1)(B) permit application in the context of permit issuance criteria (see below). An Environmental Action Statement, Environmental Assessment, or Environmental Impact Statement serves as the USFWS's record of compliance with the National Environmental Policy Act (NEPA), which is available for a 30-day, 60-day, or 90-day public comment period. An Implementing agreement is required for HCPs unless the HCP qualifies as a low-effect HCP. A Section 10(a)(1)(B) incidental take permit is granted upon a determination by the USFWS that all requirements for permit issuance have been met. Statutory criteria for issuance of the permit specify that:

- Taking will be incidental.
- Impacts of incidental take will be minimized and mitigated to the maximum extent practicable.
- Adequate funding for the HCP and procedures to handle unforeseen circumstances will be provided by the Permittee (Yamhill County).
- Taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild.

- The applicant will provide additional measures that the USFWS requires as being necessary or appropriate.
- The USFWS has received assurances, as may be required, that the HCP will be implemented.

During the post-issuance phase, the Permittee and other responsible entities implement the HCP, and the USFWS monitors the Permittee's compliance with the HCP, as well as the long-term progress and success of the HCP. The public is notified of permit issuance by means of the Federal Register.

1.5.2 National Environmental Policy Act

The issuance of a Section 10 permit by USFWS is considered a federal action requiring compliance with NEPA. The purpose of NEPA is two-fold: to ensure that federal agencies examine environmental impacts of their actions (in this case deciding whether to issue an incidental take permit) and to utilize public participation. NEPA serves as an analytical tool for direct, indirect, and cumulative impacts of the proposed project alternatives to help the USFWS decide whether to issue an incidental take permit. NEPA analysis must be done by the USFWS for each HCP as part of the incidental take permit application process.

1.6 Species to be Covered by the Permit

Yamhill County requests an incidental take permit that authorizes incidental take of Fender's blue butterfly and Kincaid's lupine (Table 1-1).

One other candidate species potentially affected by the activities addressed in this HCP that is not covered is Taylor's checkerspot butterfly (*Euphydryas editha taylori*). This species occurs in a prairie habitat; however, Taylor's checkerspot is only found at one site in Benton County on property owned by the Weyerhauser Company. Therefore, it is unlikely that activities occurring in Yamhill County would affect this species. Should Taylor's checkerspot occur in the County, the mitigation and minimization measures identified in Chapter 6 for Fender's blue butterfly would also help protect this species.

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Chapter 2

Covered Area

2.1 Environmental Setting

The Habitat Conservation Plan (HCP) would cover all Yamhill County roads and right-of-ways where road maintenance activities occur. The County includes two different ecoregions: Willamette Valley and Coast Range. An ecoregion is an ecologically and geographically distinct assemblage of natural areas and species, and is often associated with soil and landform characteristics. Fender's blue butterfly (*Icaricia icarioides fenderi*) and Kincaid's lupine (*Lupinus oreganus*) habitat in the County occurs only within the prairie ecosystems of the Willamette Valley ecoregion (Chapter 3). Willamette Valley upland prairies are dry, open areas with well-drained soils and no prolonged standing water. The native prairies of western Oregon are among the most endangered ecosystems in the United States (United States Fish and Wildlife Service [USFWS] 2010) and are threatened by habitat destruction, land cover changes, and competition from invasive plant species.

2.1.1 Physical Environment

2.1.1.1 Climate

The climate of the Willamette Valley is relatively mild throughout the year, characterized by cool, wet winters, and warm, dry summers. Typical distribution of precipitation includes about 50 percent of the annual total from December through February, lesser amounts in the spring and fall, and very little during summer. Rainfall tends to vary inversely with temperatures – the cooler months are the wettest, the warm summer months the driest (Oregon State University [OSU] 1993).

Extreme temperatures in the Willamette Valley are rare. Days with maximum temperature above 32°C/90°F occur only 5 to 15 times per year on average, and temperatures below zero occur only about once every 25 years. Mean average temperatures range from 10°C (50°F) to 27°C (80°F) in the summer months and 1°C (34°F) to 4°C (39°F) in the winter months, while average lows are generally in the low 10s°C (50s°F) in summer and low 1°C (34°F) in winter. The mean growing season lasts 150 to 180 days in the lower elevation portions of the valley, and 110 to 130 days in the foothills (above about 244 meters or 800 feet).

Severe storms are rare in the Willamette Valley. Ice storms occasionally occur in the northern portions of the Valley, resulting from cold air flowing westward through the Columbia Gorge. High winds occur several times per year in association with major weather systems. Relative humidity is highest during early morning hours, and is generally 80 to 100 percent throughout the year. During the afternoon, humidity is generally lowest, ranging from 70 to 80 percent during January to 30 to 50 percent during the summer months. Annual pan evaporation (that is, the measure of how much evaporation occurs in a year) is about 0.9 meter (35 inches); most of the evaporation occurs during the period from April to October. Winters are likely to be cloudy. Average cloud cover during the coldest months exceeds 80 percent, with an average of about 26 cloudy days in January (in addition to three partly cloudy and two clear days). During the

summer months, sunshine is much more abundant, with average cloud cover less than 40 percent; more than half of the days in July are clear (OSU 1993).

2.1.1.2 Air Quality

The County meets the national air quality standards for lead, ozone, sulfur dioxide, carbon monoxide, and particulates, and has pollutant concentrations at levels that are generally considered "good" (Oregon Department of Environmental Quality [ODEQ] 2011).

2.1.1.3 Topography

The Willamette Valley ecoregion is located on the alluvial-deposited soils of the Willamette River drainage basin. It is surrounded by the Coast Range Mountains to the west and the Cascade Mountains to the east. Elevations in the Willamette Valley range from about 100 feet (30 meters) above mean sea level up to about 1,000 feet in the uplands, and as high as 3,400 feet (1,000 meters) at Trask Mountain (Yamhill County Comprehensive Parks and Open Spaces Master Plan n.d.).

2.1.1.4 Geology and Soils

The regional geology of the Willamette Valley was recently studied as part of the U.S. Geological Survey (USGS) Regional Aquifer System Analysis program. The Willamette Valley is underlain by a variety of rock types (Walker and MacCleod 1991). The Willamette Valley is a lowland that has accumulated a substantial thickness of alluvial sediment (clay or silt gravel carried by streams) as well as basalt lava (volcanic rock) that flowed into the region during the early stages of basin development. This lava, known as the Columbia River Basalt Group, occurs in the northern two thirds of the Willamette Valley. The basalt lava has been folded and faulted, and now forms a series of uplands that separate the Willamette Valley into a series of sediment-filled subbasins. The basalt lava is exposed in the uplands separating the subbasins, and lies beneath the valley-filling sediments in the intervening areas (USGS 2011).

The geology of the Willamette Valley in the County is primarily underlain with quaternary deposits. The western portion of the county is underlain with Paleogene volcanic, mafic (rock rich in magnesium and iron), and sedimentary rock, moving from north to south (National Atlas 2011). The soil types generally present in the County include silty loams, silty clay loams, clay loams, stony loams, cobbly loams, clay stony loams, and sandy loams (USGS 2011).

2.1.1.5 Surface and Groundwater

Yamhill County is primarily encompassed by the Yamhill subbasin (USGS Hydrologic Unit Code (HUC) 17090008), with portions also extending into the Tualatin (HUC 17090010) and Middle Willamette (HUC 17090007) subbasins. All subbasins are included in the Willamette Basin (HUC 170900), which includes the Willamette River and drains the area of northwestern Oregon between the Cascade and Coast Ranges. The major rivers within the Yamhill subbasin are the North Yamhill, South Yamhill, and the Yamhill River. The Willamette River forms the County boundary to the east, and is the receiving waterbody for all streams in the Yamhill, Middle Willamette, and Tualatin subbasins. Water quality in the North Yamhill, South Yamhill, Yamhill, and Willamette rivers is limited by a variety of parameters, including pH, nutrients, dissolved oxygen, and heavy metals.

Surface-water resources in the Willamette Basin are largely allocated; groundwater resources are being increasingly looked upon to meet the growing demand for water.

2.1.2 Biological Environment

2.1.2.1 Vegetation Communities

Vegetation communities in the County described below were summarized based on Oregon Gap Analysis Program (Oregon GAP) (Kiilsgaard 1999; land cover classifications) geographic information system (GIS) data. These data are shown in Table 2-1 and Figure 2-1.

Table 2-1 Vegetation Communities in Yamhill County

OR GAP Vegetation Class	Acres in Yamhill County	Percent Cover
Agriculture	143,657	31%
North Pacific Oak Woodland, North Pacific Lowland Mixed Hardwood Conifer Forest and Woodland, North Pacific Dry Douglas-fir (Madrone) Forest and Woodland	118,988	26%
North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest	72,650	16%
Harvested Forest	38,247	8%
Developed	31,470	7%
North Pacific Lowland Riparian Forest and Shrubland	20,229	4%
Orchards/Vineyards	13,410	3%
Willamette Valley Upland Prairie and Savanna	5,672	1%
Other	11,973	4%

Source: Kiilsgaard 1999

Vegetation types found in the County are further described below.

Agriculture

Agriculture is identified as those lands that have been modified for growing crops and/or animal husbandry.

North Pacific Oak Woodland, North Pacific Lowland Mixed Hardwood Conifer Forest, and Woodland, North Pacific Dry Douglas-fir (Madrone) Forest and Woodland

These systems are associated with dry, predominantly low-elevation sites and/or sites that experienced frequent pre-settlement fires. In the Willamette Valley, soils are moderately moist, yet well-drained. This land cover type is patchy in nature. Plant succession in the absence of fire tends to favor increased shrub dominance in the understory, increased tree density, and increased importance of conifers, with the end result being conversion to a conifer forest. The vegetation ranges from savanna and woodland to forest dominated by deciduous broadleaf trees.

Figure 2-1 Vegetation Communities in Yamhill County

North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest

This vegetation community is a significant component of the lowland and low highland forests of northwestern Oregon, occurring on the western slopes of the Cascades, around the margins of the Willamette Valley, and on the west side of the Coast Range. Forests occur on moist habitats and microhabitats, mainly in lower slopes or valley landforms, within the Western Hemlock Zone of the Pacific Northwest. They have hydrophilic (water loving) undergrowth species, moist to sub-irrigated soils, high abundance of shade- and moisture-tolerant canopy trees, as well as higher stand productivity, due to higher soil moisture and lower fire frequency.

Harvested Forest

This vegetation type includes forests that have been previously harvested. Most previously harvested forests of the lowlands and lower slopes support mixed conifer-deciduous forest, with young Douglas fir and western hemlock found in a mosaic with hardwood species.

Developed

Developed land is a natural landscape that has been altered for purposes such as agriculture or housing.

North Pacific Lowland Riparian Forest and Shrubland

The North Lowland Riparian Forest and Shrubland vegetation communities are linear in character, occurring on low elevation, alluvial floodplains that are confined by valleys and inlets or lower terraces of rivers and streams. Annual flooding is a key ecological processes, which results in a diversity of patch types such as woodlands, shrublands, wet meadows, and marshes. These plant communities associated with this vegetation type are adapted to specific flooding regimes or stages. Very early successional stages can be sparsely vegetated or dominated by herbaceous vegetation. Willows such as Sitka willow (*Salix sitchensis*) may also dominate early- to mid-stage types. Dominant species of mid- to late-stage patches are typically deciduous trees (i.e., black cottonwood [*Populus balsamifera* ssp. *trichocarpa*] and red alder [*Alnus rubra*]) but conifers can be dominant as well. Conifers such as grand fir (*Abies grandis*), Douglas-fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), and western red cedar (*Thuja plicata*) tend to increase with succession in the absence of major disturbance. Conifer-dominated plant communities are now very rare and not well described. Major broadleaf dominant species are Oregon maple (*Acer macrophyllum*), red alder, black cottonwood, Sitka willow, Pacific willow (*Salix lucida* ssp. *lasiandra*), red dogwood (*Cornus sericea*), and Oregon ash (*Fraxinus latifolia*).

Orchards/Vineyards

Orchards and vineyards are lands where trees, shrubs, and/or vines are maintained for food production.

Willamette Valley Upland Prairie and Savanna

This vegetation community is endemic to the Willamette Valley. It formed a complex mosaic of varying patch sizes with wet prairies and riparian forests over much of the Willamette Valley during the pre-European settlement era. It occurs on well-drained deep soils and was maintained historically by frequent controlled burning. Landforms are usually flat, rolling, or gently sloping, and often part of extensive plains. Dominant vegetation includes perennial bunch grasses, especially Roemer's fescue (*Festuca roemeri* [*Festuca idahoensis* var. *roemeri*]) and, to a lesser degree, California oatgrass (*Danthonia californica),* with abundant and diverse forbs. Scattered

deciduous (Oregon Oak [*Quercus garryana*]) and/or coniferous (Douglas-fir [*Pseudotsuga menziesii*] and ponderosa pine [*Pinus ponderosa*]) trees are rarely found now, but such savannas historically covered about one-third of the total acreage. In the absence of disturbance, many of them have succeeded to forest and others continue to do so.

2.1.2.2 Wildlife

The County has varied wildlife resources, which include upland game, fur bearers, anadromous and warm water fish, waterfowl, and a large variety of non-game species. Diversity and acreage of natural wildlife habitats in the County have been reduced as land has been converted from natural forest and grassland to managed forests, cropland, homesteads, and urban areas. Clearing of lands for agriculture, forestry, and other developments (e.g., urbanization) continues to threaten sensitive plant and animal populations. Invasion of non-native species is also reducing the viability of native species (Soil and Water Conservation District 2011).

Mammal species typically occurring in the covered area include: the deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), western gray squirrel (*Sciurus griseus*), Camas pocket gopher (*Thomomys bulbivorus*), gray-tailed vole (*Microtus canicaudus*), and red fox (*Vulpes vulpes*). Camas pocket gopher and gray-tailed vole are both endemic to the Willamette Valley. The historic distribution of red fox in western Oregon remains ambiguous. Several non-native, mammalian species have become widespread in uplands in the Willamette Valley. Eastern gray squirrel (*Sciurus carolinensis*) and house mouse (*Mus musculus*) have been reported to occur primarily in urban areas, whereas the eastern cottontail (*Sylvilagus floridanus*) and Virginia opossum (*Didelphis virginiana*) are common throughout the Willamette Valley, particularly in shrubby vegetation, including within oak and prairie habitats (Vesely & Rosenberg 2010).

Oak woodlands support different avian communities than conifer-dominated stands in the Willamette Valley and have a higher proportion of Neotropical migrants (Vesely & Rosenberg 2010). Species that are characteristic of oak woodlands and less common in conifer forests include the western wood-pewee (*Contopus soridulus*), lazuli bunting (*Passerine amoena*), Cassin's vireo (*Vireo cassinii*), and Bullock's oriole (*Icterus bullockii*). Species that have increased in abundance include the Swainson's thrush (*Catharus ustulatus*), Pacific slope flycatcher (*Empidonax difficilis*), and purple finch (*Carpodacus purpueus*). Non-native bird species that commonly occur in prairie and oak habitats of the Willamette Valley include wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), and European starling (*Sturnus vulgaris*) (Vesely & Rosenberg 2010).

Historical records indicate that at least 24 butterfly species were associated with upland prairies in the Willamette Valley, of which 13 species are extinct or exist only as isolated populations on remnant patches of native upland prairie (Wilson et al. 1998a). Characteristic upland species include the checkered skipper (*Pyrgus ruralis*), Sonora skipper (*Polites sonora*), and anise swallowtail (*Papilio zelicaon*). Common moths and butterflies (*Lepidoptera*) of wet prairies include the sheep moth (*Hemileuca eglanterina*) and field crescent butterfly (*Phyciodesss pratensis*) (Wilson et al. 1998b). Two of the butterflies most closely associated with prairies of western Oregon are Fender's blue butterfly and Taylor's checkerspot butterfly (*Euphydryas editha taylori).*

2.1.3 Land Use

The County lies on the west side of the lower middle part of the Willamette Valley. The County is bounded by Washington, Clackamas, Polk, Marion, and Tillamook counties. The Willamette River is the eastern boundary. In 1900, the population of the County (which comprises 70 percent of the basin) was 13,000 (Otte et al. 1974). The current population of the County is approximately 97,037 (United States Census Bureau 2011).

Agriculture and forestry are the dominant land use in the County (Table 2-2 and Figure 2-2). In 2007, there were approximately 2,115 farms in the County, with an average size of 86 acres (United States Department of Agriculture 2009). Nearly half of the forestry land in the County is zoned as commercial forestry; other productive forestlands are scattered throughout the County and are zoned as agriculture/forestry large holding. Urban development is concentrated in the ten cities in the County: Amity, Carlton, Dayton, Dundee, Lafayette, McMinnville, Newberg, Sheridan, Willamina, and Yamhill.

Table 2-2 Land Use in Yamhill County

Land Use	Hectares (Acres) in Yamhill County	Percent Cover[1]
Exclusive Farm Use	77,449 (191,381)	42%
Commercial Forestry	49,192 (121,557)	27%
Agriculture/Forestry Large Holding	14,324 (35,396)	8%
Bureau of Land Management	13,093 (32,354)	7%
Siuslaw National Forest	10,088 (24,927)	5%
Residential	9,319 (23,028)	5%
Urban/Commercial	6,160 (15,221)	3%
Tribal Land	4,053 (10,016)	2%
Mineral Resources	614 (1,516)	0%
Public Services	485 (1,199)	0%
Park-Recreation-Open Space	391 (966)	0%
Industrial Use	366 (905)	0%
Other	20 (49)	0%
Total	**185,554 (458,515)**	**100%**

Source: Yamhill County 2011

[1] Percent cover reported at 0% not actually zero, but a small fraction of a percent that is not shown in this table.

Figure 2-2 Land Use in Yamhill County

2.1.4 Yamhill County Managed Right-of-Way

Yamhill County manages 2,000 hectares (4,943 acres) of right-of-way (Figure 2-3) with agriculture being the primary land use (62 percent) adjacent to County managed right-of-way (Table 2-3).

Table 2-3 Land Use Adjacent to Yamhill County Managed Right-of-Ways

Land Use Adjacent to Yamhill ROW	Hectares (Acres) Managed by Yamhill County	Percent Cover[1]
Exclusive Farm Use	1,242 (3,068)	62%
Residential	295 (729)	15%
Agriculture/Forestry Large Holding	202 (498)	10%
Commercial Forestry	171 (423)	9%
Urban/Commercial	62 (153)	3%
Industrial Use	12 (29)	1%
Bureau of Land Management	7 (18)	0%
Public Services	5 (12)	0%
Parke-Recreation-Open Space	5 (12)	0%
Mineral Resources	2 (5)	0%
Other	1 (3)	0%
Total	**2,000 (4,943)**	**100%**

Source: Yamhill County 2011

[1] Percent cover reported at 0% not actually zero, but a small fraction of a percent that is not shown in this table.

ROW right-of-way

Figure 2-3 Yamhill County Right-of-Ways

Chapter 3

Covered Species

Covered Species are those animals and plants that Yamhill County requests authorization from U.S. Fish and Wildlife Service (USFWS) for incidental take due to activities on Yamhill County roads and right-of-way lands covered by this Habitat Conservation Plan (HCP). Known locations of Fender's blue butterfly (*Icaricia icarioides fenderi*), and Kincaid's lupine (*Lupinus oreganus*) and critical habitat for Fender's blue butterfly and Kincaid lupine are included in Figure 3-1 and Appendix A; photos of each species are included in Figure 3-2.

3.1 Fender's Blue Butterfly

3.1.1 Ecology

Fender's blue butterfly is a relatively small butterfly with a wingspan of approximately 2.5 centimeters (1 inch). The upper wings of the males are brilliant blue with a blackish wing margin and a white fringe of scales. The upper wings of the females are brown with 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.

Habitat requirements for Fender's blue butterfly include host plants for egg laying (oviposition) and caterpillar (larval) development. The Fender's blue butterfly uses specific species of lupine as host plants such as Kincaid's lupine or longspur lupine (*L. arbustus),* and occasionally sicklekeel lupine (*L.albicaulis*). The adults use a variety of native wildflowers for nectar food sources. Nectar sources most frequently include narrowleaf onion (*Allium amplectens),* Tolmie star-tulip (*Calochortus tolmiei),* dwarf checkermallow (*Sidalcea malviflora* ssp. *virgata),* common woolly sunflower (*Eriophyllum lanatum),* Kincaid's lupine, and Oregon geranium (*Geranium oreganum).* Although they are inferior to the native nectar sources, non-native vetches (common vetch [*Vicia sativa*] and tiny vetch [*V. hirsute*]) are also frequently used. Population size of Fender's blue butterfly has been found to correlate directly with the abundance of native nectar sources (USFWS 2010). USFWS determined that at least 5 hectares (12 acres) of high quality feeding habitat are necessary to support a Fender's blue butterfly population. However, since many prairie habitats in the region are degraded and of low quality, a larger area of degraded habitat may be required to support a similar population. If habitat is fragmented, it may only support small populations (USFWS 2010).

Figure 3-1 Known Fender's Blue Butterfly and Kincaid's Lupine Habitat in Yamhill County

Fender's blue butterfly
Photo by Dana Ross

Kincaid's lupine
Photo by Bruce Newhouse

Figure 3-2 Covered Species for the Yamhill County HCP

Kincaid's lupine is the preferred larval host plant at most known Fender's blue butterfly populations, and is used as a nectar source. Other species are also used as nectar source. At two sites, Coburg Ridge and Baskett Butte, in Lane County, Oregon, Fender's blue butterflies were found feeding primarily on longspur lupine, even though Kincaid's lupine was present. Sicklekeel lupine is used by Fender's blue butterfly where it occurs in poorer quality habitats. Fender's blue butterfly has not been found to use broadleaf lupine *(Lupinus latifolius)*, a plant commonly used by other subspecies of blue butterfly, even though it occurs in habitats occupied by the Fender's blue butterfly (USFWS 2010).

3.1.2 Species Distribution

The Fender's blue butterfly occurs only in the Willamette Valley. As of 2010, there were about 17 populations on remnant prairies in Yamhill, Polk, Benton, and Lane counties (USFWS 2010). The Prairie Restoration Plan (USFWS 2010) estimates the current range-wide number of butterflies to be 3,000 to 5,000 individuals.

3.1.2.1 Fender's Blue Butterfly Surveys

Dr. Paul Hammond has been performing yearly surveys (conducted with ESA Section 6 funding) of Fender's blue butterfly in the Willamette Valley of Yamhill County, Oregon since the early 2000s (Hammond 2007). Two populations of Fender's blue butterfly are found in Yamhill County: Oak Ridge and Gopher Valley. In general, the Oak Ridge Area (ORA) population of Fender's blue butterfly is substantially larger than that at the Gopher Valley Area (GVA). A lone male Fender's blue butterfly was first observed at Deer Creek Park in 2003; it was not until 2005 that both male and female butterflies were observed (Hammond 2005). See Table 3-1 for overall population trends of Fender's blue butterfly by location and year.

Table 3-1 Summary of Section 6 Survey's for Fender's Blue Butterfly 2000-2010

Overall Population of Fender's Blue Butterfly by Year											
Site Name	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Oak Ridge Area	168	192	293	240	259	96	100	226	226	600	NA[3]
Gopher Valley Area	12-15	7	22	20	10-20	2	9	80-100	120-200	173	NA[3]
Deer Creek Park	0	0	0	1[1]	0	2	0	2	NO[2]	4	2

Source: Hammond 2001-2010

[1] One stray male seen, first record at this site.

[2] NO: No observations made

[3] total population estimate not possible

In general, the ORA is one of the more important populations of Fender's blue butterfly in its range in the Willamette Valley, both because it is one of the larger remaining populations, and because it is located at the most northern end of the butterfly's range in Yamhill County (Hammond 2004). Dips in the butterfly populations at the ORA in 2005 and 2006 may be partly attributed to bad weather earlier in the spring, and to surveys slightly missing the peak count of the adult flight season. However, the habitat in the ORA can also be affected by competition from non-native invasive plant species (e.g., oatgrass [*Arrhenatherum* species] and Scotch broom [*Cytisus scoparius*]), which reduce habitat for Kincaid's lupine, and therefore reduce available habitat for Fender's blue butterfly (Hammond 2005). Hammond (2007) recommended coordinating roadside management with the Yamhill County Public Works Department to improve existing habitat for the Fender's blue butterfly. The large population increase in the ORA in 2009 was attributed (Hammond 2009) to extensive management work on numerous private lands in the area (coordinated by the Soil and Water Conservation District and the USFWS), as well as favorable weather conditions during 2008 and 2009.

The Fender's blue butterfly population in the GVA is smaller than the ORA population and has ranged from 2 to 200 individuals in the last five years (Table 3-1). The large increase of Fender's blue butterfly at the GVA in 2007 is due to that being the first year a survey of the Nielsen property was performed; approximately 75 percent of the butterflies found that year in the GVA were on the Nielsen property site (Hammond 2007). The western portion of this property, bordering Gopher Valley Road, was found to be a pristine upland native bunchgrass prairie, perhaps the best example of upland prairie remaining in Yamhill County (Hammond 2007). In 2008, The Nature Conservancy acquired the Nielsen property as a conservation preserve.

3.1.3 Life History

3.1.3.1 Reproduction

An adult female Fender's blue butterfly may lay approximately 350 eggs over her 10- to 15-day lifespan, of which perhaps two or fewer will survive to adulthood. Females lay their eggs on perennial lupines referred to as host plants, which become the larval food plants, during May and June. Newly hatched larvae feed for a short time, reaching their second developmental stage (or instar) in the early summer, at which point they enter an extended dormant phase called

diapause. When the lupine plant dies back (senesces), diapausing larvae remain in the leaf litter at or near the base of the host plant through the fall and winter. Larvae become active again in March or April of the following year, although some larvae may be able to extend diapause for more than one season depending upon the individual and environmental conditions. Once diapause is broken, the larvae feed and grow through three to four additional developmental stages before entering their pupal stage. After about two weeks, they emerge as adult butterflies in May and June (USFWS 2010).

3.1.3.2 Diet

Adult butterflies feed on nectar (sugary fluid) produced by certain flower species. Insufficient nectar sources may limit Fender's blue population size. Table 3-2 provides a list of flowering plants that provide nectar sources for Fender's blue butterfly.

Table 3-2 Partial List of Plant Species Used as Nectar Sources by Fender's Blue Butterfly

Scientific Name	Common Name
Allium amplectens	Narrowleaf onion
Anthemis arvensis	Corn chamomile
Bellis perennis	Lawndaisy
Calochortus tolmiei	Tolmie star-tulip
Camassia quamash	Small camas
Cryptantha intermedia	Clearwater cryptantha
Eriophyllum lanatum	Common woolly sunflower
Hypochaeris radicata	Hairy cat's-ear
Lathyrus sphaericus	Grass pea
Leucanthemum vulgare (= Chrysanthemum leucanthemum)	Oxeye daisy
Linum angustifolium (=L. bienne)	Pale flax
Lupinus arbustus (=L. laxiflorus)	Longspur lupine
Lupinus oreganus	Kincaid's lupine
Myosotis discolor	Changing forget-me-not
Sidalcea malviflora spp. *virgata*	Dwarf checkermallow
Sidalcea campestris	Meadow checkermallow
Sidalcea nelsoniana	Nelson's checkermallow
Vicia hirsuta	Tiny vetch
Vica sativa	Common vetch
Vicia villosa	Winter vetch

Source: Schultz and Dlugosch 1999 as cited in USFWS 2010

3.1.4 Threats

Fender's blue butterfly is endangered due to habitat loss (USFWS 2000). The species relies on Kincaid's lupine as a host plant for reproduction and on lupine and other plant species described

above for nectar as a food source. Much of the native prairie habitat in the Willamette Valley has been subjected to fire suppression, invaded by non-native plants, converted to agriculture, or otherwise developed. Because these changes have reduced the amount of habitat available, remaining populations of prairie species, including Fender's blue butterfly, are mostly limited to fence rows and intervening strips of land along agricultural fields and roadsides. The remaining habitat areas have continued to decline when land use conversions occur. By nature, prairies are a transient community, requiring disturbance to prevent a transition to forest. With extensive changes in the fire regime, disturbances that maintained native prairies have been substantially altered, allowing tree and shrub species to invade and shade out low-growing plants such as Kincaid's lupine. In addition, non-native species such as Himalayan blackberry (*Rubus discolor*) aggressively overtake open spaces and crowd out native species.

Loss of native prairie has resulted in the isolation of butterfly populations, which were once inter-connected. Adult Fender's blue butterflies rarely travel farther than 2 kilometers (1.2 miles) during their life span; therefore, as the native prairie habitat continues to become fragmented and the distance between prairie sites increases, opportunities for movement of adults between populations are reduced. Populations isolated in this manner face a higher risk of extinction because they are more vulnerable to natural and human-made disturbances.

3.1.5 Conservation

Biologists from federal and state agencies and private conservation organizations are actively participating in restoration programs to improve the habitat for Fender's blue butterfly, as well as monitoring to evaluate the location and status of remaining populations (USFWS 2010). Fender's blue butterfly population trends have been correlated with lupine vigor, and abundant leaf growth appears to produce larger butterfly populations (USFWS 2010). Recent studies have shown Fender's blue butterfly populations respond positively to habitat restoration (Hammond 2010). Mowing, burning and mechanical removal of weeds have all resulted in improved habitat conditions for Kincaid's lupine and nectar species for Fender's blue butterfly, thereby providing for increased Fender's blue butterfly populations.

3.1.6 Species Status

Fender's blue butterfly was listed in 2000 under the federal Endangered Species Act (ESA) as an endangered species throughout its range, which is limited to the Willamette Valley. The primary threat identified in the endangered species listing (USFWS 2000) was habitat loss, including loss of native prairie plant species that support the reproductive cycle (Kincaid's lupine) and provide food sources for the butterfly.

3.1.7 Critical Habitat

When a species is listed under the ESA, the USFWS determines the habitat areas that are essential for conserving and recovering the species, and designates those areas as critical habitat. Critical habitat is comprised of specific geographic areas that contain habitat components that are important for the species; in some areas, the species may not currently occupy the habitat, but the area is considered essential for recovery of the species (USFWS 2009).

USFWS designated critical habitat for Fender's blue butterfly on October 31, 2006 (USFWS 2006a). Thirteen critical habitat units have been designated in Benton, Lane, Polk and Yamhill

counties, Oregon. Of these thirteen units, two occur in Yamhill County, encompassing 28.9 hectares (71.3 acres), most of which occur on private land. The critical habitats designated in Yamhill County include private land occurring within northern Yamhill County, within the Oak Ridge habitat network and private lands, and within southern Yamhill County along Gopher Valley Road (USFWS 2006a). Critical habitat designations include identification of primary constituent elements (i.e., those physical and biological features essential to the conservation of the species), which are then used to evaluate potential effects on the species and their critical habitat during ESA consultations.

The primary constituent elements of critical habitat for the Fender's blue butterfly are:

1. Upland prairie, wet prairie, or oak grassland habitat with a mix of low-growing grasses and forbs, an absence of dense canopy vegetation, and undisturbed subsoils.

2. Larval host-plants such as Kincaid's lupine longspur lupine, or sicklekeel lupine.

3. Adult nectar sources, such as tapertip onion, narrowleaf onion, Tolmie star-tulip, small camus, clearwater cryptantha, common woolly sunflower, Oregon geranium, Oregon iris (*Iris tenax)*), pale flax (*Linum angustifolium),* blue flax (*Linum perenne),* meadow checkermallow (*Sidalcea campestris),* dwarf checkermallow, bird vetch (*Vicia cracca),* common vetch, and winter vetch.

4. Stepping-stone habitat, consisting of undeveloped open areas with the physical characteristics appropriate for supporting the short-stature prairie oak savanna plant community (such as well drained soils), within 2 km (1.24 miles) of natal lupine patches. This allows butterflies to move between small populations, providing a network of populations that may allow butterflies to expand their distribution.

Critical habitat does not include human-made structures existing on the date of the critical habitat ruling (October 31, 2006) that do not contain one or more of the primary constituent elements (e.g., buildings, aqueducts, airports, and roads, and the land on which such structures are located).

3.1.8 2011 Presence / Absence Survey for Fender's Blue Butterfly

The County conducted presence/absence surveys in 2011 for Fender's blue butterfly and Kincaid's lupine at the 12 USFWS known Fender's blue butterfly locations (USFWS known locations) along Yamhill County right-of-ways (Appendix B and Appendix C). Typically Fender's blue butterfly surveys are conducted in mid-May through early June during the flight period and when conditions are conducive to butterfly activity (1000-1600 hours, sunny, >60°F). However, in 2011, flight seasons were delayed due to the unusually cool, wet, and cloudy conditions (the majority of the presence/absence surveys were conducted in late May through June).

Surveys were conducted by slowly walking a given roadside and inspecting the right-of-way for butterflies. A butterfly net was used to flush insects from roadside vegetation and to catch butterflies for in-hand identification on some occasions. The USFWS known locations are designated by general road locations. GVA sites occur within the vicinity of Gopher Valley

Road, and ORA sites occur within the vicinity of Oak Ridge Road. Fender's blue butterfly was documented at seven of the USFWS known locations and not observed at five locations (Table 3-3). Historically, Fender's blue butterfly is usually present at two of these five locations (GVA 1 and GVA 5; [Appendix B]). During the surveys, Fender's blue butterflies were observed in the vicinity of Kincaid's lupine, but the butterfly was not found everywhere that Kincaid's lupine was present. Appendix C contains maps of the USFWS known locations.

Table 3-3 Summary of Survey Results for Fender's Blue Butterfly at Known USFWS Locations in Yamhill County in 2011

Site Name	Site (Description)	Fender's Blue Butterfly Observed
GVA1[1]	Gopher Valley Rd., vicinity Dupee Valley Rd. N to Agee Lane	No
GVA 2	Gopher Valley Rd., Yamhill Oaks, The Nature Conservancy Property	Yes
GVA 4	Intersection Gopher Valley Rd. and Agee Lane	No
GVA 5	Deer Creek Park	No
GVA 6	Muddy Valley Rd.	No
Rock Creek	Rock Creek	No
ORA1[2]	North side Oak Ridge Rd., near intersection with Fairdale Rd.	Yes
ORA 2	South side Oak Ridge Rd., near intersection with Fairdale Rd.	Yes
ORA 3	North Oak Ridge Rd.	Yes
ORA 5	Old Moores Valley Rd.	Yes
ORA 6	Moores Valley Rd.	Yes
ORA 7	Hacker Rd.	Yes

Source: Ross 2011

[1] USFWS designation for Gopher Valley Area

[2] USFWS designation for Oak Ridge Area

3.2 Kincaid's Lupine

3.2.1 Ecology

Kincaid's lupine is a long-lived perennial plant in the pea family (Fabaceae). It has palmately compound leaves clustered at the base of single, unbranched stems, and produces unbranched flowers of whitish-purplish to tan color. Kincaid's lupine can be distinguished from other Willamette Valley lupines by its characteristic low growth height and unbranched flower (e.g., Kincaid's lupine is lower to the ground and does not have branching in the flowers). Its aromatic flowers have a shape that is slightly curved backward, a distinctly ruffled banner, and are yellowish-cream colored, often showing shades of blue on the bottom edge of the flower. The leaflets are deep green with a smooth upper surface. The plants are 40.6 cm (16 inches) to 76.2 cm (30 inches), with flowering stems that exceed the height of the branched crown of the plant. Flowering typically occurs in May and June.

3.2.2 Species Distribution

Kincaid's lupine occupies sites throughout the Willamette Valley, a few sites in the Umpqua River Basin, and one site in southern Washington. The northern limit of Kincaid's lupine is

Lewis County, Washington, and it ranges south to Douglas County, Oregon. Within the Willamette Valley, Kincaid's lupine typically occurs in upland prairies on the valley bottom or surrounding foothills. Kincaid's lupine is the primary host plant for the Fender's blue butterfly (see Section 2.1) (USFWS 2010).

At the time of listing, there were 54 known sites of Kincaid's lupine, covering 158 hectares (370 acres): two in Lewis County, Washington; 48 within the Willamette Valley, Oregon; and four populations in the Umpqua Valley, Oregon (USFWS 2000). Of these 54 sites, 45 occurred on less than 3.4 hectares (8.3 acres). In Yamhill County, there are two known populations. These occur primarily in the Oak Ridge and Gopher Valley areas.

3.2.3 Life History

Seeds are dispersed from fruits that open explosively upon drying in mid-summer (USFWS 2011). Kincaid's lupine can live up to 25 years (USFWS 2000). The species reproduces by seed and also spreads vegetatively through root growth. The flowers are visible in May and June. Kincaid's lupine relies on insects for pollination. Seed production is variable, but the average is estimated to be approximately 47.1 seeds per square meter of leaf cover (estimated from data reported by USFWS 2006b). Lupine leaf cover correlates with lupine abundance, and has been adopted as the standard metric for determining lupine abundance (USFWS 2006b).

3.2.4 Threats

The primary threats to Kincaid's lupine are habitat loss, competition from non-native plants, and elimination of historical disturbance regimes (USFWS 2006b).

Habitat loss from a wide variety of causes (e.g., urbanization, agriculture, silvicultural practices, and roadside maintenance) has been the single largest factor in the decline of Kincaid's lupine (USFWS 2000). Land development and alteration in the prairies of western Oregon and southwest Washington has been so extensive that the remaining nine populations are relegated to small, isolated patches of habitat. Habitat loss is likely to continue as land use changes over time; at least 49 of 54 sites occupied by Kincaid's lupine in 2000 at the time of listing occurred on private lands and are at risk of being lost unless conservation actions are implemented (USFWS 2006b).

Habitat fragmentation, geographic isolation, and hybridization with other lupine species may be reducing the genetic fitness of Kincaid's lupine by inhibiting seed production and affecting the species' ability to adapt over time to changing conditions. Hybridization between Kincaid's lupine and longspur lupine has been found at Baskett Slough National Wildlife Refuge (USFWS 2006b), and could be occurring in other locations in the Willamette Valley. Invasion by non-native plants has severely degraded prairie habitat quality throughout the range of Kincaid's lupine. Non-native plants often form dense monocultures (e.g., areas with only one type of plant present, rather than a mix of species, such as a large patch of blackberry compared to a mix of grasses and perennial species) which compete for space, water, and nutrients with the native prairie species. These dense mats of invasive plants inhibit the growth and reproduction of Kincaid's lupine by shading out the lupine plants (USFWS 2006b).

Prairies require frequent disturbances to hold back the natural invasion (succession) of trees and shrubs. Before settlement by Euro-Americans, the regular occurrence of fire maintained the open

prairie habitats essential to Kincaid's lupine. The loss of a regular disturbance regime, primarily fire, has resulted in the decline of prairie habitats. The spread of native and nonnative trees and shrubs has shaded out native prairie species and allowed the establishment of nonnative grasses and other plants. When Kincaid's lupine was listed, USFWS estimated that in the range of Kincaid's lupine, 83 percent of upland prairie sites were changing to forest land (USFWS 2006b).

3.2.5 Conservation

Natural processes that maintain open grasslands have been altered to the point that intervention is needed to prevent further loss. Historically, large-scale fire played a role in maintaining grasslands in an open state. Today, grassland remnants are no longer maintained by fire due to fire suppression efforts. Where possible, controlled burning or careful mowing and clearing are used to manage grassland ecosystems. However, Kincaid's lupine is host to the endangered Fender's blue butterfly; thus, management actions have to be carefully planned in order to avoid harming the butterfly (USFWS 2011).

3.2.6 Species Status

Kincaid's lupine was listed as threatened under the ESA in 2000 (USFWS 2000). A recovery plan for Kincaid's lupine and several other native prairie species of western Oregon and southwestern Washington was released in 2010 (USFWS 2010).

3.2.7 Critical Habitat

USFWS designated critical habitat for Kincaid's lupine on October 31, 2006 (USFWS 2006a). Two hundred and thirty seven hectares (585 acres) of habitat in Benton, Lane, Polk, and Yamhill counties, Oregon and Lewis County, Washington have been designated. Thirteen critical habitat units have been designated for Kincaid's lupine. Of these 13 units, four occur in Yamhill County, encompassing 57.3 hectares (141.7 acres). Of the 57.4 hectares (141.7 acres), 56.7 hectares (140 acres) occur on private land and 0.7 hectare (1.7 acres) occurs on state land (USFWS 2006a).

The designations in Yamhill County include the following: private land in the northern part of the County along Oak Creek Road; private land along the east and west sides of Gopher Valley Road near its intersection with Dupee Valley Road; private lands located west of Muddy Valley Road and south of Eagle Point Road; and Oregon Department of Transportation land south of Highway 18, east of Ballston Road, and approximately 1 km (0.6 miles) south of the Yamhill River (USFWS 2006a). Appendix A shows the location of the designated critical habitat.

Primary constituent elements essential to the conservation of Kincaid's lupine include:

- Upland prairie, wet prairie, or oak grassland habitat with a mix of low-growing grasses and forbs, an absence of dense canopy vegetation, and undisturbed subsoils.
- The presence of insect pollinators, such as bumblebees, with unrestricted movement between existing lupine patches.

3.2.8 2011 Survey for Kincaid's Lupine

Botanical surveys completed by the County during the growing season are presented in Appendix B (Salix Associates 2011a/b). In June 2011, 13 USFWS known locations for Kincaid's

lupine were surveyed utilizing protocols developed in collaboration with the USFWS to document presence of Kincaid's lupine as well as other federally-listed plants and native species. Kincaid's lupine surveys at the USFWS known locations were conducted by the surveyor walking each side of the right-of-way; occasional surveying was done into the right-of-way (perpendicular to a road) in wide areas to increase detectability. Due to the cool, wet spring, not all of the Kincaid's lupine observed were in flower. However, most were in bud and easily visible to the surveyor.

Kincaid's lupine was documented at 10 of the 13 sites (Appendix B) and occurred in the foreslope at 4 sites (Table 3-4). Two other lupine species, many-leaved lupine (*L. polyphyllus*) and small-flowered lupine (*L. polycarpus*), were noted in or near the survey sites. These are readily distinguished from Kincaid's lupine without technical botanical analysis. Many-leaved lupine is much larger and grows in moist to fairly wet areas. Small-flowered lupine is much smaller, and has much smaller flowers and inflorescences. It generally grows in areas with little competition from vegetation, such as road shoulders.

In late June, at the suggestion of USFWS, dispersal zone surveys covering an area with a radius extending 2 km (1.24 mile) outward from the USFWS known locations were conducted to determine if additional Kincaid's lupine were within the Fender's blue butterfly dispersal zone. Both sides of each of the designated roadways were driven slowly on the far right edge of the pavement. Portions of these areas that were walked for the previous survey were excluded. Areas excluded were driven at a normal speed without surveying. The 2 km (1.24 mile) survey occurred slightly past the peak of the flowering "window" that would have allowed for the highest detectability of Kincaid's lupine, leaving the possibility that some lupine plants were not seen. Most lupine plants observed were past their flowering period, and flowers were either not present, present but only at the top of a stalk, or partially present but partly brownish in color. Some of the lupine population observed consisted of one or a few vegetative plants partially concealed by surrounding vegetation.

Kincaid's lupine was found at seven new undocumented Yamhill County Road right-of-way areas: Tupper Road, Oak Ridge Road, Beaver Creek Road, Moores Valley Road, Gopher Valley Road, Old Moores Valley Road, and Panther Creek Road (Appendix D) and occurred in the foreslope at one site (Table 3-4). Broadleaf lupine and many-leaved lupine were also seen during this survey. Broadleaf lupine was particularly numerous in western portions of the Oak Ridge area. Fender's blue butterflies do not use broadleaf lupine as a nectar species. Broadleaf lupine can occupy habitats similar to those where Kincaid's lupine might occur, however, it can be separated from that species using differences in flower parts (petal shape) and leaf hairs. It generally grows in association with conifer forests, but can overlap with Kincaid's lupine on edges or in gaps in mixed forest habitats. Kincaid's lupine and broadleaf lupine grow together at the Oak Ridge Road Site location listed in Table 3-4. Many-leaved lupine is larger in all its parts, has lateral branches not ending in racemes, and grows in moist to somewhat wet areas. It was observed in several moist locations during the survey, primarily in ditches. The flower color of many-leaved lupine can range from white to muddy pink-purple to blue-purple, but all the plants observed were white (or very pale).

A summary of the 2011 surveys results is presented in Table 3-4.

Table 3-4 Summary of Survey Results for Kincaid's Lupine at Known USFWS Locations and the 2 km (1.24 mile) Dispersal Zones in Yamhill County in 2011

Site Name	Site (Description)	Kincaid's Lupine Present	Kincaid's Lupine Observed in the Potential Impact Zone	Approximate Number or Size of Area of Kincaid's Lupine[4,5]
USFWS Known Locations				
GVA[1] 1	Gopher Valley Rd., vicinity Dupee Valley Rd. N to Agee Lane	Yes	No	8 clumps
GVA 2	Gopher Valley Rd., Yamhill Oaks, The Nature Conservancy Property	Yes	No	2 large and many small patches
GVA 4	Intersection Gopher Valley Rd. and Agee Lane	No	No	None found
GVA 5	Deer Creek Park	Yes	No	208 plants
GVA 6	Muddy Valley Rd.	No	No	None found
Rock Creek	Rock Creek	No	No	None Found
Meadow Lake[2]	Meadow Lake	Yes	No	NA
ORA[3] 1	North side Oak Ridge Rd., near intersection with Fairdale Rd.	Yes	No	217 plants
ORA 2	South side Oak Ridge Rd., near intersection with Fairdale Rd.	Yes	Yes	185 plants plus 1 large patch leading to a patch; one clump; then hundreds of plants.
ORA 3	North Oak Ridge Rd.	Yes	No	414 plants plus 115 clumps
ORA 5	Old Moores Valley Rd.	Yes	Yes	769 clumps
ORA 6	Moores Valley Rd.	Yes	Yes	41 clumps
ORA 7	Hacker Rd.	Yes	Yes	90 clumps/patches
Kincaid's Lupine Documented During the 2 km Dispersal Survey				
Tupper Road	Tupper Rd.	Yes	No	NA
Oak Ridge Road	Oak Ridge Rd.	Yes	No	NA
Beaver Creek Road	Beaver Creek Rd.	Yes	Yes	NA
Moores Valley Road	Moores Valley Rd.	Yes	No	NA
Gopher Valley Road	Gopher Valley Rd.	Yes	No	5 clumps
Old Moores Valley Road	Old Moores Valley Rd.	Yes	No	NA
Panther Creek Road	Panther Creek Rd.	Yes	No	NA

Source: Salix Associates 2011a/b

[1] USFWS designation for Gopher Valley Area

[2] Meadow Lake was added as a known location after the surveys were complete. Fender's blue butterfly surveys were not performed at this location.

[3] USFWS designation for Oak Ridge Area

[4] The number of plants is difficult to determine, as plants are somewhat clumpy, but may be rhizomatous. It is difficult to tell if a "clumpy patch" is one or more individual plants, so the "number or plants" should be interoperated very generally as "number of clumps" A clump of lupines growing from a branching root crown is a clump. A patch of lupine contains multiple clumps.

[5] NA - Not available: Plant counts were not taken.

3.3 Listed Species Not Covered

Listed species not included for coverage in this HCP include:

- Taylor's checkerspot (*Euphydrayas editha taylori*) – candidate

This species occurs in a prairie habitat; however, they are unlikely to be affected by Yamhill County road maintenance activities. The Taylor's checkerspot is only found at one site in Benton County on property owned by the Weyerhauser Company. Therefore, it is unlikely that activities occurring in Yamhill County would affect this species. Should Taylor's checkerspot occur in the County, the mitigation and minimization measures identified in Chapter 6 for Fender's blue butterfly would also help protect this species.

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Chapter 4

Covered Activities

This chapter describes the activities and projects within the area included in this Habitat Conservation Plan (HCP) that are covered by an incidental take permit and for which the HCP provides avoidance, minimization and mitigation for effects to covered species in Chapter 6, Conservation Measures. Incidental take authorization is sought for road maintenance activities generally described in this chapter.

An activity is covered under this HCP if the effects of the activity are evaluated in Chapter 5, Effects Analysis, and:

- There is sufficient take coverage available under the incidental take permit issued to Yamhill County for the activity.
- The activity does not preclude achieving the biological goals and objectives of this HCP.
- The activity is under the jurisdiction of Yamhill County.
- The activity occurs within the HCP Area.
- The activity occurs within the term (30 years) of the incidental take permit.

Yamhill County (County) is seeking coverage for its road maintenance activities conducted on 1,090 km (677 miles) of County roads and right-of-ways. These activities are conducted pursuant to the County's mission to provide essential services to the residents, businesses, and visitors of the County, specifically to maintain county roadways to protect public safety and to enhance the quality of life in Yamhill County. Road maintenance activities the County undertakes are described in this Chapter. Subsequent Chapters 5 (Effects Analysis) and Chapter 6 (Conservation Measures) evaluate potential effects to covered species and present avoidance, minimization and mitigation measures to offset expected effects.

4.1 Road Maintenance Activities within the Yamhill County Right-of-Way

This HCP applies to maintenance activities used for all roads and land within the County right-of-way. Typical activities are listed in Table 4-1. For some roads, the County's right-of-way starts at the road centerline and extends 9.1 meters (30 feet) on either side; for other roads, the right-of-way width from centerline is 4.8 meters (20 feet). The access road to Deer Creek Park extends 5.0 meters (16.5 feet) from centerline.

County right-of-way is divided into two distinct sections based on the activities performed in these sections of right-of-way: 1) the first 1.52 meters (5 feet) from the shoulder of the road to the back of the ditch, referred to as the "Potential Impact Zone" and 2) the remaining 4.57 meters (15 feet) from the back of the ditch to the end of the right-of-way, referred to as the "No Impact Zone." The Potential Impact Zone represents the area where normal maintenance activities occur. The No Impact Zone represents the area where normal maintenance is not performed.

Table 4-1 Maintenance Activities Occurring on County Roads

Maintenance Activity	Paved County Roads (631 km (392 miles))	Gravel County Roads (459 km (285 miles))
Mowing	•	•
Brush Cutting	•	•
Spraying (hand application and broadcast)	•	•
Large Tree and Shrub Removal	•	•
Snow Plowing	•	•
Sign Posting	•	•
Drainage Maintenance	•	•
Seeding	•	•
Emergency Earth Removal	•	•
Road Improvements	•	•
Soft Spot Dig-Outs	•	•
Grading and Gravel Placement	-	•
Dust Abatement	-	•
Grinding	•	-
Hot Mix Asphalt Concrete (HMAC) Overlay	•	-
Chip Sealing	•	-
Crack Sealing	•	-
Shoulder Preparation and Rocking	•	-
Sweeping and Washing	•	-
Centerline and Fog-Line Striping	•	-
Deicing	•	-
Sanding	•	•

• Activity occurs on this road type

- Activity does not occur on this road type

Of the total of 1,090 km (677 miles) of road currently maintained by the County, 631 km (392 miles) are paved roads and 459 km (285 miles) are gravel roads (Table 4-1). All roads that were considered in this HCP are listed in Appendix E, Yamhill County Roads.

Several terms are used in the following discussion of road maintenance (see Figures 4-1 and 4-2). *Road prism* includes the ditch, the shoulder and the roadbed. *Foreslope* is the slope from the edge of the shoulder to the bottom of the ditch or to the bottom of the roadway fill. *Backslope* is the slope from the bottom of the ditch to natural ground, on the opposite side of the foreslope. The *shoulder* is a gravel section adjacent to the paved surface of a paved road. It is ideally a minimum of 0.6 meter (2 feet) wide. The *shoulder* is included in the *road prism.*

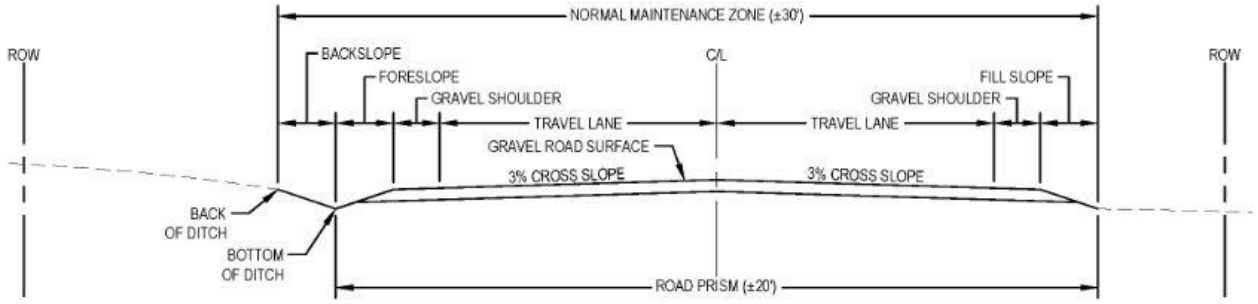

Figure 4-1 Typical Section for a Gravel Road

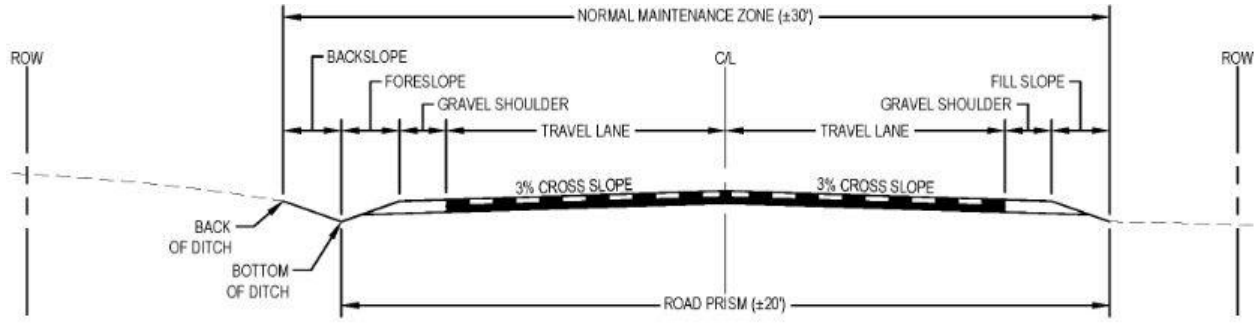

Figure 4-2 Typical Section for a Paved Road

4.1.1 Vegetation Control

4.1.1.1 Mowing

Mowing along the County road right-of-way is generally done twice a year between April and November (Figure 4-3). This is generally done from 0.9 to 1.2 meters (3 to 4 feet) on the foreslope. Mowing controls or removes vegetation from the edge of the road that impairs the sight distance of drivers or obscures wildlife, traffic signals, signs, and curves in the roadway. A mower is driven along the road with a lateral cutter that is suspended out over the side of the road. The mower does not leave the road to perform this maintenance.

The County is considering use of a combination mower/sprayer unit, which would allow the County to spray a chemical growth retardant product (such as Roundup™) immediately after mowing to reduce the frequency of mowing necessary in these locations. The chemical growth retardant spray released from this unit would not extend past the mower arm. This is also discussed in the following section on Spraying (Section 4.1.1.3).

Figure 4-3 Typical Mowing Activity on County Roads

4.1.1.2 Brush Cutting

Brush cutting is performed as needed when line of sight is obscured or there is vegetative encroachment on the roadway (Figure 4-4). A brush cutter also operates by driving along the roadway with a cutter arm extended out over the shoulder to remove brush by cutting limbs and stalks. Plant material is chipped on site. Mowing and brush cutting are also effective in controlling invasive non-native plant species. The brush cutter also does not leave the road to perform this maintenance.

Figure 4-4 Typical Brush Cutting Activity on County Roads

4.1.1.3 Spraying

Noxious weeds may be controlled with the use of herbicides consistent with Oregon Revised Statute 570.505, Oregon Administrative Rule 603-052-1200, and USFWS policy. Pre- and post-emergent herbicides are applied along road shoulders to control grasses and weeds. The products currently used to control grass are Embark®, Accord®, Landmark®, and Perspective™; these or similar products would be used in the future. Spraying for invasive species (i.e., Himalayan blackberries and Scotch broom) is done on both paved and gravel roads if they affect sight distance or safe road passage or threaten the structural integrity of the roadway. Broadcast spraying is done on both paved and gravel roads and is illustrated in Figure 4-5. The sprayer is attached to a truck on an adjustable boom that can be extended parallel to the road surface to adjust the distance the spray extends from the edge of the pavement. The sprayer boom can also be adjusted so that it sits perpendicular to the road surface, to allow spraying on taller brush and broadleaf plants. In spring, the shoulders of about 40 percent of County paved roads are sprayed, which generally includes about 0.6 meters (2 feet) of the shoulder. Broadcast spraying on gravel roads is done as needed for invasive species control and to provide for safe sight distances.

Site and weed-specific spot application of broadleaf herbicide is used to control invasive and/or problematic species periodically during the spring. The product currently used for spring broadleaf control is Garlon® 3a. This or a similar product would be used in the future. Most of the broadleaf herbicide for Himalayan blackberry control is applied in the fall. The product currently used to control blackberries is Escort®. This or a similar product would be used in the future.

Herbicides are applied by a County employee or contractor (who holds a Public Pesticide Applicators License) in a manner consistent with label requirements and regulations. Herbicides are applied in conjunction with grading, mowing, and brush cutting, where feasible, to maximize effectiveness. Herbicides are applied during acceptable atmospheric conditions (calm, light wind) and during the appropriate season for the target species.

Figure 4-5 Typical Broadcast Spraying Activity on Paved Road

4.1.1.4 Large Shrub and Tree Removal

Shrub and tree removal occurs year-round as needed. Hazard trees are taken down by chainsaw and are generally donated for firewood or given to the landowner.

4.1.2 Winter Road Treatments

Deicer (liquid magnesium chloride) is applied to halt or delay the formation of ice and/or frost on paved roads during the late fall or winter. The County uses a contractor to apply liquid magnesium chloride on the travel lanes of paved roads at known hazard locations, curves, intersections, and shady spots that have a history of ice-related accidents.

Sanding is done primarily on paved roads to abate public hazards and improve traction during icy or snowy conditions, which generally occur between late October and February. The sand material is applied by sanding trucks with rotating sand applicator disks. The sand material includes a small amount of salt (27 kilograms [kg] [60 pounds] salt to 20,000 kg [44,092 pounds] of sand) to keep sanding material from freezing in the storage pile and the truck bed.

Snow plowing is done to remove snow and ice to improve winter driving conditions. It occurs on both paved and gravel roads in the winter. Snow is deposited along the side of the road and allowed to melt naturally.

4.1.3 Sign Posting

Sign posting occurs throughout the year on gravel and paved roads to maintain existing signs and occasionally install new signs. Sign location is governed by the Manual of Uniform Traffic Control Devices and generally occurs within the Potential Impact Zone. This activity involves digging a post hole for the sign foundation, installing the post foundation, and installing the post and sign. A normal replacement schedule is once every 5 to 10 years due to environmental weathering; however, vandalism can significantly change that schedule.

4.1.4 Drainage Maintenance

Drainage maintenance activities include cleaning and/or replacing existing culverts and clearing filled ditches and culverts on non fish-bearing streams. Drainage activities are scheduled during the dry season whenever possible. However, some work occurs in the wet periods during fall, winter and spring months. Ultimately, the schedule for drainage maintenance activities depends upon weather and land use variables. Ditches along gravel roads are generally maintained during grading operations.

Emergency drainage work to clear ditches and plugged culverts may take place during precipitation events to abate public hazards and avoid damage to or failure of parts of the road system.

Cleaning and/or replacing existing culverts is normally scheduled during the dry time of the year for convenience and to avoid water complications during periods of high surface storm water runoff. If the culvert falls within the waters of the state or United States, a permit from the Division of State Lands and U.S. Army Corps of Engineers may be required. If a U.S. Army Corps of Engineer's permit is needed, endangered species consultation would take place under Section 7 of the ESA, and no coverage is sought for these projects in this HCP. The County commits to obtaining a permit under Section 7 of the ESA, if required. The County complies with all state and federal permit requirements.

4.1.5 Seeding

Hydro-seeding or hand seeding is performed for erosion control. This is usually done in the spring or fall to take advantage of existing moisture to initiate the growth cycle. The seed mix applied is a blend of rye, fescue and bluegrass, which is often obtained from the Yamhill County Soil and Water Conservation District.

4.1.6 Emergency Earth Removal

Emergency earth removal for landslides and erosion repairs are driven by emergencies and occur most frequently during the rainy season, but can occur at any time.

4.1.7 Road Improvements

Road improvements include lane and shoulder widening activities and bike path construction. The County will occasionally perform minor widening activity along portions of their roadway, in preparation for a hot mix asphalt concrete (HMAC) overlay project. Many county roads have substandard widths (2.7- to 3.0-meter [9- to 10-foot] lane widths) for the travel lane and shoulders (0- to 0.3-meter [0- to 1-foot] shoulder widths). As the County experiences traffic growth, these substandard widths make traffic too constrained. Road widening activity provides

for a wider travel surface, typically up to 3.7-meter (12-foot) wide travel lanes and/or 0.6- to 1.2-meter (2- to 4-foot) gravel shoulders outside of the travel lane. The purpose for this activity is to provide a wider, safer road for the public to use. This activity may involve excavating banks and/or filling to expand the roadbed or shoulder area. Ditches and culverts are adjusted as part of this activity to match the new roadbed or shoulder.

Road improvements are also used to improve sight distance along the roadway, where the sight distance interferes with safe use of the roadway. Improved lines of sight may be needed for intersections, driveways and other hazardous locations to improve their safety. Road improvements may occur as emergency maintenance.

Oregon Law requires that one percent of the state highway tax funds be spent for bike path construction inside public right-of-ways. The County uses these funds to improve selected county roads to provide a safe dedicated bike path along a county road. This activity can involve cuts and fills next to the road to adjust ditches and culverts. The bike path is then constructed of an all-weather surface such as asphalt. Typically, this activity is proposed at the annual budget process, approved by the budget committee and the Board of County Commissioners and then scheduled for the next construction season. The goal of the bike paths is to connect potential bike users and points of interest such as schools, commercial areas, parks and wine country.

4.1.8 Dust Abatement

Dust abatement typically occurs from May to September on county gravel roads. The approved dust abatement material in the county is lignosulfonate. This material is water soluble and is applied to the gravel road at the end of the spring rainy season. Lignosulfonate is applied by contractors at the request of property owners who are required to pay for the application. The County offers a cost share program for residents with documented dust-related health risks.

4.1.9 Gravel Road Maintenance

Grading of gravel road surfaces is typically conducted two to four times a year to eliminate hazards, improve drainage, and reshape road surfaces damaged by surface settlement, rutting, or erosion. During the grading process, the ditches are pulled (restored to provide positive drainage and conveyance of water off the roadway), the ditch material is blended with fresh gravel as needed, and the roadway is shaped and contoured. Typically, a 3 percent crown is constructed to optimize the drainage of storm water from the road to the adjacent ditch. Figure 4-2 shows a cross section of a typical gravel roadway.

Figures 4-6 and 4-7 show a typical roadway before and after grading.

Figure 4-6 Typical Roadway Before Grading

Figure 4-7 Typical Roadway After Grading

Gravel road maintenance schedules are driven by several factors including weather, traffic, soil types, terrain and geography of the area, travel speed, vehicle weight, and construction of the roadbed. Yamhill County is divided into four districts for grading gravel roads, with a grader assigned to each district. Grader operators work in their own districts on a pre-assigned route. Gravel roads will typically be graded and have additional gravel applied as needed, generally two to three times per year. Lower volume gravel roads may be graded and graveled about two times per year; higher volume may be graded and graveled about four times per year.

Weather, soil type, and traffic volume act together to drive the maintenance schedule on a gravel road. High precipitation combined with a soil type that does not drain well, such as clay, will create a soft sub-grade condition that can pump mud up through the base of the gravel road, creating soft muddy spots and in some cases severe rutting. Depending on the severity of this condition, even normal traffic volumes can lead to higher maintenance. An increase in traffic, especially heavy truck traffic, will make this situation worse and require frequent repairs. The base rock on the road can bridge the soft sub-grade conditions with light traffic loading. Higher volumes of traffic and especially heavier vehicles (trucks) require a much stronger base to bridge the soft sub-grade. Most gravel roads are built with a relatively light base that functions well for normal traffic loads.

Travel speed on a gravel road can also be a maintenance issue. Strong acceleration and braking can cause stresses in the road surface materials and exceed the road's ability to support traffic weight. The result can be wash-boarding and rutting of the surface of the road. These symptoms are exaggerated by increased traffic volume and increased vehicle weight. Excessive road surface corrugation, wash-boarding and rutting is a significant public safety hazard and leads to a higher demand for maintenance.

The terrain and geography of the gravel road can also lead to higher maintenance requirements. Flat terrain would seem to favor a good gravel road, however if flat terrain and poor drainage combine with poor soil conditions, a higher maintenance condition can result. Steep terrain tends to encourage better drainage, however erosion and sedimentation can cause deeply eroded ditch lines, which then require maintenance to keep the drainage system functioning. Roads on steep terrain also tend to have wash-boarding issues. Steep terrain can also have dangerous conditions during snow and/or ice storms leading to more required maintenance.

Low maintenance road sections can and do have some of the characteristics described for high volume/high maintenance roads; however, the presence of lower traffic volumes and lower vehicle loads allows the roadbed to remain intact despite these issues. Moderate weather and traffic, well drained soils, moderate terrain, reasonably slow travel speeds, light vehicle weights and a well-constructed road base help to create a low maintenance gravel road, however it is rare that all of those favorable conditions are found in one spot. Low maintenance roads can become high maintenance when one of these conditions changes. The conditions that change the most frequently are weather and traffic. A prolonged wet weather stretch will increase the maintenance requirements on many County roads with poor soil sub-grades and erodible ditches, as described above. A logging, farming or rock quarry operation that starts hauling loads over a low maintenance gravel road can quickly change the road status to high maintenance for as long as the hauling operation occurs. Many of the logging, farming, or rock quarry activities are initiated by private property owners and are often seasonal or of limited duration, making the

transition from a low maintenance road to a high maintenance road a one-time or temporary occurrence. Once the hauling activity (ies) has been completed, the road would generally return to low maintenance status.

Soft spot digouts are done as needed, and generally occur in wet months during or after periods of high precipitation.

4.1.10 Paved Road Maintenance

Paved road maintenance activities include but are not limited to: soft spot dig-outs, grinding, HMAC overlays, chip sealing, crack sealing, shoulder preparation and rocking, sweeping and washing, centerline and fog-line striping, and deicing. These activities are generally seasonal in nature.

Soft spot dig-outs and grinding are two methods of repairing paved road defects and are done as needed, primarily in spring and summer months. HMAC overlays and chip seals are used to extend the life of a paved road (Figure 4-8). HMAC overlays are done during summer and early fall months to take advantage of the dry, warmer weather. Chip sealing is done in July and August. The County overlays or chip seals 3 to 5 percent of its paved roads every year. Roads are selected for this surface treatment on the basis of pavement condition. All of the above activities are performed within the existing roadway width.

Crack sealing is done during dry periods, usually during the summer or fall, however it can be done during longer dry periods in the winter as well. Crack sealing is performed on an as needed basis and typically starts about the mid-way through the life span of a paved road (approximately 20 years) and continues until its next HMAC overlay or chip seal.

Shoulder preparation and rocking is usually done in conjunction with summer paving operations to adjust the shoulder height to the new pavement height after an overlay. However, this may also occur during the fall, winter, or spring to correct vertical drop-offs that may develop due to traffic.

Sweeping and washing is done just prior to striping to provide a clean surface on which to apply the paint. Centerline and fog-line striping is done annually during dry weather, usually in the late summer or early fall after the paving season has completed. Sweeping and washing can also occur at other times of the year to address undesirable materials (such as mud or gravel) on the paved surface. Mud or gravel on the road may occur due to activities on private properties where a small amount of mud, gravel or other materials is tracked onto the road from vehicle traffic. These types of activities generally occur infrequently and are usually contained within the shoulder. If large quantities of gravel and/or mud need to be removed from the roadway, the County would sweep it up and haul it away as opposed to sweeping it on the shoulder.

Figure 4-8 Typical Maintenance Activity on a Paved Road

4.2 Utility Permitting

Utility companies are required to obtain a permit from the County whenever they wish to install and maintain utilities within the County right-of-way. Utilities are generally placed in the backslope of the right-of-way. Construction to place these utilities could involve land disturbance, including trenching and movement of heavy equipment. Land disturbance would be the most intense during the installation of underground utilities. Maintenance activities include routine or emergency repairs, minor grading, or soil disturbance and vegetation management.

Chapter 5

Effects Analysis

Chapter 5, Effects Analysis, discusses the potential effects, both adverse and beneficial, of the activities described in Chapter 4, Covered Activities, on Fender's blue butterfly (*Icaricia icarioides fenderi*) and Kincaid's lupine (*Lupinus oreganus*) within the Habitat Conservation Plan (HCP) area. Potential effects on designated critical habitat for Fender's blue butterfly and Kincaid's lupine are also described. The effects analysis discusses these potential effects prior to the implementation of avoidance, minimization or mitigation measures, which are discussed in Chapter 6, Conservation Measures. Botanical and butterfly surveys that were conducted to inform this analysis are discussed in Section 3.1.8 (Fender's blue butterfly) and Section 3.2.8 (Kincaid's lupine) of Chapter 3, Covered Species.

The effects analysis identifies activities that may result in incidental take of covered species through both direct and indirect effects. Direct effects encompass the immediate, often obvious, effect of an activity on a species or its habitat (typically direct harm or harassment to individuals and/or habitat). Examples of potential direct effects are disturbance, injury, mortality, or alterations to habitat that may occur from one of the covered activities. Indirect effects are defined as effects that are caused by, or result from, a project activity that occur later in time, but are still reasonably certain to take place. In contrast to direct effects, indirect effects can often be more subtle, and may affect species' populations and habitat quality over an extended period, long after project activities are completed.

5.1 Effect Mechanisms

This section provides a discussion of how the covered activities (Chapter 4, Covered Activities), may affect the covered species (Chapter 3, Covered Species), and describes the anticipated extent and magnitude of that potential effect. These effects can be both direct and indirect, and beneficial or adverse. The first step in the effects analysis is to understand which of the species and life stages could be affected by the covered activities. Table 5-1 presents a periodicity table showing the timing of life stages of the covered species and the overlap in time when the covered activities are most likely to occur. For each activity that overlaps in time with a covered species, the likelihood of how the covered activity would affect the life stage is presented.

Table 5-1 Timing of Covered Species Life Stages and Covered Activities

Life Stage	Fender's blue butterfly	Diapause[1]		Larvae		Adult		Egg and Larvae		Diapause			
	Kincaid's lupine	Senescent[2]		Vegetative						Senescent			
					Flowering								
Maintenance Activity	**Months**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
	Mowing	o	o	o	✓	✓	✓	✓	✓	✓	✓	✓	o
	Brush Cutting	o	o	o	✓	✓	✓	✓	✓	✓	✓	✓	o
	Spraying	-	-	-	✓	✓	✓	✓	✓	✓	o	o	-
	Large Tree and Shrub Removal	o	o	o	✓	✓	✓	✓	✓	✓	✓	✓	o
	Snow Plowing	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓
	Sign Posting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Drainage Maintenance	o	o	o	o	o	o	✓	✓	✓	o	o	o
	Seeding	-	-	✓	✓	✓	o	-	-	✓	✓	-	-
	Emergency Earth Removal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Road Improvements	o	o	o	✓	✓	✓	✓	✓	✓	✓	✓	o
	Grading and Gravel Placement	✓	✓	✓	✓	✓	o	o	o	✓	✓	✓	✓
	Dust Abatement	-	-	-	-	✓	✓	✓	✓	o	-	-	-
	Soft Spot Dig-Outs	o	o	o	o	✓	✓	✓	o	o	o	o	o
	Grinding	-	-	✓	✓	✓	✓	✓	o	o	-	-	-
	Hot Mix Asphalt Concrete (HMAC) Overlay	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-
	Chip Sealing	-	-	-	-	-	o	✓	✓	o	-	-	-
	Crack Sealing	-	-	-	-	-	✓	✓	✓	✓	o	-	-
	Shoulder Preparation and Rocking	o	o	o	o	✓	✓	✓	✓	✓	o	o	o
	Sweeping and Washing	-	-	-	-	-	-	✓	✓	✓	-	-	-
	Centerline and Fog-Line Striping	-	-	-	-	-	-	✓	✓	✓	-	-	-
	Deicing	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓
	Sanding	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓

[1]Diapause – A period of suspended development in an insect, other invertebrate, especially during unfavorable environmental conditions.

[2]Senescent – Growing old; aging.

✓Activities are typically performed during these months

o Activities occasionally occur during these months

- Activities are generally not performed during these months

Source: United States Fish and Wildlife Service (USFWS 2010). Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. Region 1 United States Fish and Wildlife Service. Portland, Oregon. Available online: http://www.fs.fed.us/r6/sfpnw/issssp/documents/inventories/cs-multi-prairie-species-2010-05.pdf

5.1.1 Direct Effects

Fender's blue butterfly and Kincaid's lupine may be directly affected by Yamhill County road maintenance activities. The precise mechanism of these effects is discussed in Section 5.2.1.1 for Fender's blue butterfly and Section 5.2.1.2 for Kincaid's lupine and Section 5.2.1.3 for critical habitat. The road maintenance activities have the potential to affect Fender's blue butterfly

adults, caterpillars, or larvae directly if the species come in direct contact with equipment, personnel, or chemicals used for routine maintenance. These effects could include death, reduced fecundity, or displacement of Fender's blue butterfly. Kincaid's lupine that occur between the edge of the road and the edge of the County road right-of-ways may be directly affected by mowing, brushing, sweeping, washing, posting signs, drainage activities, cleaning or replacing culverts, emergency earth removal, and dust abatement. These activities have the potential to remove or trample plants resulting in death. Even if the plant is not removed, seed dispersal could be affected, resulting in a decreased population size.

Grading, chip sealing, soft spot dig outs and grinding, hot mix asphalt concrete (HMAC) overlays, crack sealing, shoulder preparation and rocking, and centerline and fog-line striping activities are less likely to affect lupines. Vegetation control (mowing, brushing, and spraying) conducted during the development and flowering season of Kincaid's lupine (April – June) could negatively affect reproduction by cutting off flowers or inhibiting seed set and dispersal. However, vegetation control conducted at seasonally appropriate times (August through March) could benefit lupine plants by removing or reducing the height of competing plants, especially those that grow taller and create shade, which limits lupine growth.

5.1.2 Indirect Effects

Indirect effects that are caused by, or result from, covered activities can occur later in time, but are still reasonably certain to occur. The precise mechanisms of these effects are discussed in Section 5.2.1.1 for Fender's blue butterfly, Section 5.2.1.2 for Kincaid's lupine, and Section 5.2.1.3 for critical habitat. In contrast to direct effects, indirect effects can often be more subtle, and may affect species' populations and habitat quality over an extended period, long after project activities have been completed. For example, effects on nectar species for Fender's blue butterfly may reduce the quality of food sources, and could limit the distance that the Fender's blue butterfly is able to travel and expand its habitat range. Vegetation control may remove host or nectar species important for butterfly reproduction and foraging if it is performed during the flight window for butterflies. Spraying could also reduce the amount or geographical extent of plants that Fender's blue butterfly uses for foraging and nectar sources. This could affect Fender's blue butterfly over time by restricting their dispersal distance and limiting the potential expansion of their habitat. This, over time, may lead to a reduction in butterfly populations.

Vegetation maintenance (including mowing, brushing, and spraying) within the Yamhill County right-of-way can also be beneficial for lupines by removing or controlling species that compete for light and nutrients. This would be considered a beneficial indirect effect on Fender's blue butterfly. Selective vegetation management would promote expansion of prairie plant populations.

5.1.3 Butterfly and Plant Species Effects Assessment Methodology

Potential effects on Fender's blue butterfly and Kincaid's lupine are based on the amount of habitat with species occupancy. The effects assessment for this HCP assumed that both Fender's blue butterfly and Kincaid's lupine occupy all locations where the USFWS previously determined species presence. These locations are referred to as "USFWS known locations" (pers. comm. Collins 2011; Perritt 2011). Additional locations were found during surveys conducted in support of this HCP (Salix Associates 2011b). This additional survey was conducted at the

request of USFWS within the 2 km (1.24 miles) area around the known locations (Appendix B, Survey Reports and Appendix D, Kincaid's Lupine 2-Kilometer Buffer Survey) to identify additional suitable habitat in close proximity to the existing Fender's blue butterfly population that would allow colonization.

Using a GIS, known species locations and their designated critical habitat were overlaid with Yamhill County roads and right-of-ways to identify habitat areas that could be affected by covered activities. Potential effects on Fender's blue butterfly and Kincaid's lupine were assessed for these areas.

County right-of-way varies between 12 and 18 meters (40 and 60 feet). To be conservative, the greater distance of 18 meters (60 feet) was used. Within the 18-meter (60-foot) right-of-way, there is a 6-meter (20-foot) road prism. The road prism was eliminated from the analysis, since it does not provide usable habitat. The remaining right-of-way used for this analysis is 12 meters (40 feet) wide, 6 meters (20 feet) from the edge of each side of the road prism. This 6 meter (20 foot) County right-of-way is divided into two distinct sections:

1. Potential Impact Zone - the first 1.52 meters (5 feet) from the shoulder of the road to the back of the ditch, and

2. No Impact Zone - the remaining 4.57 meters (15 feet) from the back of the ditch to the end of the right-of-way

For reference, Figures 4-1 and 4-2) show typical cross-sections of gravel and paved roads. The Potential Impact Zone represents the area where normal maintenance activities occur. The No Impact Zone represents the area where normal maintenance is not performed. The area within these zones was calculated to provide an estimate of the habitat area potentially affected by road maintenance activities.

To determine the area inside the County's T&E Special Maintenance Zones that could potentially be affected by road maintenance activities, the known Fender's blue butterfly locations were overlaid atop the 18-meter (60-foot) right-of-way to identify the acreage that occurs within the County right-of-way. Kincaid's lupine identified within the Fender's blue butterfly 2 km (1.24 miles) dispersal zone were assigned GPS points. If the plant(s) covered 5 meters (16 feet) or less, the area was calculated as 5 meters (16 feet). If the plants cover exceeded an area greater than 5 meters (16 feet), GPS points were taken to define the entire area that the lupine occupied (Appendix D).

To determine potential effects to the covered species outside of the County's T&E Special Maintenance Zones (Appendix F), GIS was used to identify the acreage within the County right-of-way, excluding the T&E Special Maintenance Zones. This total acreage occurring outside of the T&E Special Maintenance Zones was further refined using the proportion of Kincaid's lupine identified during the 2 km (1.24 mile) dispersal survey to the acres of habitat surveyed (described below).

Within the Fender's blue butterfly 2 km (1.24 mile) dispersal zone, 118.31 hectares (292.34 acres) of habitat along 96.56 km (60.00 miles) County road was surveyed for Kincaid's lupine (Salix Associates 2011b). Kincaid's lupine was identified on 0.18 hectare (0.45 acre) during the

2 km (1.24 mile) dispersal survey. It can be surmised using this information that Kincaid's lupine would occur in 0.0015 percent of the potential suitable habitat outside the T&E Special Maintenance Zones in Yamhill County.

There are 1,283.84 hectares (3,172.43 acres) of County right-of-way outside of the T&E Special Maintenance Zones. Using the percentage calculated above, there would be a total of 1.97 hectare (4.88 acres) in the County right-of-way, including both the Potential Impact and No Impact Zone, outside of the T&E Special Maintenance Zones. The Potential Impact Zone outside of the T&E Special Maintenance Zones were given a slightly larger buffer, extending the 1.52 meters (5 foot) area to 2.01 meters (6.60 feet) to account for spray drift and brushing. This increase in the Potential Impact Zone reduces the No Impact Zone to 4.08 meters (13.4 feet) from 4.57 meters (15 feet). Of the total acreage, 0.66 hectare (1.62 acres) occurs in the Potential Impact Zone and 1.32 hectare (3.26 acres) occurs in the No Impact Zone. Therefore, 0.66 hectare (1.62 acres) could potentially be affected by the covered activities outside of the T&E Special Maintenance Zones.

To determine the area of Kincaid's lupine potentially affected by County road maintenance activities, an analysis similar to what is described above was performed. However, the area was corrected to reflect actual plant cover in the Potential Impact Zone. Kincaid's lupine surveys identified lupine occurring in the Potential Impact Zone at 4 of 13 USFWS known locations and at 1 of 7 sites in the 2 km (1.24 mile) dispersal zone (Chapter 3). The combined Kincaid's lupine cover at these five sites within the T&E Special Maintenance Zones was 0.004 hectare (0.01 acre). To determine Kincaid's lupine cover outside of the T&E Special Maintenance Zones the 0.66 hectare (1.62 acres) identified above was further refined to account for actual plant cover. Kincaid's lupine occurred in the Potential Impact Zone at 1 of 7 sites (14 percent) identified during the 2 km (1.24 mile) dispersal survey. Using this information, Kincaid's lupine would occur in 0.09 hectare (0.23 acre) of the potential suitable habitat outside the T&E Special Maintenance Zones in Yamhill County.

To determine the area of nectar plants used by Fender's blue butterfly potentially affected by County road maintenance, a 0.5 km (0.3 mile) nectar zone was drawn around known Kincaid's lupine locations. The area (hectare/acre) and frontage (km/mile) was then calculated using the Potential Impact and No Impact Zone for the area that occurs outside of the known locations, but inside of the 0.5 km (0.3 mile) nectar zone along the County right-of-way. Habitat within the 0.5 km (0.3 mile) nectar zone was not classified; for the purpose of this analysis, it was assumed that the entire area could potentially contain nectar plants.

The implementation of special maintenance practices within the T&E Special Maintenance Zones protects nectar habitat in the vicinity of known populations of Fender's blue butterfly. However, the question arose about the potential effect of road maintenance activities on forage habitat outside of the T&E Special Maintenance Zones. Since all known populations are protected by the T&E Special Maintenance Zones, potential effects to nectar species for undiscovered population of Fender's blue butterfly that may exist in Yamhill County was evaluated. To perform this evaluation, it was assumed that a total of eight "unknown" Fender's blue butterfly populations could occur in the vicinity of the County right-of way outside of the T&E Special Maintenance Zones. The forage area for Fender's blue butterfly is 0.5 km (0.3 mi) from their host site. At least 5 hectares (12 acres) of high quality habitat are necessary to support

a populations of Fender's blue butterfly, a larger quantity of lower grade habitat is required (USFWS 2010). Nectar plants within the foraging area that occur within the Potential Impact Zone of the right-of-way could be affected by County road maintenance activities.

The native nectar habitat associated with the eight unknown populations could encompass as much as 148 hectares (366 acres), of this, 32.50 hectares (80.32 acres) would occur within County managed right-of-way, with 8.15 hectares (20.16 acres) occurring in the Potential Impact Zone. This 8.15 hectares (20.16 acres) represents 5.5% of the total native nectar habitat (148 hectares [366 acres]) potentially available. The nectar habitat in the remainder of the right-of-way, 24.35 hectares (60.16 acres); would continue to be available to Fender's blue butterfly. Additional nectar habitat could also exist on the 115.5 hectares (285.7 acres) that occurs within the 0.5 km (0.3 mile) nectar zone that is outside of the right-of-way. Additional nectar habitat may be available within the forage area outside of the right-of way, this area may support nectar species that could be used by the Fender's blue butterfly.

The potential effects of County maintenance activities on nectar habitat are expected to have a de minimums effect on Fender's blue butterfly. Fender's blue butterfly have a variety of nectar sources including native and nonnative species. A partial list of nectar species is presented in Chapter 3 (Table 3-2). Adult nectar sources are identified in the recovery plan as a primary constituent element of critical habitat, however, the availability of forage habitat has not been identified as a threat to the continued existence of Fender's blue butterfly (USFWS 2010).

5.2 Effects of Road Maintenance Activities on Butterfly and Plant Species

Yamhill County contains approximately 2,000 hectares (4,943 acres) of County right-of-way along 1,090 km (677 miles) of roadway. Based on the USFWS known Fender's blue butterfly locations and the 2 km (1.24 mile) dispersal survey, populations of Fender's blue butterfly and Kincaid's lupine occur in 0.75 hectares (1.86 acres) in the Potential Impact Zone and 2.00 hectares (4.95 acres) in the No Impact Zone of the County right-of-way along 3.69 km (2.28 miles) of County roads (Table 5-2).

Table 5-2 Fender's Blue Butterfly and Kincaid's Lupine at USFWS Known Locations and 2 km Dispersal Locations Potentially Affected by Covered Activities

		Total Potential Effects		
			Potential Impact Zone 1.52 meter (5 foot)	No Impact Zone 4.57 meter (15 foot)
Site Name[1, 2]	Site Description	Km (Miles)	Hectare (Acres)	Hectare (Acres)
GVA[3] 1	Gopher Valley Rd., vicinity Dupee Valley Rd. N to Agee Lane	0.44 (0.27)	0.05 (0.13)	0.17 (0.43)
GVA 2	Gopher Valley Rd., Yamhill Oaks TNC	0.50 (0.31)	0.11 (0.27)	0.26 (0.64)
GVA 4	Intersection Gopher Valley Rd. and Agee Lane	0.04 (0.02)	NA[7]	0.00 (0.01)
Rock Creek	Rock Creek	0.45 (0.28)	0.10 (0.25)	0.31 (0.76)
Meadow Lake[4]	Meadow Lake	0.06 (0.04)	0.02 (0.04)	0.05 (0.12)
ORA[5] 1	North side Oak Ridge Rd., near intersection with	0.23 (0.14)	0.03 (0.08)	0.13 (0.31)

Table 5-2 Fender's Blue Butterfly and Kincaid's Lupine at USFWS Known Locations and 2 km Dispersal Locations Potentially Affected by Covered Activities

		Total Potential Effects		
			Potential Impact Zone 1.52 meter (5 foot)	No Impact Zone 4.57 meter (15 foot)
Site Name[1, 2]	Site Description	Km (Miles)	Hectare (Acres)	Hectare (Acres)
	Fairdale Rd.			
ORA 2	South side Oak Ridge Rd., near intersection with Fairdale Rd.	0.23 (0.14)	0.04 (0.09)	0.13 (0.31)
ORA 3	North Oak Ridge Rd.	0.75 (0.47)	0.22 (0.54)	0.54 (1.33)
ORA 5	Old Moores Valley Rd.	0.07 (0.04)	0.02 (0.06)	0.06 (0.15)
ORA 6	Moores Valley Rd.	0.05 (0.03)	0.00 (0.01)	0.02 (0.04)
ORA 7	Hacker Rd.	0.25 (0.16)	0.07 (0.18)	0.15 (0.38)
Hill Road North[6]	Hill Rd. North	0.37 (0.23)	0.04 (0.11)	0.05 (0.12)
Tupper Road	Tupper Road	0.02 (0.01)	0.00 (0.01)	0.02 (0.05)
Oak Ridge Road	Oak Ridge Road	0.01 (0.01)	0.00 (0.00)	0.00 (0.01)
Beaver Creek Road	Beaver Creek Road	0.10 (0.06)	0.02 (0.04)	0.06 (0.14)
Moores Valley Road	Moores Valley Road	0.01 (0.01)	0.00 (0.01)	0.01 (0.02)
Gopher Valley Road	Gopher Valley Road	0.01 (0.01)	0.00 (0.00)	0.00 (0.01)
Old Moores Valley Road	Old Moores Valley Road	0.04 (0.02)	0.01 (0.02)	0.00 (0.01)
Panther Creek Road	Panther Creek Road	0.06 (0.04)	0.01 (0.02)	0.04 (0.11)
	Total	**3.69 (2.28)**	**0.75 (1.86)**	**2.00 (4.95)**

Source: Salix Associates 2011a/b; Ross 2011

[1] See Appendix C for map of known Fender's blue butterfly habitat

[2] See Appendix D for map of Kincaid's lupine identified within the Fender's blue butterfly 2 km dispersal zone

[3] GVA = Gopher Valley Area

[4] Added as a known location after the initial surveys were complete. Fender's blue butterfly surveys were not performed at this location.

[5] ORA = Oak Ridge Area

[6] No surveys were performed at this site.

[7] GVA 5 does not occur within the first 5' (Potential Impact Zone) of the County right-of-way

ROW = right-of-way 18 meter (60 foot)

Effects on covered species outside of the T&E Special Maintenance Zones could potentially occur in 0.66 hectare (1.62 acres) of potential habitat along the County right-of-way. Within the above acreage, Kincaid's lupine cover occurs on 0.004 hectare (0.01 acre) of the Potential Impact Zone within the T&E Special Maintenance Zones and could potentially occur on 0.09 hectare (0.23 acre) of potential habitat outside of the T&E Special Maintenance Zones.

The County maintains Vineyard Special Maintenance Zones, which primarily occur in right-of-ways adjacent to vineyards. Herbicide spraying is not performed at any of the sites to protect grape plants, which are very sensitive to herbicides. In addition, mowing and brushing activities

are prohibited at the sites on Mineral Spring Road, Smithville Road, and Broadmead Road (Appendix F). The Vineyard Special Maintenance Zones encompass 27.52 hectares (68.01 acres) along 21 km (13 miles) of road along County right-of-way (Appendix F). Due to the above restrictions, there would be less impact on the covered species in these areas.

5.2.1 Effects Discussion

Based on the above analysis, continued County road maintenance within the right-of-way could potentially affect approximately 0.75 hectares (1.86 acres) of Fender's blue butterfly and Kincaid's lupine habitat in the Potential Impact Zone along 3.69 km (2.28 miles) of County road within the T&E Special Maintenance Zones (Table 5-2). The 0.75 hectares (1.86 acres) along 3.69 km (2.28 miles) of County road represents the area where the species is known to be present (pers. comm. Collins 2011; Perritt 2011), or where the species were identified during surveys. Effects on Fender's blue butterfly nectar plants could potentially occur over 8.26 hectares (20.4 acres) in the Potential Impact Zone along 26.82 km (16.67 miles) of County road.

Effects on the covered species outside of the known locations (T&E Special Maintenance Areas) could potentially occur in 0.66 hectare (1.62 acres) of potential habitat along the County right-of-way. Road maintenance activities could inhibit or promote the expansion of Fender's blue butterfly and Kincaid's lupine distribution. Table 5-3 identifies the effects expected from the covered activities on each of the covered species: Fender's blue butterfly and Kincaid's lupine. Table 5-4 identifies the frequency and duration of the covered activities.

Table 5-3 Yamhill Covered Activities and Mechanism of Potential Effects to Fender's Blue Butterfly and Kincaid's Lupine Habitat

Covered Activities	Fender's blue butterfly		Kincaid's lupine	
	Direct	Indirect	Direct	Indirect
Activities on Gravel and Paved Roads				
Mowing	-	+/-	+/-	+/-
Brush Cutting	-	+/-	+/-	+/-
Spraying	-	+/-	+/-	+/-
Large Shrub and Tree Removal	+/-	+/-	+/-	+/-
Snow Plowing	x	x	x	x
Sign Posting	-	-	-	x
Drainage Maintenance	-	-	-	x
Seeding	x	x	x	x
Emergency Earth Removal	-	-	-	x
Soft Spot Dig-Outs	x	x	x	x
Road Improvements	-	-	-	x
Activities on Gravel Roads				
Grading	m	m	m	x
Dust Abatement	+/-	+/-	+/-	+/-
Activities on Paved Roads				
Grinding	x	x	x	x
Hot Mix Asphalt Concrete (HMAC) Overlay	x	x	x	x
Chip Sealing	x	x	x	x
Crack Sealing	x	x	x	x
Shoulder Preparation and Rocking	-	-	-	x
Sweeping and Washing	m	m	m	x
Centerline and Fog-Line Striping	x	x	x	x
Deicing	-	-	-	x
Sanding	x	x	x`	x

+ positive effect

- negative effect

m minimal

x unlikely to affect

Table 5-4 Frequency and Duration of Road Maintenance Activities

Covered Activity	Average Frequency	Duration
Activities on Gravel and Paved Roads		
Mowing	Twice a year	7 lane miles/day
Brush Cutting	Once a year	0.5 lane mile/day
Contract Spraying (road shoulders)	Once a year	40 lane miles/day
In-house Spraying (invasive control)	Once a year	5 lane miles/day
Large Shrub and Tree Removal	Once a year	2-4 hours
Snow Plowing	Weather dependent	50 miles/day
Sign Posting	As needed	2 hours
Drainage Maintenance	Twice a year	Grader operation – 2-3 lane miles/day
Seeding	As needed	2 lane miles/day
Emergency Earth Removal	As needed	500 cubic yards/day
Road Improvements	As required for safety of the traveling public	-
Activities on Gravel Roads		
Grading and Gravel Placement	Up to four times a year	Moving operation 2 miles/shift
Dust Abatement	Citizen's permit request, once a year	6,200 gallons/day
Activities on Paved Roads		
Soft Spot Dig-Outs	Once a year	4-5 hrs/dig out
Grinding	Once a year	4-5 hrs/grind
Hot Mix Asphalt Concrete (HMAC) Overlay	Once every 20 years	2 lane miles/day
Chip Sealing	Once every 10 years	2 miles/day
Crack Sealing	Once every 10 years	½ mile/shift
Shoulder Preparation and Rocking	Once every 10 years	3 lane miles/shift
Sweeping and Washing	As needed, once a year	10 miles/day
Centerline and Fog-Line Striping	Once a year	30 miles/day
Deicing	Weather dependent, 3 times a year	50 miles/shift
Sanding	Weather dependent, 3 times a year	50 miles/shift

5.2.1.1 Fender's blue butterfly

Adult Fender's blue butterflies would be vulnerable to more types of road maintenance activities than larvae or caterpillars. The County generally performs mowing and brushing activities between April and November. Posting signs and emergency earth removal occur throughout the year as necessary, while drainage activities, such as cleaning or replacing culverts, and are generally scheduled during the dry time of the year. In a typical year in the Willamette Valley, Fender's blue butterfly normally flies from mid-May though early-mid June, with the larva dropping to the ground in mid-June or July, where it hibernates through the fall and winter. If maintenance activities occur during times when the adults are present, butterfly death could occur if equipment contacts the butterflies. Direct effects could also occur if equipment kills,

maims, or displaces caterpillars on plants during their active stage or near the soil in their dormant phase. Road improvement projects would have effects similar to those described above; however, this type of project would encompass a much larger footprint and therefore potentially affect a greater number of butterflies than other road maintenance activities.

Indirect effects on Fender's blue butterfly could occur through the loss of nectar sources or host plants as a result of vegetation maintenance, posting signs, emergency earth removal, drainage activities, cleaning or replacing culverts, and road improvement projects. These activities could lead to decreased fitness and potentially death of butterflies. There is potential for Fender's blue butterfly to experience greater pressure at nectar sources in the following areas; ORA 1, 2, and 3; ORA 5 and 6; and GVA 1, 2, and 4. Each of the three areas experience overlapping nectar zones (within the area, not overall; Appendix C) that could increase competition among the butterfly for access to high quality nectar sources. If vegetation maintenance (i.e., mowing, spraying, shrub and tree removal) is conducted in the late summer and early fall after plants have set seed and senesced (died off), it can be beneficial if it improves habitat conditions for host plant or by removing or lowering the height of plant species that compete for light and nutrients.

Grading, chip sealing, soft spot dig-outs and grinding, HMAC overlays, crack sealing, shoulder preparation and rocking, and centerline and fog-line striping are less likely to affect the butterfly both directly and indirectly than vegetation removal activities. For these activities, equipment is operated only to the ditch line of the road, and would only affect plants on the foreslope of the road. Plants have been observed growing in the foreslope of the road; however, this is not a common occurrence. Additionally, grading typically occurs during the wet winter months, when the caterpillars would be dormant; thus, only caterpillars near the base of plants in the foreslope of the road could be affected.

There are limited studies that can aid in identifying direct effects on Fender's blue butterfly from herbicide application, dust abatement (lignosulfonate) or deicer (liquid magnesium chloride). A study conducted by Bramble et al. (1997) indicates that butterfly populations are similarly affected by mechanical maintenance and herbicide application. Toxicological studies on lignosulfonate indicate that the chemical is non-toxic to humans. However, studies to determine a lethal dose to butterflies have not been performed. It is possible that direct contact with liquid magnesium chloride could affect gene expression; again, no studies have been performed specific to butterflies. Effects on Fender's blue butterfly are more likely to result from application of herbicides, which could indirectly affect the butterfly if nectar species or host species are exposed to the herbicide, resulting in a die-off. However, removal of invasive species like blackberries and scotch broom provides additional habitat for prairie species such as Kincaid's lupine, which could benefit the butterfly.

Exposure to dust abatement product (lignosulfonate) or deicer (liquid magnesium chloride) is less likely. The products are applied directly to the road bed. The only pathway into the roadside areas would be by rain runoff. The rain may carry these chemicals into the ditch, but the opportunity for direct effects on the butterfly is remote. Application of these chemicals could result in indirect effects on nectar or host species for the butterfly if they are located in close proximity to the drainage ditch, as they could be exposed to chemicals in the runoff.

Snowplowing is unlikely to affect the Fender's blue butterfly, as this activity occurs within the 6-meter (20-foot) road prism. Sanding is also unlikely to affect the Fender's blue butterfly, as there is a very small proportion of salt in the sand mixture (27 kg (60 pounds) of salt to 20,000 kg (44,092 pounds) of sand). Additionally, these activities occur in the fall and winter months when the caterpillars would be dormant. Hydro seeding is unlikely to affect the butterfly as the equipment stays on the road prism and this activity occurs along un-vegetated slopes where neither lupines, nor butterflies would be present. Hand seeding may cause trampling of caterpillars or lupines if they are present.

5.2.1.2 Kincaid's lupine

Kincaid's lupine could be directly affected by mowing, brushing, spraying, tree and shrub removal, hand seeding, drainage activities, cleaning or replacing culverts, emergency earth removal, and sign posting operations. Mowing could prevent reproduction by cutting off flowers or inhibiting seed set and dispersal. Other activities that may trample or damage listed plants, leading to death or decreased propagation include shrub removal, cleaning or replacing culverts, sign posting and emergency earth removal. Road improvement projects could have effects similar to those described above, as well as potentially reducing the population of Kincaid's lupine by digging up the plant.

Application of herbicides could kill plants or stunt growth. Application of dust abatement chemical (lignosulfonate) and deicer (liquid magnesium chloride) could affect the growth of vegetation adjacent to the roadway if it comes into contact with Kincaid's lupine. Particles of liquid magnesium chloride can get into the cells of the plants and make them less cold hardy and more susceptible to freezing (Perry n.d.). Application of lignosulfonates and liquid magnesium chloride could alter the pH of the soil, which could affect the growing environment. However, reduction of dust collecting on the plant would benefit lupine, as there would be no reduction of their photosynthetic rate (Hiarano et al. 1995).

Grading, chip sealing, soft spot dig-outs and grinding, HMAC overlays, crack sealing, shoulder preparation and rocking, and centerline and fog-line striping are less likely to affect lupines than mowing or other vegetation removal, as equipment is operated only to the ditch line of the road, and would only affect plants on the foreslope of the road. Road maintenance activities during the plant's dormant phase would be less likely to cause direct or indirect effects.

If done at the appropriate time, vegetation maintenance (including mowing, brushing, shrub and tree removal, and spraying) within the County right-of-way can benefit lupines by removing or controlling species that compete for light and nutrients. Selective vegetation management would promote expansion of lupine populations.

Snowplowing is unlikely to affect Kincaid's lupine, as this activity occurs within the 6-meter (20-foot) road prism. Sanding is also unlikely to affect Kincaid's lupine as there is a very small proportion of salt in the sand mixture. Additionally, these activities occur in the fall and winter months when the plant would be dormant. Hydro seeding is unlikely to affect Kincaid's lupine as the equipment stays on the road prism and this activity occurs along un-vegetated slopes where lupines would not be present. Hand seeding may cause trampling of lupines if they are present.

5.2.1.3 Effects on Critical Habitat for Fender's blue butterfly and Kincaid's lupine

Critical habitat is designated by USFWS to protect specific areas within the geographical area occupied by the species where physical or biological features essential to the conservation of the species are found. This habitat may require special management consideration and protection. Critical habitat has been designated in Yamhill County for Fender's blue butterfly and Kincaid's lupine.

Fender's blue butterfly critical habitat: Approximately seven percent of Fender's blue butterfly critical habitat within Yamhill County could be potentially affected by the covered activities. Yamhill County supports a total of 28.85 hectares (71.30 acres) of critical habitat for Fender's blue butterfly. Road maintenance activities will occur along only 1.62 km (1.02 miles) or 1.98 hectare (4.90 acres) of Fender's blue butterfly in critical habitat units FBB-1 and FBB-2 (Table 5-5). Appendix A, Fender's Blue Butterfly and Kincaid's Lupine Critical Habitat, provides a map showing the locations of designated critical habitat and where it intersects with road maintenance activities.

Table 5-5 Kilometers and Acres of Yamhill County Road Right-of-Way in Fender's Blue Butterfly and Kincaid's Lupine Designated Critical Habitat

Critical Habitat Units for Fender's Blue Butterfy[1]	Critical Habitat Units for Kincaid's Lupine[1]	Road Name	Km (Mile)	Hectares (Acres)
FBB[2]-1A	KL[3]-2A	Oak Ridge	0.38 (0.24)	0.46 (1.14)
FBB-1B	KL-2B	Oak Ridge	0.38 (0.24)	0.47 (1.17)
FBB-2	KL-3	Agee	0.09 (0.06)	0.10 (0.25)
FBB-2	KL-3	Gopher Valley	0.74 (0.46)	0.91 (2.25)
FBB-2	KL-3	Dupee Valley	0.03 (0.02)	0.04 (0.09)
-	KL-4[4]	Muddy Valley	0.02 (0.01)	0.17 (0.41)
		Fender's Blue Butterfly Total	**1.62 (1.02)**	**1.98 (4.90)**
		Kincaid's Lupine Total	**1.64 (1.03)**	**2.15 (5.31)**

[1] See Appendix A for map of Fender's blue butterfly and Kincaid's lupine critical habitat.

[2]FBB=Fender's blue butterfly

[3]KL=Kincaid's lupine

[4] KL-4 does not have an associated Fender's blue butterfly designated habitat unit

Kincaid's lupine critical habitat: Approximately four percent of Kincaid's lupine critical habitat within Yamhill County could be potentially affected by the covered activities. Yamhill County supports a total of 57.34 hectares (141.7 acres) of critical habitat for Kincaid's lupine. Critical habitat for lupines is mostly coincident with critical habitat for Fender's blue butterfly (Table 5-5). Road maintenance activities will occur along 1.64 km (1.03 miles) or 2.15 hectares (5.31 acres) of Kincaid's lupine critical habitat in units KL-2, KL-3, and KL-4. Appendix A, Fender's blue butterfly and Kincaid's lupine Critical Habitat, provides a map showing the locations of designated critical habitat and where it intersects with the County right-of-way.

Potential effect on critical habitat is evaluated by examining the potential effects of the action on the habitat's primary constituent elements, or the element important to the survival of the species. The primary constituent elements of critical habitat for Fender's blue butterfly include:

- Maintaining early stage upland prairie, wet prairie, or oak savanna habitat with a mosaic of low-growing grasses and forbs, an absence of dense canopy vegetation, and undisturbed subsoils;
- Larval host-plants Kinkaid's lupine, longspur lupine (L. arbustus) , or sicklekeel lupine (*L. albicaulis*);
- Adult nectar sources, such as: tapertip onion (*Allium acuminatum*), narrowleaf onion (*Allium amplectens*), Tolmie star-tulip (*Calochortus tolmiei*), small camas (*Camassia quamash*), clearwater cryptantha (*Cryptantha intermedia*), common woolly sunflower (*Eriophyllum lanatum*), Oregon geranium (*Geranium oreganum*), Oregon iris (*Iris tenax*), pale flax (*Linum angustifolium*), blue flax *(Linum perenne*), meadow checkermallow (*Sidalcea campestris*), *Sidalcea malviflora* ssp. Virgata, bird vetch (*Vicia cracca*), common vetch (V. *sativa*), and tiny vetch (V. *hirsuta*); and
- Stepping-stone habitat (small patches of habitat linking the species to larger habitat areas), consisting of undeveloped open areas with the physical characteristics appropriate for supporting the short-stature prairie oak savanna plant community (well drained soils), within about 2 km (1.2 miles) of natal lupine patches.

Road maintenance activities, such as vegetation control, spraying, shrub and tree removal, and dust abatement, could have both positive and negative effects on the primary constituent elements of critical habitat. If these activities are conducted in the late summer and early fall after plants have set seed and senesced (died off), they can be useful in restoring native prairies, larval host plants, nectar sources, and stepping-stone habitat by removing or lowering the height of plant species that compete for light and nutrients. However, if these activities are conducted during the reproduction season (April – June), they can have a negative effect on prairie ecosystems by reducing productivity of nectar and host plants or inhibiting reproduction. If maintenance activities occur from late April through June, road maintenance crews could trample, run over, remove, or otherwise prevent reproduction by flower and seed removal. Stepping stone habitat could be affected if large machinery (e.g., mowers and earthmovers) compact the soil so that prairie plant species can no longer flourish. However, this is unlikely because road maintenance machinery operates from the roadbed, where plants do not generally grow.

In addition to the effects described above, road improvement projects could negatively affect all primary constituent elements associated with the Fender's blue butterfly (prairie ecosystem, larval host plants, nectar sources, and stepping stone habitat) by digging up plants associated with these primary constituent elements. Grading, chip sealing, soft spot dig-outs and grinding, HMAC overlays, crack sealing, shoulder preparation and rocking, and centerline and fog-line striping is less likely to affect the primary constituent elements, as equipment is operated only to the ditch line of the road, and would only affect plants in the foreslope of the road. Application of dust abatement chemicals (lignosulfonate) could potentially stunt the growth of vegetation in the area adjacent to the roadway. Sanding would be unlikely to result in direct effects on the prairie habitat due to the very low proportion of salt included in the sand mixture. Maintenance activities conducted during the plants' dormant phase would be unlikely to have any effect on Fender's blue butterfly critical habitat.

The primary constituent elements of critical habitat for Kincaid's lupine include:

- Early stage upland prairie, wet prairie, or oak savanna habitat with a mosaic of low-growing grasses and forbs, and spaces to establish seedlings or new vegetative growth; an absence of dense canopy vegetation; and undisturbed subsoils.
- The presence of insect outcrossing pollinators, such as *Bombus mixtus* and California bumblebee (*B. californicus)*, with unrestricted movement between existing lupine patches.

Road maintenance activities such as vegetation control, spraying, shrub and tree removal, and dust abatement would have both positive and negative effects on the primary constituent elements. These activities are useful in restoring and maintaining native prairies by removing or reducing the height of plant species that compete for light and nutrients. Road improvement projects could negatively affect the prairie ecosystem by digging up plants. Grading, chip sealing, soft spot dig-outs and grinding, HMAC overlays, crack sealing, shoulder preparation and rocking, and centerline and fog-line striping are unlikely to affect the primary constituent elements, as equipment is operated only to the ditch line of the road. Spraying vegetation with herbicides could potentially reduce the insect pollinator population due to chemical-related mortality for a short time after spraying, but would not appreciably reduce the pollination success. Pollinators would quickly repopulate the area.

Application of dust abatement chemicals (lignosulfonate) could potentially retard the growth of prairie vegetation in the area adjacent to the roadway. Sanding would be unlikely to result in direct effects on the prairie habitat due to the very low proportion of salt included in the sand mixture. Maintenance activities, such as vegetation control, spraying, shrub and tree removal, and dust abatement conducted during a plant's dormant period would be unlikely to have any negative or adverse effect on the prairie ecosystem within Yamhill County. Road improvement projects would likely adversely affect the prairie ecosystem, due to plant removal, regardless of the timing.

Table 5-6 summarizes the effects on Fender's blue butterfly and Kincaid's lupine critical habitat from the covered activities.

5.2.2 Summary of Effects

Fender's blue butterfly and Kincaid's lupine could be affected by Yamhill County maintenance activities. Although Fender's blue butterflies could be directly affected (e.g., death) by encounters with equipment or trampling, most of the effects of the covered activities would likely be indirect effects associated with effects on Kincaid's lupine and other plant species used as nectar sources. Direct effects on Fender's blue butterflies could result from road improvement projects, depending on project timing. Adult Fender's blue butterflies, caterpillars, or larvae could be affected. Mowing and herbicide application have the greatest opportunity to have an adverse affect on listed plants and therefore indirectly adversely affect Fender's blue butterfly.

Mowing and herbicide application activities also have the greatest chance of indirectly benefiting plant species by removing competition and increasing sunlight on the ground. These factors benefit listed plants and prairie habitat. Brushing is also more likely to result in positive effects since it allows more sunlight to reach the soil, without disrupting existing colonies of listed plants. Selective vegetation management would promote expansion of lupine populations. This potential expansion of prairie habitat would indirectly benefit the Fender's blue butterfly.

Table 5-6 Yamhill Covered Activities and Mechanism of Potential Effects to Fender's Blue Butterfly and Kincaid's Lupine Critical Habitat

Covered Activities	Fender's blue butterfly Critical Habitat		Kincaid's lupine Critical Habitat	
	Direct	Indirect	Direct	Indirect
Activities on Gravel and Paved Roads				
Mowing	+/-	x	+/-	x
Brush Cutting	+/-	x	+/-	x
Spraying	+/-	x	+/-	x
Large Shrub and Tree Removal	+/-	x	+/-	x
Snow Plowing	x	x	x	x
Sign Posting	-	x	-	x
Drainage Maintenance	-	x	-	x
Seeding	x	x	x	x
Emergency Earth Removal	-	x	-	x
Soft Spot Dig-Outs	x	x	x	x
Road Improvements	-	x	-	x
Activities on Gravel Roads				
Grading	m	x	m	x
Dust Abatement	+/-	x	+/-	x
Activities on Paved Roads				
Grinding	x	x	x	x
Hot Mix Asphalt Concrete (HMAC) Overlay	x	x	x	x
Chip Sealing	x	x	x	x
Crack Sealing	x	x	x	x
Shoulder Preparation and Rocking	-	x	-	x
Sweeping and Washing	-	x	-	x
Centerline and Fog-Line Striping	x	x	x	x
Deicing	m	x	m	x
Sanding	x	x	x	x

+ positive effect

- negative effect

m minimal

x unlikely to affect

Other activities, including tree and shrub removal, hand seeding, drainage activities, cleaning or replacing culverts, emergency earth removal, or sign posting operations may affect lupine by trampling or disrupting plants in a confined area where the disturbance occurs. Road improvement projects, such as widening and bike path development, would have effects similar to those described above; however, these effects would encompass a larger footprint. Dust abatement and deicing are conducted at specific locations on County roads. Information on

lignosulfonates indicates that it can be harmful to plants, stunting growth and turning leaves brown (Environmental Protection Agency 2002). Sanding would be unlikely to result in effects on the listed species due to the very low proportion of salt included in the sand mixture. Deicing and dust abatement may affect listed plants and butterfly habitat near the edge of the shoulder or from the ditch to the road. However, this is not an area where Kincaid's lupine is generally present. During surveys, some plants were found in this area, but it is not expected to support large numbers of prairie plants or covered species.

Road maintenance activities could potentially affect Fender's blue butterfly and Kincaid's lupine designated critical habitat. Effects on upland prairie habitat, larval host plants, adult nectar sources, and stepping stone habitat would be similar to the direct and indirect effects identified above for Kincaid's lupine. Spraying vegetation with herbicides could potentially reduce the insect pollinator population due to chemical-related mortality for a short time after spraying, but would not appreciably reduce the pollination success. Pollinators would quickly repopulate the area. Maintenance activities conducted during a plant's dormant period would be unlikely to have any negative or adverse effect on the prairie ecosystem within Yamhill County.

Chapter 6

Conservation Measures

This chapter discusses the conservation measures that Yamhill County (County) would implement to reduce potential adverse effects of covered activities on the covered species and to mitigate unavoidable adverse effects within the Habitat Conservation Plan (HCP) area. These conservation measures are intended to meet the biological goals and objectives described for this HCP (Section 6.1), thereby benefiting the covered species including Fender's blue butterfly (*Icaricia icarioides fenderi*) and Kincaid's lupine (*Lupinus oreganus* var. *kincaidii;* formerly *L. sulphureus* spp. *kincaidii* [covered species]) and their habitat.

The conservation measures are designed to be comparable with the level of "take" anticipated as a result of the covered activities (described in Chapter 4). These measures would also provide a positive conservation benefit for the covered species to help their recovery. Monitoring and reporting for implementation of conservation measures would be conducted by the County or its contractors and is described in Section 6.4.The County has developed the measures in this chapter in cooperation with the United States Fish and Wildlife Service (USFWS) and the HCP Implementation Committee to avoid, minimize, and /or mitigate potential adverse effects of covered activities on covered species. Chapter 5 discussed the potential adverse effects on the covered species.

6.1 Biological Goals and Objectives

The goal of the HCP is to provide a template that governs the road maintenance activities necessary for the County to maintain safe road conditions while promoting long-term conservation and recovery of the covered species. The conservation strategies contained in this HCP build on the biological goals and objectives for these species as presented in the USFWS Recovery Plan for the Prairie Species of Western Oregon and Southwest Washington (USFWS 2010). Primary emphasis is given to:

- Preserving habitat for the covered species in the County right-of-way.
- Protecting the reproduction cycles (continued existence) of covered species in the County right-of-way.
- Increasing habitat available for the covered species in an undisturbed area outside of the County right-of-way.

Specific objectives to achieve the goals include:

- Implementing avoidance and minimization measures for road maintenance activities in the County right-of-way to reduce potential impacts on the covered species and their habitat.
- Implementing actions to benefit the covered species within County right-of-way.

- Restoring upland prairie habitat at County-owned Deer Creek Park or other areas containing suitable habitat within the County and conducting long-term management of these lands for the benefit of the covered species.

6.2 Species Conservation Measures

Species conservation measures include avoidance and minimization measures that would be implemented when road maintenance activities are undertaken within known locations for Fender's blue butterfly, Kincaid's lupine, and designated critical habitat for these species. These avoidance and minimization measures would also protect nectar species occurring within the Fender's blue butterfly and Kincaid's lupine known locations and critical habitat. In order to offset unavoidable effects to the covered species resulting from road maintenance, additional mitigation is proposed, including upland prairie habitat enhancement at County-owned Deer Creek Park. Species conservation measures are summarized in Table 6-1 and described below. Specific tasks are described for each conservation measure, as well as the monitoring and reporting requirements for that measure.

Table 6-1 Species Conservation Measures to be Implemented Within Yamhill County

Conservation Measure	Tasks
Establish T&E Species Special Maintenance Zones where covered species or designated critical habitat occurs along the County right-of-way.	▪ All T&E Special Maintenance Zones will be marked with placards at 0.5 km (0.3 mile) before and after locations of Kincaid's lupine and Fender's blue butterfly. ▪ Place additional Yamhill County T&E Special Maintenance Zone placards at the Kincaid's lupine locations (seven) identified during the 2 km (1.24 mile) dispersal survey.
Implement avoidance and minimization measures for roadside populations within T&E Special Maintenance Zones.	▪ In T&E Special Maintenance Zones, implement modified road maintenance protocols for the protection and benefit of the covered species and their habitat (including nectar species).
Enhancement of covered species habitat by control of invasive species in T&E Special Maintenance Zones.	▪ Remove invasive species within T&E Special Maintenance Zones to enhance habitat.
Designate and manage conservation areas for covered species on County land.	▪ Develop a restoration plan for Fender's blue butterfly and Kincaid's lupine at Deer Creek Park ▪ Implement upland prairie habitat restoration in Deer Creek Park.
Monitoring and reporting	▪ Annual summary and report of activities conducted associated with conservation measures. ▪ Evaluation and summary report of upland prairie habitat restoration at Deer Creek Park (annual). ▪ Integration with ongoing monitoring conducted by USFWS for Fender's blue butterfly under Section 6 grants.

6.2.1 Threatened and Endangered Special Maintenance Zones for Covered Species

Locations within the County right-of-way known to support Fender's blue butterfly, Kincaid's lupine or designated critical habitat for Fender's blue butterfly would be included in Threatened and Endangered Species Special Maintenance Zones (T&E Special Maintenance Zones). In 2005, the County established T&E Special Maintenance Zones and began modifying their maintenance activities to avoid adverse effects on Fender's blue butterfly habitat including Kincaid's lupine from road maintenance activities. The maintenance activities described below

include practices developed by the County in 2005 as well as additional practices that will apply to, and expand, the existing T&E Special Maintenance Zones. These practices will conserve covered species and protect critical habitat and nectar species while allowing the County to maintain their roads and right-of-way to preserve a safe environment for public use.

6.2.2 Avoidance and Minimization Measures

Avoidance and minimization measures will be implemented within T&E Special Maintenance Zones along the County right-of-way to reduce potential adverse effects on covered species, nectar species, and designated critical habitat. These measures are described below. Restrictions on road maintenance activities during sensitive time periods for the covered species are shown in Table 6-2. The net effect of covered activities on covered species after implementation of avoidance and minimization measures is shown in Table 6-3.

6.2.2.1 Special Maintenance Zones

The County is currently managing 11.02 km (6.85 miles) of T&E Special Maintenance Zone to protect covered species at USFWS known Fender's blue butterfly locations. The T&E Special Maintenance Zone encompasses the known location and approximately 0.50 km (0.31 mile) buffer on each end of the USFWS designated site (Appendix F). County right-of-way activities within these T&E Special Maintenance Zones would follow the avoidance and minimizations measures outlined in Section 6.2.2.

Expansion of Special Maintenance Zones to Include 2 km (1.24 Mile) Dispersal Survey

The County would create additional T&E Special Maintenance Zones to protect the seven Kincaid's lupine sites identified during the 2 km (1.24 mile) dispersal survey (Appendixes B and D), the Rock Creek, and the Hill Road North USFWS location (Appendix F). The locations of these T&E Special Maintenance Zones were identified using Geographic Information Systems (GIS) to overlay a 0.5 km (0.31 mile) nectar area over the seven locations, Rock Creek, and Hill Road North. If the 0.5 km (0.31 mile) buffer encompassed a single road, the entire area would be identified as a T&E Special Maintenance Zone. In areas where the 0.5 km (0.31 mile) buffer encompasses roads adjacent to the lupine location, land cover data and information from the 2 km (1.24 mile) dispersal survey (Appendix B) were used to identify whether the area(s) contain potential habitat. Roads containing potential habitat were included in T&E Special Maintenance Zones. Roads not containing potential habitat were not provided extra protection and have been excluded from T&E Special Maintenance Zones. An additional 11.72 km (7.28 miles) of T&E Special Maintenance Zones will be added to protect the Kincaid's lupine identified during the 2 km (1.24 mile) dispersal survey and the Rock Creek and Hill Road North locations. County right-of-way activities within these T&E Special Maintenance Zones will follow the avoidance and minimizations measures outlined below.

6.2.2.2 Activities on Gravel and Paved Roads

Mowing

The main concern with mowing is the interruption of the reproductive cycle and reduced fitness (general health and ability to expand) of the covered species. The measures to be implemented within the T&E Special Maintenance Zones would reduce potential adverse effects (e.g., death and habitat reduction) by setting the timing of mowing to reduce impacts to reproduction and

raising the mower height to avoid injury to larval butterflies. Mowing in T&E Special Maintenance Zones will include the following specific measures:

Table 6-2 Timing Restrictions in T&E Special Maintenance Zones During Sensitive Life Stages

Life Stage	Fender's blue butterfly	Diapause[1]		Larvae		Adult		Egg and Larvae		Diapause			
	Kincaid's lupine	Senescent[2]		Vegetative						Senescent			
				Flowering									
Maintenance Activity	**Months**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
	Mowing	-	-	-	-	x	x	x	x	✓	✓	✓	-
	Brush Cutting	-	-	-	-	x	x	x	x	✓	✓	✓	-
	Spraying	-	-	-	x	x	x	x	x	✓	o	o	-
	Large Tree and Shrub Removal	o	o	o	x	x	x	x	x	✓	✓	✓	o
	Snow Plowing	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓
	Sign Posting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Drainage Maintenance	o	o	o	x	x	x	x	x	✓	o	o	o
	Seeding	-	-	✓	x	x	-	-	-	✓	✓	-	-
	Emergency Earth Removal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Road Improvements	o	o	o	✓	x	x	x	x	✓	✓	✓	o
	Grading and Gravel Placement	✓	✓	✓	✓	o	o	o	o	o	✓	✓	✓
	Dust Abatement	-	-	-	-	✓	✓	✓	✓	✓	-	-	-
	Soft Spot Dig-Outs	-	-	-	-	o	o	o	o	o	-	-	-
	Grinding	-	-	-	-	o	o	o	o	o	-	-	-
	Hot Mix Asphalt Concrete (HMAC) Overlay	-	-	-	-	-	o	o	o	o	-	-	-
	Chip Sealing	-	-	-	-	-	x	x	o	o	-	-	-
	Crack Sealing	-	-	-	-	-	o	o	o	✓	o	-	-
	Shoulder Preparation and Rocking	-	-	-	o	x	x	x	x	✓	o	-	-
	Sweeping and Washing	-	-	-	-	-	-	x	x	✓	-	-	-
	Centerline and Fog-Line Striping	-	-	-	-	-	-	o	o	✓	-	-	-
	Deicing	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓
	Sanding	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓

[1]Diapause – A period of suspended development in an insect, other invertebrate, especially during unfavorable environmental conditions.

[2]Senescent – Growing old; aging.

✓Activities are typically performed during these months

o Activities occasionally occur during these months

X Activities are restricted during these months

- Activities are generally not performed during these months

Source: USFWS 2010. Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. Region 1 United States Fish and Wildlife Service. Portland, Oregon. Available online: http://www.fs.fed.us/r6/sfpnw/issssp/documents/inventories/cs-multi-prairie-species-2010-05.pdf

Table 6-3 Effect on Covered Species After Implementation of Avoidance and Minimization Measures

Covered Activities	Fender's blue butterfly		Kincaid's lupine	
	Direct	Indirect	Direct	Indirect
Activities on Gravel and Paved Roads				
Mowing	x	+	+	+
Brush Cutting	x	+	+	+
Spraying	x	+/-	+/-	+
Large Shrub and Tree Removal	-	+	x	+
Snow Plowing	x	x	x	x
Sign Posting	x	x	x	x
Drainage Maintenance	-	-	-	x
Seeding	x	x	x	x
Emergency Earth Removal	-	-	-	x
Soft Spot Dig-Outs	x	x	x	x
Road Improvements	-	-	-	x
Activities on Gravel Roads				
Grading	-	-	-	x
Dust Abatement	+	+	+	x
Activities on Paved Roads				
Grinding	x	x	x	x
Hot Mix Asphalt Concrete (HMAC) Overlay	x	x	x	x
Chip Sealing	x	x	x	x
Crack Sealing	x	x	x	x
Shoulder Preparation and Rocking	-	-	-	x
Sweeping and Washing	-	x	x	x
Centerline and Fog-Line Striping	x	x	x	x
Deicing	-	-	-	x
Sanding	x	x	x	x

+ net positive effect

- negative effect

x unlikely to affect

- The County will mow in the T&E Special Maintenance Zones between August 15 and March 1 to reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly, the reproductive timeframe for Kincaid's lupine.
- The County will not mow from March 1 through August 15 (the Fender's blue butterfly typical flight season and the time when caterpillars are likely to be present) within the T&E Special Maintenance Zones.

- Tractor mower decks will be set at a minimum of 15 cm (6 inches) above the ground to reduce potential effects on butterfly larvae. This increased deck distance from the ground will reduce the likelihood that butterfly larvae will be crushed or displaced by mowing activities.

Brush Cutting

The concern with brush cutting is similar to those described above for mowing. Brush cutting in T&E Special Maintenance Zones will include the following specific measure:

- The County will cut brush in the T&E Special Maintenance Zones only between August 15 and March 1 to reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly and the reproductive timeframe for Kincaid's lupine.

Spraying

Herbicide spraying poses the potential for butterflies and caterpillars to be killed, maimed, or displaced. Spraying may result in habitat and nectar plant reduction due to plant death. The measures below would reduce potential adverse effects by changing the timing of herbicide application to occur outside the reproductive window for the Fender's blue butterfly and Kincaid's lupine, as well as limiting the potential for drift to affect other plants occurring in the area. Spraying of herbicides in T&E Special Maintenance Zones will include the following specific measures:

- Site-specific spot application of herbicide to control invasive and/or problematic species will occur from August 15 to March 1. Herbicides may be applied to plants causing adverse shading or encroachment on Kincaid's lupine habitat and nectar species.
- Chemical treatments will follow labeled restrictions, including limitations for use near water, and will be applied by licensed applicators, using appropriate equipment.

Large Shrub and Tree Removal

Removal of large trees and shrubs could potentially kill covered species due to crushing by foot traffic, portions of the tree or shrub, or equipment. Large shrub and tree removal within T&E Special Maintenance Zones will occur only between August 15 and March 1, which will reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly. The potential to affect butterfly larval and dormant plants would still exist due to crushing by foot traffic or equipment.

Sign Posting

Sign posting could potentially kill covered species due to crushing by foot traffic or equipment. Sign location is governed by the Manual of Uniform Traffic Control Devices. Whenever possible, signs would be located 5 meters (16 feet) away from Kincaid's lupine plants, reducing the potential for adverse effects to the plants as well as the larval butterflies they may contain.

Seeding

A native seed mixture comprised of Roemer's fescue (*Festuca roemeri*), California brome (*Bromus carinatus*), and native bent grass will be used in the T&E Special Maintenance Zones to avoid introducing non-native grasses.

Non-County Work within the Right-of-Way

Work performed in County owned right-of-ways by an entity other than Yamhill County could potentially affect covered species and/or habitat. Prior to working in County managed right-of-ways, non-County entities would be responsible for consulting with USFWS to obtain the appropriate permits. If a permit is sought from the County, proof of consultation with USFWS must accompany the permit application.

Drainage Maintenance

The main concern with drainage maintenance is the potential for adversely affecting covered species present in the vicinity of the culvert or drainage conveyance structures. Individuals near the work area may be disturbed or killed by maintenance activities. Changing the timing of culvert maintenance will reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly. The potential to affect butterfly larval and dormant plants would still exist due to crushing by foot traffic or equipment. Projects requiring a U.S. Army Corps of Engineers permit are not covered under this HCP. For these projects, Endangered Species Consultation will be conducted under Section 7 by the lead agency and measures to avoid injury and additional mitigation needed to offset adverse effects on covered species will be coordinated with USFWS as part of the permitting process.

Within the T&E Special Maintenance Zones, the following restrictions for culvert maintenance and right-of-way maintenance adjacent to culverts and bridges will be implemented:

- Routine culvert cleaning and replacements will be scheduled between August 15 through October 31 to reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly and the reproductive timeframe for Kincaid's lupine.

Culvert repairs may need to be completed on an emergency basis. Emergency procedures are discussed below.

Emergency Road Maintenance Actions

Covered activities will occasionally need to be conducted on an emergency basis to maintain safety for the traveling public. In these situations, the County may not be able to follow the protocols established in the HCP for timing or accomplishing pre-work surveys. Examples of these activities include culvert replacement, ditch management, tree removal, and earth movement (landslides). If these emergency activities occur within a T&E Special Maintenance Zone and normal protocols cannot be followed, the County will notify USFWS within 48 hours that an emergency has occurred and disclose the actions taken. The County will consult with USFWS within 30 days of the emergency action to determine if additional actions and/or mitigation are required.

6.2.2.3 Gravel Road Maintenance

Minimization and mitigation measures that apply to activities conducted on gravel roads are described below.

Grading

Gravel road maintenance could disturb covered species occupying the shoulder of the road. Fender's blue butterflies present on the shoulder of the road could be killed, maimed, or displaced by grading equipment, while Kincaid's lupine could be crushed and killed. The measures described below would reduce potential adverse effects by limiting the area where grading activities can occur to avoid contact with the covered species where practical. Grading in T&E Special Maintenance Zones will include the following avoidance and mitigation measures:

- Normal gravel road maintenance activities (i.e., grading and contouring) will be restricted to the foreslope and gravel road surface. This will avoid the area where Kincaid's lupine and consequently Fender's blue butterfly most often occur.
- Excess material created during grading will not be placed on top of vegetation in the County right-of-way, but will be disposed of at designated and approved locations for receiving such materials.
- Most emergency grading repairs are due to landslide or erosion and occur during the winter months, reducing potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly and the reproductive timeframe for Kincaid's lupine. Procedures for emergency repairs are discussed above.

Dust Abatement

The main concern with dust abatement (lignosulfonates) is the potential for chemicals to spread to nearby vegetation via drift during spraying and/or rainfall and damage covered plants, some of which may be host (Kincaid's lupine) or nectar plants for Fender's blue butterfly. Application of lignosulfonates could alter the pH of the soil along the road shoulder and ditch, affecting the growing environment. The measures below would reduce potential adverse effects by employing measures to contain the lignosulfonates to the surface of the road. Application of dust abatement chemicals in the T&E Special Maintenance Zones will include the following avoidance and mitigation measures:

- All private contractors will obtain a permit from the County for each section of road that will receive a dust abatement application. Permits will include restrictions for use, such as confining materials to the roadway and having spill protection equipment on hand.
- Dust control chemicals will not be applied when it is raining. (Generally, a 3-day forecast of clear weather should follow any application of lignosulfonate).

6.2.2.4 Paved Road Maintenance

Minimization and mitigation measures that apply to activities conducted on paved roads are described below.

Shoulder Preparation and Rocking

The main concern with shoulder preparation and rocking is the death or disturbance of covered species occupying the shoulder of the road. The measures below would reduce potential adverse effects by confining the activities to areas away from the covered species where practical. Avoidance and minimization measures for road shoulder preparation and rocking within T&E Special Maintenance Zones include:

- Shoulder preparation and rocking would occur between August 15 and March 1 to reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly and the reproductive timeframe for Kincaid's lupine. If Fender's blue butterfly larvae were to occur along the shoulder of the road, the potential for death or disturbance from maintenance equipment would still exist.

Sweeping and Washing

The main concern with sweeping and washing is transporting road wash with grease and oil to the covered species along the road shoulder and ditch. Contact with these materials could lead to death or reduced fitness of the covered species. The measures below would reduce potential adverse effects by containing the activities to areas away from the covered species. Sweeping and washing avoidance and minimization measures within T&E Special Maintenance Zones include:

- Sweeping and washing would occur between August 15 and March 1 to reduce potential adverse effects by avoiding the active butterfly and caterpillar season for Fender's blue butterfly and the reproductive timeframe for Kincaid's lupine. If Fender's blue butterfly larval were to occur along the shoulder of the road and ditch, the potential for death or disturbance from maintenance equipment would still exist.

Major Road Improvements

The main concern with major road improvements is the death, maiming, or displacement of covered species occupying the shoulder of the road. When planning major road improvement project such as road widening or bike path construction activities, the County will retain a qualified botanist to perform surveys to identify covered species during the flowering season. If covered species are identified, the County will plant greenhouse-grown plants at a known location to offset the impacts of the road improvement activities. These activities will need to be scheduled the year prior to construction to allow for successful identification and planting of covered species.

6.2.2.5 Employee and Contractor Training Program

The County will improve upon their current employee training program to acquaint its maintenance staff with the covered species and the avoidance and minimization measures to be applied in the T&E Special Maintenance Zones. All County maintenance vehicles will be equipped with a manual that includes a description of the special maintenance measures, and photos of covered species. The County will provide similar training for contractors working in T&E Special Maintenance Zones, and the contractor will be required to follow the avoidance and minimization measures in this HCP.

The County will update their Take Avoidance Manual (Blue Book). This manual will include:

- Information about the covered species to help the road crew identify them in the field.
- Maps showing current known locations (with 0.5 km [1.24 mile] buffers).
- A listing of all T&E Special Maintenance Zones on County maintained roads, including beginning and ending mileposts and GPS coordinates.
- A graphic of T&E Special Maintenance Zones signs with an explanation of its codes.

6.3 Mitigation Actions

Mitigation would occur when impacts are unavoidable and would be completed at sites with appropriate habitat in the County. Mitigation may be achieved by butterfly habitat enhancement or species planting for Kincaid's lupine. Mitigation actions would occur at sites that already support the Fender's blue butterfly and Kincaid's lupine, or at sites that contain suitable habitat but do not currently have an established Fender's blue butterfly population or host plants. Mitigation would not occur at sites where there is no suitable habitat for the covered species.

Mitigation would not be required for effects on non-native nectar species for Fender's blue butterfly, as these species, many of which are considered weeds, are common across the landscape. A list of native species found along the County right-of-way is included in Appendix B. Non-native nectar species tend to repopulate quickly and would not require mitigation as ground disturbance tends to increase their cover, often at the expense of native species.

As part of the HCP, and to provide a conservation benefit for the species, the County would implement conservation measures. These include:

- Establishing additional T&E Special Maintenance Zones in 6.43 miles of road to encompass the Kincaid's lupine identified during the 2 km (1.24 mile) dispersal survey.

Enhancing habitat in 2.82 hectares (6.96 acres) of the County right-of-way in T&E Special Maintenance Zones and at Deer Creek Park. Habitat enhancement in the County right-of-way would be achieved through removal of invasive plants, trees and shrubs to allow more sunlight to reach the ground to benefit Kincaid's lupine and nectar species where practical. At Deer Creek Park, Fender's blue butterfly habitat would be restored by planting Kincaid's lupine and nectar species.

6.3.1 Mitigation Ratios and Obligation

The quantity of mitigation to be completed is identified using a mitigation ratio. For activities where habitat would be affected (e.g., mowing in the T&E Special Maintenance Zones) USFWS has indicated they would require a 1:1 ratio (one acre of mitigation for each acre affected). However, if activities lead to the destruction or elimination of habitat (e.g., major road improvement projects), a ratio of 2:1 (two acres of mitigation per acre affected) may be required. The mitigation ratios reflect the value of the lost habitat and its potential effect on covered species by lost habitat from the covered activities. The type and quantity of mitigation is determined from a combination of:

- Quality of affected habitat
- Quality of the mitigation site
- Timing of mitigation (before impacts or concurrent with impacts)
- Mitigation site status

The covered activities could potentially affect approximately 1.41 hectares (3.48 acres) of covered species habitat in the County right-of-way. This includes 0.75 hectares (1.86 acres) within the Potential Impact Zone of the T&E Special Maintenance Zones and 0.66 hectares (1.62 acre) outside the T&E Special Maintenance Zone. The T&E Special Maintenance Zones include

21.02 hectares (51.94 acres) of mitigation lands. There are also 1.22 hectare (2.99 acres) of land available at Deer Creek Park. To mitigate for the effects of the covered activities, 2.82 hectares (6.96 acres) of that land within the T&E Special Maintenance Zones and Deer Creek Park would be managed to benefit the listed species. This is a 2:1 mitigation ratio. See Table 6-4 for mitigation obligations.

Table 6-4 Mitigation Obligation

Affected Area	Affected Hectares (Acres)	Mitigation Requirement Hectares (Acres)
T&E Special Maintenance Zones (Potential Impact Zone)	0.75 (1.86)	1.50 (3.72)
County ROW[1] Outside of the T&E Special Maintenance Zones	0.66 (1.62)	1.32 (3.24)
Total	**1.41 (3.48)**	**2.82 (6.96)**

[1]ROW = right-of-way 18 meters (60 feet)

6.3.1.1 Habitat Enhancement Actions

Within one year from issuance of the incidental take permit, the County will develop habitat restoration plans in conjunction with an appropriate outside partner. The habitat restoration plans will maintain and enhance the covered species habitat within the T&E Special Maintenance Zones in the County right-of-way and at the mitigation site for Kincaid's lupine and Fender's blue butterfly habitat located in Deer Creek Park.

County Right-of-Way

County right-of-way is divided into two distinct sections based on the activities performed in these sections of right-of-way: 1) the first 1.52 meters (5 feet) from the shoulder of the road to the back of the ditch, referred to as the "Potential Impact Zone" and 2) the remaining 4.57 meters (15 feet) from the back of the ditch to the end of the right-of-way, referred to as the "No Impact Zone" (Figure 4-1 and 4-2). The Potential Impact Zone represents the area where normal maintenance activities occur. The No Impact Zone represents the area where normal maintenance is not performed. The following activities would be implemented in the No Impact Zone to help control invasive species and enhance the covered species habitat:

- Mowing to promote upland prairie habitat (Section 6.2.2.2) would be done once every 2 to 3 years between November and March.
- Brush cutting or tree removal (Section 6.2.2.2) would be done once every 2 to 3 years.
- Spot spraying to control invasive plant (Section 6.2.2.2) would be done in October and November once every 2 to 3 years.

Within the T&E Special Maintenance Zones (which includes the USFWS known locations and the 2 km (1.24 miles) dispersal survey lupine locations), there are 22.76 km (14.14 miles) of right-of-way with 6.98 hectares (17.23 acres) of land in the Potential Impact Zone, and 21.02 hectares (51.94 acres) of land in the No Impact Zone (Table 6-5).

Table 6-5 Threatened and Endangered Species Special Maintenance Zones

Site Name[1,]	Total Potential Road Effects		
		Potential Impact Zone 1.52 meter (5 foot)	No Impact Zone 4.57 meter (15 foot)
	Km (Miles)	Hectare (Acres)	Hectare (Acres)
GVA[2] 1, 2, 4, and Gopher Valley Road[3]	2.72 (1.69)	0.83 (2.05)	2.50 (6.18)
GVA 6[4]	1.59 (0.99)	0.49 (1.21)	1.48 (3.66)
Rock Creek	1.48 (0.92)	0.45 (1.12)	1.37 (3.38)
Meadow Lake and Old Moores Valley Road[3]	3.69 (2.29)	1.13 (2.78)	3.39 (8.37)
ORA[5] 1, 2, and 3, Oak Ridge Road[3]	3.56 (2.21)	1.09 (2.69)	3.27 (8.08)
ORA 5 and Old Moores Valley Road[3]	1.92 (1.19)	0.59 (1.45)	1.77 (4.38)
ORA 6 and Moores Valley Road[3]	1.37 (0.85)	0.42 (1.03)	1.26 (3.12)
ORA 7	1.00 (0.62)	0.31 (0.76)	0.93 (2.30)
Hill Road North	1.37 (0.85)	0.42 (1.04)	1.27 (3.14)
Tupper Road	1.38 (0.86)	0.42 (1.05)	1.28 (3.16)
Beaver Creek Road	0.85 (0.53)	0.27 (0.66)	0.81 (1.99)
Panther Creek Road	1.83 (1.14)	0.56 (1.39)	1.69 (4.18)
Total	**22.76 (14.14)**	**6.98 (17.23)**	**21.02 (51.94)**

[1] See Appendix F for a map of County Special Maintenance Zones

[2] GVA = Gopher Valley Area

[3]The T&E Special Maintenance Zones overlap at these areas

[4]Site is greater than 60' from the right-of-way; however, a Special Maintenance Zone has been designated in this area.

[5]ORA = Oak Ridge Area.

As stated above, the area in the No Impact Zone does not undergo routine maintenance; it would be maintained specifically for the restoration, enhancement, and management of the covered species.

Since the County cannot always control the action of others that may affect habitat in the T&E Special Maintenance Zones, there is a potential for the mitigation areas to be adversely affected by the actions of others. The County is responsible for the integrity of their mitigation areas; if an area becomes non-functional through the action of others, the County can restore or move that mitigation area to a new site, with the approval of USFWS.

The potential to affect covered species outside of the T&E Special Maintenance Zones is discussed in Chapter 5. In the area outside of the T&E Special Maintenance Zones, there is an estimated 0.66 hectare (1.62 acre) of potential Fender's blue butterfly and Kincaid's lupine habitat along the County right-of-way. No minimization or avoidance measures would be implemented, and this area is not self-mitigating as described above for the T&E Special Maintenance Zones. The County would restore Fender's blue butterfly, Kincaid's lupine, and nectar habitat along the County right-of-way and at Deer Creek Park to offset the effects in this area.

Habitat Enhancement at Deer Creek Park

Deer Creek Park is an ideal location for habitat enhancement for Fender's blue butterfly, as it already contains Fender's blue butterflies and Kincaid's lupine (GVA 5; Appendix C). Within GVA 5, which encompasses 0.32 hectares (0.78 acres), there are approximately three square meters (30 square feet) of Kincaid's lupine. An additional 0.90 hectare (2.21 acres) of suitable habitat surrounds GVA 5. The combination of these sites would provide 1.22 hectares (2.99 acres) of suitable habitat; of that, 0.40 hectare (1 acre) would be improved under a habitat restoration plan to support a population of Fender's blue butterfly and Kincaid's lupine.

The County, in conjunction with an appropriate outside partner, will develop a habitat restoration plan for Deer Creek Park within one year from issuance of the incidental take permit. Prior to implementation of the restoration plan, the USFWS will review and approve the restoration plan for Fender's blue butterfly habitat. Restoration and monitoring tasks at Deer Creek Park are anticipated to include control of invasive species, native grass seeding, and planting of Kincaid lupine and nectar species to increase habitat for Fender's blue butterfly and increase the cover of Kincaid's lupine plants. In addition, an interpretative sign will be installed to provide public outreach and educate the community about the covered species.

6.4 Monitoring and Reporting

USFWS is conducting monitoring for Fender's blue butterfly and Kincaid's lupine in the County using ESA Section 6 funding, which is allocated by USFWS to promote recovery of the species. This monitoring would continue to provide information regarding these populations. The County would work in partnership with USFWS to ensure Fender's blue butterfly locations along Yamhill County right-of-ways are surveyed, while avoiding a duplication of effort. Monitoring of Fender's blue butterfly and Kincaid's lupine would be completed by the County in the T&E Special Maintenance Zones, not including the USFWS known locations.

Monitoring for Fender's blue butterfly and Kincaid's lupine would occur at Deer Creek Park where habitat restoration, enhancement, and management would occur. This monitoring would be done annually until Kincaid's lupine is established. Once established, monitoring would occur every three years. The monitoring would determine the success of habitat restoration, enhancement, and management, as measured by tracking species status and habitat condition. Results from the monitoring efforts would be reported to the USFWS.

6.4.1 Monitoring

Monitoring would occur at sites where habitat restoration, enhancement, and management occur (T&E Special Maintenance Zones outside of the USFWS known locations and Deer Creek Park). This monitoring would be done once every three years to determine the success of habitat restoration, enhancement, and management, as measured by tracking species status and habitat condition.

Effectiveness monitoring data objectives include:

- Monitor Fender's blue butterfly populations in the portion of the T&E Special Maintenance Zones not included in Section 6 monitoring.

- Record changes in butterfly habitat quality at Deer Creek Park (plant community composition and species cover) every 3 years.
- Measure the success of habitat enhancement activities in County T&E Special Maintenance Zones (mowing, brushing, herbicide application).
- Measure the County's fulfillment of their mitigation requirements.
- Monitoring would be performed by a qualified biologist in possession of the necessary permit(s) for the activities they are conducting.

6.4.1.1 Monitoring Plans

Monitoring plans would be developed one year from incidental take permit issuance, for all sites where monitoring is required, including mitigation sites. Monitoring plans would include the following:

- Name of site
- Management goals and objectives for the site
- Species to be monitored
- Variables to be measured and data collection methods
- Frequency of monitoring
- Sampling locations
- Data analysis methods

6.4.1.2 Monitoring Timing and Frequency

Monitoring would be conducted during the flight season of the Fender's blue butterfly and the flowering season of Kincaid's lupine. This timeframe can vary from one to three weeks each year depending on the weather and differences in site conditions. Monitoring will begin with year one and occur every 3 years. HCP Implementation Committee can recommend more frequent monitoring for approval by County Commissioners and USFWS. If implementation of habitat restoration, enhancement, or management activities at a given site ceases, monitoring would be conducted for a minimum of two additional cycles after cessation of the activities.

6.4.1.3 Species Status Monitoring

Monitoring for Fender's blue butterfly and Kincaid's lupine would be completed at sites where mitigation work is performed (Table 6-6).

Abundance of each species would be measured using the following metrics:

- Fender's blue butterflies would evaluate by the abundance of Fender's blue butterfly and the quality of butterfly habitat following USFWS Section 6 monitoring protocols.
- Kincaid's lupine would be evaluated on the basis of square meters of foliar cover.

Table 6-6 Monitoring Occurrence

Monitoring Location	Monitoring Type	Occurrence
Deer Creek Park	Lupine Surveys	Annually until lupine is established, then every 3 years.
Deer Creek Park	Butterfly Surveys in Conjunction with Section 6 Surveys[1]	USFWS responsibility
Deer Creek Park	Butterfly Surveys in the Absence of Section 6 Surveys	Every 3 years
T&E Special Maintenance Zones	Lupine Surveys	Every 3 years
T&E Special Maintenance Zones	Butterfly Surveys in Conjunction with Section 6 Surveys[1]	USFWS – 13 sites
		County – 8 sites
T&E Special Maintenance Zones	Butterfly Surveys in the Absence of Section 6 Surveys	Every 3 years

[1] Surveys will be coordinate between USFWS and Yamhill County

6.4.2 Monitoring Data Management

Data on the monitoring methods, results, and analysis would be managed, stored, and made available to interested parties, including but not limited to, County staff, cooperators, technical advisors, USFWS, and the Oregon Natural Heritage Information Center. A database and clear reporting procedures would be required for incidental take permit compliance. The data would be managed to ensure accurate and up-to-date information is available for making management decisions.

6.4.3 Conservation Measure Review Process

The object of monitoring for the purpose of adaptive management is to track trends in the covered species populations and/or habitat(s) within the T&E Special Maintenance Zones and at the Deer Creek Park mitigation site. These trends can be positive or negative and are influenced by many factors, such as climate and precipitation. The Implementation Committee (see Chapter 7) has the responsibility to review the annual report and make recommendations to the Yamhill County Commissioners if conservation goals are not being achieved. The County would also alert the USFWS, who would help in suggesting additional or new actions, if needed, to fulfill the mitigation requirements of the HCP.

- The County would monitor changes to the covered species and habitat at the Deer Creek Park mitigation site through the monitoring reports outlined above and would ensure development is consistent with the management plan developed for the site.
- If trends in habitat and covered species populations are not increasing or are trending downward, actions would be taken by the County as recommended by the Implementation Committee, to reverse the trend. As appropriate, technical advice would be sought to assist the Implementation Committee and County in making on-the-ground decisions and changes to the management plan.
- The revised management techniques agreed upon by the County and USFW and would be employed at the site in subsequent years.

The County would also conduct monitoring of the covered activities every three years to determine whether habitat for Kincaid's lupine is increasing or stable, as well as documenting the status of Fender's blue butterfly habitat. These data would be reported to the USFWS to assist in their overall goal of tracking covered species population trends. Monitoring will be integral to tracking if the mitigation and minimization measures being implemented by the County are successful in reducing negative effects on the covered species.

Chapter 7

HCP Implementation

7.1 Habitat Conservation Plan Administration

7.1.1 Organizational Structure

The Yamhill County (County) Commissioners will be responsible for the administration and implementation of the Yamhill County Road Maintenance Habitat Conservation Plan (HCP). The Commissioners will establish an HCP Implementation Committee. The Implementation Committee will make recommendations regarding the implementation and changes in actions that will allow the County to achieve the goals of the HCP. The County Commissioners are the ultimate decision-making authority for implementation of the HCP and will consider the recommendations of the Implementation Committee. An HCP Administrator will be appointed by the County Commissioners to manage the HCP and assist the Implementation Committee.

Funding for implementation of the HCP will primarily come from County road maintenance funds; however, other funding sources may become available over the 30-year duration of the permit. The County Commissioners may choose to supplement road maintenance funds with County general fund or other County funds for required minimization, monitoring and mitigation, particularly at Deer Creek Park.

Upon signing the HCP and subsequent issuance of the incidental take permit by U. S. Fish and Wildlife Service (USFWS), the County Commissioners will:

- Appoint a HCP Administrator (role described in Section 7.1.3) within 30 days of permit issuance.
- Work with the HCP Administrator to organize the Implementation Committee (refer to Section 7.1.2).
- Designate funding within the County road maintenance budget for funding of the minimization, monitoring, and mitigation actions outlined in Chapter 6.

7.1.2 HCP Implementation Committee

The HCP Administrator will oversee implementation of the HCP with the assistance of the HCP Implementation Committee. The Implementation Committee will review, comment, and make recommendations to the County Commissioners regarding the prioritization of conservation measures (minimization/mitigation). The Implementation Committee will propose or submit budget requests for implementation and monitoring activities on an annual basis and will coordinate the HCP budget request with the County budget process. Final decisions regarding annual funding of HCP activities will be made by the County Commissioners and will be consistent with the terms of the HCP. The annual budget will be submitted to USFWS for review and comment.

7.1.2.1 Structure and Organization of the Implementation Committee

- The Implementation Committee will be chaired by the HCP Administrator, acting on behalf of the County Commissioners.
- The membership of the Implementation Committee will consist of the HCP Administrator, two representatives from both the County Road Improvement Advisory Committee and the County Parks and Recreation Board. Ex-officio members of the Implementation Committee will include the USFWS and up to two species experts.
- The Implementation Committee may be expanded to include other entities upon approval by the County Commissioners.
- Meetings of the Implementation Committee will be open to the public and will be held as necessary to administer and implement the HCP. At a minimum, Implementation Committee meetings will be held semi-annually to review annual road maintenance activities, monitoring reports, and mitigation actions. More frequent meetings may be required early in the implementation process. The HCP Administrator shall convene the Implementation Committee as necessary.

7.1.2.2 Duties and Responsibilities of the Implementation Committee

The Implementation Committee will:

- Review monitoring reports and evaluate the success of the conservation measures.
- Develop an Annual Work Plan recommending expenditures to be included in the County's HPC budget for conservation measures to implement the HCP.
- Provide oversight for the development of public information programs as required by the HCP.
- Review the Annual Compliance Report (Annual Report) and other information annually to ensure compliance with the requirements of the HCP and the incidental take permit.

7.1.3 Role of the HCP Administrator

The HCP Administrator will be appointed by the County Commissioners to assist with the administration and management of the HCP. The HCP Administrator will oversee the HCP and chair the Implementation Committee meetings. The HCP Administrator will consult with species experts and USFWS on specific issues as appropriate. The County Commissioners may elect to assign the duties of the HCP Administrator to an existing County position.

7.1.3.1 Duties and Responsibilities of the HCP Administrator

Responsibilities of the HCP Administrator include:

- Monitor implementation of the HCP's avoidance and minimization measures and document the implementation of mitigation measures.
- Maintain files of information developed and actions performed under the HCP, including species surveys, management plans, annual work plans, and progress reports. These files will be accessible to the public over the term of the incidental take permit.

- Work with the Implementation Committee to prepare an Annual Work Plan and budget to implement the HCP.
- Administer contracts and performance of contractors conducting annual monitoring; coordinate with USFWS in their annual monitoring of the covered species.
- Determine the effectiveness of the minimization and mitigation measures.
- Coordinate responses to public inquiries concerning the HCP.
- Work with the Implementation Committee to prepare an Annual Compliance Report detailing the findings and recommendations of the Implementation Committee; submit the Annual Compliance Report to the County Commissioners.
- Work with the Implementation Committee to recommend changes to the conservation actions, if needed. Any recommended changes would need both County and USFWS approval.

7.1.4 Annual Work Plan

Successful implementation of the HCP requires detailed planning and budgeting. The County will establish a specific HCP Budget, including expenses for funding HCP minimization and mitigation measures, as part of its annual budget. The HCP Administrator, with input from the Implementation Committee, will prepare an Annual Work Plan and budget that details the allocation of HCP funds. The Annual Work Plan will identify:

- Tasks to be accomplished.
- Persons or organization to implement tasks (e.g., monitoring, mitigation activities, and reporting).
- Schedules and budget for completion of tasks.

The Annual Work Plan will be presented to the County Commissioners for approval and implementation consistent with the County's standard fiscal year (Table 7-1). The Annual Work Plan will be submitted to USFWS by April 15 for review to determine whether the avoidance, minimization, and mitigation measures are commensurate with the level of impact to the covered species. Comments on the Annual Work Plan from USFWS must be submitted in writing to the County Commissioners within 30 days of receipt of the Annual Work Plan, but no later than May 15. The County Commissioners shall respond to the USFWS comments within 30 days of receipt, but no later than June 14. The County shall adopt the Annual Work Plan no later than June 30, so the HCP Administrator can begin to implement the Annual Plan at the start of the July 1 fiscal year. The County and the USFWS may modify this schedule by mutual agreement.

Table 7-1 Annual Work Plan Schedule

Date	Action/Description
February 28	Implementation Committee recommends Annual Work Plan and budget to County Commissioners
April 15	County Commissioners submit the upcoming HCP fiscal year budget and Annual Work Plan to USFWS.
May 15	USFWS provides comments on the Annual Work Plan to the County Commissioners.
June 14	County Commissioners respond to USFWS comments.
June 30	County Commissioners adopt the upcoming year HCP Budget and Annual Work Plan as part of the County's annual budget adoption.

7.1.5 HCP Mitigation Plans

The County will prepare a mitigation plan for the habitat enhancement actions that will occur in the County right-of-way and a restoration plan for development of upland prairie habitat, with an emphasis on establishing Kincaid's lupine in Deer Creek Park. The location of the mitigation areas in the County right-of-way and the actions to be performed at each site will be determined after a site review to be conducted in May 2012. Species experts, County road maintenance staff, and USFWS staff will visit the T&E Special Maintenance Zones to review current habitat values, identify potential improvements, and select the sites that would best contribute to meeting the HCP goals. A plan identifying the potential enhancement actions for the mitigation areas will be developed by the County and submitted with the fiscal year 2012-13 Annual Report to USFWS for approval. Enhancement action in the T&E Special Maintenance Zones will be initiated in fiscal year 2012-13.

A restoration plan for Deer Creek Park will also be developed starting in fiscal year 2012-13. The first year of the plan will include a review at Deer Creek Park by County staff and species experts, followed by the development of a conceptual restoration plan. This conceptual plan will be provided to USFWS as part of the Annual Report. After receiving comments from USFWS on the conceptual plan, a site restoration plan will be developed, including a detailed site preparation plan, erosion control plan, planting plan for Kincaid's lupine and other native species, weed control plan, and a long-term site management and maintenance plan. The detailed plan will be included in the Annual Report for 2013-14. Initiation of site work would start in fiscal year 2014-15 pending approval by USFWS.

7.2 Reporting

7.2.1 Annual Compliance Report

With input from the Implementation Committee, the HCP Administrator will prepare an Annual Compliance Report for the County Commissioners no more than 60 days following the end of the fiscal year, June 30.

The Annual Compliance Report will include:

- A description of conservation measures initiated, continued, or completed during the previous year, and a description of conservation measures projected to be implemented during the upcoming year.

- A summary of findings, results, and conclusions of monitoring activities, and a projection of monitoring needs for subsequent years.
- A tabulation and description of funds expended during the previous year, and a projection of funds to be expended during the upcoming year.
- Other recommendations, such as minor modifications or amendments to the HCP document.

The Annual Compliance Report will be reviewed and approved by the County Commissioners and submitted to the USFWS. The Annual Compliance Report will verify compliance with the incidental take permit. If additional information is needed, the USFWS must submit a request, in writing, to the County Commissioners within 30 days of receipt of the Annual Compliance Report. The County Commissioners shall respond within 45 days of receipt of the USFWS request.

7.2.2 Reporting Schedule

A general reporting schedule is provided in Table 7-2. Changes to the dates may occur over the 30-year permit term to accommodate Federal or County timeline constraints or to improve HCP implementation efficiency.

Table 7-2 Proposed Reporting Schedule

Date – No later than	Action/Description
July 30	HCP Administrator reviews Annual Compliance Report with the HCP Implementation Committee
August 29	Annual Compliance Report submitted to the County Commissioners
September 30	Annual Compliance Report submitted to the USFWS
October 30	USFWS provides comments on the Annual Compliance Report to the County Commissioners
December 15	County Commissioners respond to USFWS Comments

7.3 Changed and Unforeseen Circumstances

7.3.1 Changed Circumstances

Changed circumstances are circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated and for which contingency plans can be prepared (e.g., the new listing of species, a fire, or other natural catastrophic event in areas prone to such an event). Reasonably foreseeable circumstances for which the County will submit draft responses to USFWS, should they occur, are listed in Table 7-3. The process for responding to changed circumstances will be initiated as soon as practicable but no later than 60 days after a changed circumstance is revealed. The County will rely on the Implementation Committee to develop a draft response that provides a summary of the impact or effects the changed circumstance would have on the implementation of the HCP. The County will forward the draft response letter to the USFWS for review. If additional conservation management or mitigation measures are deemed necessary to address a changed circumstance that was not provided for in the plan, and assuming that the HCP is being properly implemented, USFWS will gain the consent of the County before requiring implementation of these additional measures.

Table 7-3 Potential Changed Circumstances and Draft Responses

Changed Circumstances	Draft Responses
The creation of habitat for the covered species in accordance with the HCP is unsuccessful (for instance, fails to provide essential habitat elements).	The cause of the failure will be identified through monitoring. The Implementation Committee will identify and develop measures to correct or replace the failed conservation measure.
Created habitat is lost as a result of natural disaster, vandalism, or fire.	County Commissioners will notify the USFWS and replant damaged vegetation planted as mitigation pursuant to implementation of the HCP, and replace any damaged infrastructure installed or constructed as mitigation pursuant to implementation within the affected area. Created habitats will be re-established following loss, unless monitoring reveals a reason why a given site would fail again, in which case another priority site would be selected for restoration.
Listing of a new species.	At the request of the County, the incidental take permit and the HCP will be re-evaluated by the USFWS. The covered activities may be modified, as necessary, to ensure that activities covered under the HCP are not likely to jeopardize or result in take of the newly listed species or adverse modification of designated critical habitat. The County will implement the modifications to the HCP covered activities to avoid the likelihood of jeopardy or take of the newly listed species or adverse modification of the designated critical habitat. The County will continue to implement such modifications until such time as the County has applied for, and the USFWS has approved, an amendment of the incidental take permit, in accordance with applicable statutory and regulatory requirements, to cover the newly listed species, or until the USFWS notifies the County in writing that the modifications to the HCP covered activities are no longer required.

7.3.1.1 Additional Federally Listed or State Listed Species

Should additional prairie species not covered by the HCP be listed, proposed, or petitioned for listing, the County may request that USFWS add such species to the incidental take permit and the HCP. To determine whether to make this request, the County may consider whether the species is present in the covered area and if it is likely to be affected by the covered activities. If incidental take coverage is desired, the County may seek to amend the incidental take permit and HCP. Alternatively, the County may apply for a new and separate incidental take permit.

7.3.1.2 Previously Undiscovered Covered Species outside the Special Maintenance Zones

This HCP provides coverage for road maintenance activities conducted on 1,090 km (677 miles) of County roads and right-of-ways. The portion of the covered area outside of the T&E Special Maintenance Zones was evaluated in Chapter 5 and an affected acreage was quantified. In the future, if Fender's blue butterfly and Kincaid's lupine are identified at a new location outside of the T&E Special Maintenance Zones (Table 6-5); no additional measures will be taken to protect them. Their take is covered under the incidental take permit.

7.3.2 Unforeseen Circumstances

Unforeseen circumstances are changes in circumstances that affect a species or geographic area covered by the HCP that could not reasonably be anticipated by HCP developers and the USFWS during the HCP's development. An unforeseen circumstance must result in a substantial adverse change in status of a covered species. The USFWS is responsible for determining if an unforeseen circumstance has occurred based on an analysis of the circumstances and the information provided by the County. Should the USFWS require reallocation of funds or

resources necessary to respond to the unforeseen circumstance within the existing commitments of the County under the HCP, they will provide the justification and approval.

The "No Surprises" Rule under Section 10 of the ESA states that additional mitigation requirements would not be imposed on the permit holder for species covered by a properly implemented HCP in the event of an unforeseen circumstance. Thus, if unforeseen circumstances occur, no additional operational restrictions or financial compensation would be required of the County without the consent of the County.

7.4 Revisions and Amendments

There are two types of changes that may be made to the HCP and its permits: revisions or amendments. Revisions and amendments shall be processed in accordance with all applicable legal requirements, including the ESA, NEPA, and any applicable federal regulations.

7.4.1 Revisions

Revisions to the HCP may be made provided the changes do not modify the scope or nature of covered activities, do not significantly change the operations described in the HCP, and do not result in new or significantly different adverse impacts on the environment.

The following are examples of potential revisions to the HCP:

- Correction of maps or exhibits to correct errors in mapping or to reflect previously approved changes in the incidental take permit or HCP.
- Modification of existing or establishing new incidental take avoidance measures.
- Modification of reporting protocols for annual reports.
- Minor changes to monitoring or reporting protocols.
- Revised mitigation area enhancement and management techniques.

The County may submit a proposed revision to USFWS for review. The USFWS will respond in writing to a proposed revision within 60 days of receipt of the request. The responses will be one of the following:

- USFWS will concur with the proposed revision.
- USFWS will identify additional information necessary to enable the USFWS to approve or disapprove the revision.
- USFWS will reject the revision.

If the USFWS rejects the revision, it shall include an explanation of its determination in its written response. If the USFWS approves the request, the request will be processed as an amendment to the HCP and incidental take permit.

7.4.2 Minor Amendments

According to the HCP Handbook (USFWS 1996), clarifications, and minor administrative amendments may be incorporated into the HCP administratively if:

- The amendment has the consent of the County and the USFWS.
- The original HCP established specific procedures for incorporating minor amendments so that the public has an opportunity to comment on the process, and such amendments are consistent with those procedures.
- The HCP defines what types of amendments are considered minor.
- A written record of any amendments is prepared.
- The net effect on the species involved, and level of take resulting from the amendment, is not significantly different from that analyzed under the original HCP and the USFWS decision documents.

7.4.2.1 Procedures for Incorporating Minor Amendments and Public Comment

The County or USFWS may submit a request for a minor amendment. The request must be submitted to the HCP Administrator, reviewed by the Implementation Committee, and recommended to the County Commissioners for adoption. The proposed amendment will be submitted to the USFWS for approval. The minor amendments or clarifications will be presented and open for public comment at a regularly scheduled meeting of the County Commissioners. If the USFWS concurs with the proposed minor amendment, then it will authorize the amendment in writing within 30 days. The amendment will be effective on the date of the written authorization from the USFWS.

7.4.2.2 Types of Amendments that are Considered Minor

Clarifications or minor amendments include:

- Corrections of typographic, grammatical, and similar editing errors that do not change the intended meaning.
- Correction of maps or exhibits to correct errors in mapping or to reflect previously approved changes in the Permit or HCP.
- Correction of land ownership and/or land boundaries.
- Correction of the acres of suitable and potential habitat for Fender's blue butterfly or Kincaid's lupine within the covered area.
- Minor changes to surveying, monitoring, or reporting protocols.
- Changes or adjustments to improve avoidance, minimization, and mitigation measures recommended by the County or USFWS.

7.4.3 Major Amendments

A major amendment to the HCP is a change affecting the impact analysis, need for additional incidental take coverage, or modification of conservation measures. Major amendments require amending the HCP and the incidental take permit, following a formal review process similar to that used for the original HCP and incidental take permit.

Major amendments may include, but are not limited to, the following:

- Revisions (addition or deletions) to the plan area, not qualifying as a minor modification.
- Adding or removing one or more species to the list of covered species.
- Increasing the amount of take allowed under the incidental take permit.
- Adding one or more activity to the list of covered activities if that activity will result in greater adverse effect to the covered species than those analyzed under this HCP.
- Modifying a conservation measure so substantially as to affect the level of authorized take, the covered activities, funding, or the nature and scope of the conservation measures.
- Extending the permit term beyond 30 years.

The County or USFWS may submit a request for a major amendment. The request must be submitted to the HCP Administrator, reviewed by the Implementation Committee, and recommended to, and approved by, the County Commissioners. A written request must be submitted to the USFWS for concurrence. Major amendments will be reviewed and recommended by the Implementation Committee, formally proposed to the USFWS by the County Commissioners, and ultimately approved, modified, or rejected by the USFWS. Any major amendment should have approval from the County and USFWS.

As the approval of the amendment is a discretionary federal action, the major permit amendment will follow the same process as the original permit application following 50 CFR Parts 13 and 17. This requires 1) an amendment to the HCP addressing the new circumstance, 2) a Federal Register notice, 3) NEPA compliance, and 4) and intra-Service Section 7 consultation.

7.5 Suspension, Revocation and Termination

The USFWS may suspend, revoke, or terminate its incidental take permit if the County fails to implement the HCP in accordance with the terms and conditions of the permit or if suspension, revocation, or termination is otherwise required by law. Prior to taking any action to suspend, revoke, or terminate the incidental take permit, the USFWS shall meet and confer with the County in order to attempt to resolve the need to suspend, revoke, or terminate the incidental take permit or to terminate with respect to specific covered species, covered area, or covered activities.

Notwithstanding the suspension or revocation of its incidental take permit, the County shall remain fully liable under the incidental take permit and the HCP to carry out all of its responsibilities, including mitigation requirements, under the incidental take permit and HCP arising from the covered activities approved, authorized or carried out between the effective date and the date the permit is suspended or revoked.

If the incidental take permit is suspended, revoked, or terminated, the County shall have no authority to rely upon the permit to approve or carry out any actions, which would violate the ESA in the absence of such permits. Notwithstanding the suspension, revocation, or termination, the County shall remain fully liable under the incidental take permit and the HCP to carry out all of its responsibilities, including mitigation requirements, under the incidental take permit and HCP arising from the covered activities approved, authorized or carried out between the effective date and the date the permit is suspended, revoked, or terminated.

7.6 Renewal of the Incidental Take Permit

Upon expiration, the incidental take permit may be renewed without the issuance of a new permit, provided that the permit is renewable, and that the biological circumstances and other pertinent factors affecting the covered species are not significantly different from those described in the original HCP.

7.7 Permit Transfer

In the event of sale or transfer of ownership of the property during the life of the permit, a new permit application, permit fee, and an Assumption Agreement will be submitted to the USFWS by the new owner(s). The new owner(s) will commit to all requirements regarding the take authorization and mitigation obligations of this HCP unless otherwise specified in the Assumption Agreement and agreed to in advance with the USFWS.

7.8 Funding

The County must demonstrate that adequate funding is available for implementation of conservation measures before USFWS can issue an incidental take permit. Sufficient funding is essential to show that conservation measures will be implemented consistent with the cumulative level of take permitted.

The County will commit to fund the HCP implementation as part of its annual road maintenance budget. The majority of the expenses of the HCP and incidental take permit administration, implementation, and maintenance will be paid from road maintenance revenues. The County Commissioners may choose to supplement road maintenance revenues with County general fund or other County revenues for these required conservation measures, particularly for mitigation at Deer Creek Park. For each fiscal year, the Implementation Committee will propose the budget and work plan to implement the HCP activities through the Annual Work Plan process for the HCP. The County will establish a funding amount for the mitigation, monitoring and other implementation actions for the HCP for the total estimated costs over the life of the permit (Table 7-4). Having a specific HCP budget, including line item expenses within the road maintenance budget, will ensure funding for the restoration actions in the T&E Special Maintenance Zones and Deer Creek Park, as well as funding for monitoring and administrative costs. The Annual Work Plan developed by the Implementation Committee and authorized by the County Commissioners, with concurrence from USFWS, will establish priorities and determine how these funds will be spent towards conservation and the recovery of the covered species.

7.9 Costs of Mitigation Measures

This HCP includes mitigation strategies for protecting and enhancing upland prairie habitat (see Chapter 6 Conservation Measures). The total costs of the conservation strategies are estimated at $949,535 (2012 dollars) over the 30-year permit term (Table 7-4).

Table 7-4 Cost of Mitigation Measures

Conservation Measure	Timeframe	Acreage	Average Cost/Acre	Annual Cost ($)	Total Cost ($)
HCP Administrator and Overhead	Years 1 to 5	-	-	27,527	137,635
	Years 6 to 30	-	-	15,016	375,400
T&E Special Maintenance Zones (Crew Training, Public Education, Signage)	Years 1 to 5	-	-	2,970	14,850
	Years 6 to 30	-	-	1,920	48,000
Habitat Enhancement on County Road Right-of-Ways	Years 1 to 5	6	499	2,995	14,975
	Years 6 to 30	6	449	2,695	67,375
Habitat Enhancement in Deer Creek Park	Years 1 to 5	1	1,450	1,450	7,250
	Years 6 to 30	1	500	500	12,500
Covered Species Surveys	Years 1 to 10	-	-	11,155	111,550
	Years 11 to 30[1]	-	-	8,000	160,000
Totals	-	-	-	-	**949,535**

[1] Years 11 through 30 assume USFWS is no longer performing Section 6 surveys

All estimates in 2012 dollars

7.9.1 Habitat Enhancement Costs within the County Right-of-Way

The desired outcome for the proposed habitat enhancement projects would be development of upland prairie habitat with Kincaid's lupine and habitat suitable for Fender's blue butterfly. Enhancement activities could include:

- Removing invasive plant species (using chemical and mechanical treatments).
- Removing shrubs or trees that are determined to be in greater abundance than the desired optimum upland prairie habitat conditions suitable for Kincaid's lupine.
- Cultivation and seeding with a native grass mixture consistent with upland prairie habitat if seeding is necessary.

7.9.2 Habitat Enhancement Costs at Deer Creek Park

Deer Creek Park is a suitable location for habitat enhancement for Fender's blue butterfly, as the park already contains both Fender's blue butterfly and Kincaid's lupine. The County, in conjunction with the Institute for Applied Sciences or others, will develop a habitat restoration plan for Deer Creek Park. Restoration activities could include:

- Removing invasive plant species (using chemical and mechanical treatments).
- Removing shrubs or trees that are determined to be in greater abundance than the desired optimum upland prairie habitat conditions suitable for Kincaid's lupine.
- Planting Kincaid's lupine to increase the total number of plants, which will also benefit Fender's blue butterfly.
- Seeding with an appropriate mixture to enhance re-establishment of upland prairie habitat, including nectar species for Fender's blue butterfly.

7.10 Funding Sources

Funding to implement the conservation measures outlined in Section 7.8 of this HCP is expected to come primarily from County road maintenance funds. The County Commissioners may choose to supplement road maintenance funds with County general fund or other County funds. Other possible sources may include legislative appropriations, grants, donations, and other sources not yet identified.

The County Commissioners will fund the administration and conservation measures set forth in the Yamhill County HCP as part of the County's annual road maintenance budget. The majority of the expenses of the HCP and incidental take permit administration, implementation, and maintenance/management will be paid from road maintenance revenues. The County Commissioners may choose to supplement road maintenance revenues with County general fund or other County revenues for these required conservation measures, particularly for mitigation at Deer Creek Park.

The total cost of implementing the Yamhill County HCP over the 30-year permit term is estimated at $949,535 (2012 dollars) as summarized in Table 7-4. This includes spending $47,897 per year for the first five years, $31,286 per year for year five to ten, and $28,131 per year for the remaining 20 years of the permit. These figures will be adjusted annually to reflect cost of living increases, not to exceed three percent per year, to fund implementation of the conservation measures identified in Chapter 6 of the HCP. The County will appropriate the necessary funds for implementation of the conservation measures identified in the Yamhill County HCP.

7.11 Supplemental Revenue Sources

Supplemental revenues may be sought from the following sources:

- The County may consider seeking public or private funding for additional mitigation or habitat enhancement actions. It may seek to expand Kincaid's lupine and/or Fender's blue butterfly habitat at Deer Creek Park; purchase private property or conservation easements on private lands, or other actions consistent with achieving the goals of this HCP.

Chapter 8

Alternatives

Yamhill County considered a number of alternatives during development of the HCP. Section 10(a)(1)(B)(iii) of the federal ESA requires the incidental take permit applicant to set forth in the HCP: (1) any specific alternative, whether considered before or after the HCP process was begun, that would reduce take below levels anticipated for the project proposal; and (2) a "no action" alternative, which means no HCP would be enacted, no incidental take permit would be issued and take would be avoided or activities would not be constructed or implemented.

This Chapter discusses alternatives to the HCP and alternative mitigation measures that Yamhill County considered during preparation of the HCP, in collaboration with the USFWS and the HCP Technical Advisory Committee.

8.1 Alternative 1: No Action or No Authorization of Take Alternative

Under Alternative 1, the County would not request and the USFWS would not issue an incidental take permit under Section 10(a)(1)(B) of the ESA and the HCP would not be implemented. The No Action Alternative includes none of the conservation measures identified in the Yamhill County Road Maintenance Activities HCP. Voluntary conservation actions would continue to be initiated by the County and private individuals and organizations. The existing recovery plans would continue to be implemented for Willamette Valley prairie species. The species and habitat conservation measures identified in the HCP would not be implemented, and recovery actions for the species would be limited to the activities and priorities of local resource management agencies.

Under this alternative, the County could not perform certain road maintenance activities along roadsides or complete road improvement projects that could result in the take of covered species. In T&E Special Maintenance Zones or anywhere else covered species are found, the County could not perform regular maintenance activities such as: mowing, brush cutting, spraying, large tree and shrub removal, grading and gravel placement, shoulder preparation and rocking, and drainage maintenance. A full list of covered activities that would not be performed under this alternative is provided in Table 8-1 below.

The absence of vegetation maintenance along County roadsides could result in public safety issues. Growth of vegetation in roadside areas would rapidly pose sight distance problems and excess vegetation could pose a fire hazard. The County would not be able to perform grading and maintenance of gravel roads. This could lead to safety hazards (e.g., potholes), and could lead to widening of the road surface as vehicles are driven on the shoulder to avoid rough and/or impassable areas, possibly impacting high quality habitat areas. Over time, lack of maintenance could lead to dysfunctional, unsafe and/or impassable roads.

Table 8-1 Maintenance Activities Occurring on County Roads

Maintenance Activity	Paved County Roads (631 km (392 miles))	Gravel County Roads (459 km (285 miles))
Mowing	•	•
Brush Cutting	•	•
Spraying (hand application and broadcast)	•	•
Large Tree and Shrub Removal	•	•
Sign Posting	•	•
Drainage Maintenance	•	•
Emergency Earth Removal	•	•
Road Improvements	•	•
Grading and Gravel Placement	-	•
Dust Abatement	-	•
Shoulder Preparation and Rocking	•	-

• Activity occurs on this road type

- Activity does not occur on this road type

8.2 Alternative 2: Proposed Action – Yamhill County Road Maintenance Habitat Conservation Plan

The proposed action is a 30-year Section 10(a)(1)(B) permit providing for the incidental take of Fender's blue butterfly and Kincaid's lupine. The USFWS would issue a Section 10(a)(1)(B) permit (incidental take permit), which would enable the County to continue road maintenance activities within the covered area. Chapter 4 of this document describes the covered activities in detail. Implementation of the covered activities could result in adverse effects on Fender's blue butterfly habitat. Under the incidental take permit, a series of conservation measures (Chapter 6) would be implemented to offset the effects of the covered activities on the species covered under the Section 10(a)(1)(B) permit.

8.3 Mitigation Options Considered

The County considered several mitigation options to benefit Fender's blue butterfly and Kincaid's lupine and to offset the potential effects of road maintenance activities. The County used USFWS known locations to evaluate potential mitigation sites. The proximity to known locations of Fender's blue butterfly and land ownership were the primary criteria used to evaluate potential mitigation sites. Distance from known butterfly locations is an important indication of whether butterflies would be able to travel to the mitigation site and occupy the habitat. Fender's blue butterfly is known to disperse as far as 2 km (1.24 miles); therefore, sites within this dispersal distance were determined to provide greater mitigation benefits for the covered species. Land ownership was evaluated in terms of the certainty of implementation and preservation of benefits. Sites where the property is owned by the County, or could be purchased and managed by the County, would have a higher mitigation value because of the increased certainty that the County would be able to implement the mitigation measures for the site. If a property were held by a different owner, the County would have reduced authority over management of the site and could not provide the same level of assurances.

Figure 8-1 provides an overview of Fender's blue butterfly known locations within Yamhill County in comparison to the mitigation sites that were evaluated. The mitigation options evaluated are described in the following sections.

8.3.1 Purchasing Private Land

The County considered the option of purchasing private land to provide benefits for Fender's blue butterfly that could offset potential impacts from road maintenance activities conducted in the County's right-of-way. If a willing seller and appropriate funding were identified for properties, this option could provide additional habitat for Fender's blue butterfly and Kincaid's lupine. Sites that are within 2 km (1.24 miles) of a USFWS Fender's blue butterfly known location would be higher priority, due to an increased likelihood that butterflies could expand from their current locations into restored habitat. Consequently, this option could allow Fender's blue butterfly to expand their current distribution and potentially increase their population. This mitigation option would be contingent on the availability of a property (or multiple sites) large enough to offset the potential impacts on habitat from the covered activities. The site would need to be larger than the area of roadside habitat affected within the County right-of-way, and would need to provide similar or better habitat quality for Fender's blue butterfly.

Further evaluations of potential sites would be required to determine whether host or nectar species are present and would benefit from the implementation of habitat maintenance measures at the site. If populations of Kincaid's lupine and nectar species are present at the site, the plant populations could be potentially enhanced through additional plantings of seedlings, or through vegetation maintenance (e.g., mowing at appropriate times). These actions would promote the growth and reproduction of native prairie plant species by inhibiting competition from non-native species that compete for space, nutrients, and light.

If private lands were purchased and managed by the County, the certainty of implementation and long-term management of the site would be increased, as the County would own the property and could ensure implementation of the mitigation measures.

8.3.2 Partner with the Nature Conservancy to Assist with Habitat Maintenance of Property

The County considered providing staff and equipment to conduct vegetation maintenance activities (i.e., mowing, brushing, and tree removal) at The Nature Conservancy property located on Gopher Valley Road to achieve biological goals consistent with this HCP. The County would assist The Nature Conservancy in reducing invasive plant species and reducing shading of native prairie species (e.g., lupines). These activities would improve habitat for Kincaid's lupine by reducing competition from invasive plant species,; increasing light could enhance their reproductive ability and allow them to expand their population. Expanding Kincaid's lupine and nectar plant species habitat would benefit Fender's blue butterfly by expanding the population of their reproductive host plant and increasing the amount and distribution of nectar species.

Figure 8-1 Potential Mitigation Locations

Because The Nature Conservancy site is within a 2 km (1.24 miles) dispersal zone of known Fender's blue butterfly populations, the above measures could allow Fender's blue butterfly to expand their current distribution and potentially increase their population. The area of the site where maintenance would be conducted on The Nature Conservancy property would be comparable in size to the area impacted by the County's road maintenance activities or larger, and would provide a net conservation benefit for Fender's blue butterfly and Kincaid's lupine. This site is within the dispersal distance of five known locations of Fender's blue butterfly (as shown in Appendix C). Kincaid's lupine and nectar plant species would be enhanced through additional plantings of seedlings, or through vegetation maintenance (e.g., mowing at appropriate times) that could promote the growth and reproduction of native prairie plant species by inhibiting competition from non-native species that compete for space, nutrients, and light.

8.3.3 Whiteson Property

The Whitson Property is owned by Yamhill County. A portion of this property was used as a landfill, which was closed in 1983. The site contains 16.60 hectares (41 acres); 11.33 hectares (28 acres) are bound by a DEQ closure permit and are not available for use until the permit is lifted. The remaining 5.27 hectares (13 acres) is available for use. The site is located four miles southwest of McMinnville on the south bank of the South Yamhill River. Portions of this site could be managed as a conservation area for the purposes of this HCP. However, this site is not located within the dispersal zone of known Fender's blue butterfly populations, nor is there appropriate stepping stone habitat between the known locations and this potential mitigation site. The Whiteson property is too distant from existing habitat to provide benefits to the species at this time.

8.3.4 Newberg Property

The Newberg Property is owned by Yamhill County and is adjacent to the Willamette River. A portion of this property was used as a landfill, which closed in 1984. This site contains 16.19 hectares (40 acres); 8.90 hectares (22 acres) are bound by a DEQ closure permit and are not available for use until the permit is lifted. The remaining 7.28 hectares (18 acres) is available for use. Portions of this site could be managed as a conservation area for the purposes of this HCP. However, this site is not located within the dispersal zone of known Fender's blue butterfly populations, nor is there appropriate stepping stone habitat between the known locations and potential mitigation site. The Newberg property is too distant from existing habitat to provide benefits to the species at this time.

8.3.5 Powerhouse Hill Property

Powerhouse Hill Property is 1.48 hectare (3.66 acre) of property owned by Yamhill County situated at the intersection of Baker Creek Road and Powerhouse Hill Road. Portions of this site could be managed as a conservation area for the purpose of this HCP. This site is not located within the dispersal zone of known Fender's blue butterfly populations; however, potential stepping stone habitat does exist between the known locations and the potential mitigation site. It is possible that the site could provide a benefit to the species.

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Chapter 9

References

Alverson, E.R. 2005. Preserving Prairies and Savannas in A Sea of Forest: A Conservation Challenge in the Pacific Northwest. Plant Talk No. 40. Accessed at: http://www.plant-talk.org/stories/40forest.html on December 7, 2006.

Bramble, W.C., R.H. Yahner, and W.R. Byrnes. 1997. Effects of herbicides on butterfly populations of an electric transmission right-of-way. Journal of Arboriculture 23(5) 196-206.

Hammond, Paul C. 2001. 2000 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Natural Heritage Program and U.S. Fish and Wildlife Service. 32 pp.

Hammond, Paul C. 2002. 2001 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Natural Heritage Program and U.S. Fish and Wildlife Service. 35 pp.

Hammond, Paul C. 2003a. 2002 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Natural Heritage Program and U.S. Fish and Wildlife Service. 30 pp.

Hammond, Paul C. 2003b. 2003 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Natural Heritage Program and U.S. Fish and Wildlife Service. 30 pp.

Hammond, Paul C. 2004. The 2004 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 36 pp.

Hammond, Paul C. 2005. The 2005 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 41 pp.

Hammond, Paul C. 2006. The 2006 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 42 pp.

Hammond, Paul C. 2007. The 2007 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 50 pp.

Hammond, Paul C. 2008. The 2008 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 47 pp.

Hammond, Paul C. 2009. The 2009 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 54 pp.

Hammond, Paul C. 2010. The 2010 study of the Fender's blue butterfly (*Icaricaia icarioides fenderi*) in Benton, Polk and Yamhill Counties. Oregon Dept. of State Lands and U.S. Fish and Wildlife Service. 43 pp.

Hiarano, T., M. Kiyota, and I. Aiga. 1995. Physical effects of dust on leaf physiology of cucumber and kidney bean plants. Environmental Pollution 89(3)255-261.

Kiilsgaard, Chris. 1999. Manual and Land Cover Type Descriptions Oregon Gap Analysis 1998 Land Cover for Oregon. Portland, Oregon. 74 pp.

National Atlas. 2011. Website: http://www.nationalatlas.gov/ accessed 27Oct11.

Oregon Department of Environmental Quality. 2007. 2004-2006 Integrated 303(d)/305(b) Water Quality Report.

Oregon Department of Environmental Quality. 2011. 2010 Oregon air quality data summaries. June 2011. 106 pp.

Oregon Department of Fish and Wildlife. 2006. Oregon Conservation Strategy. Oregon Department of Fish and Wildlife, Salem, OR. 375 pp plus appendices.

Oregon State University. 1993. The climate of Oregon climate zone 2 Willamette Valley. Special Report 914. May 1993. Agricultural Experiment Station, Oregon State University.

Oregon-Topography. 2010, Website: http://www.city-data.com/states/Oregon-Topography.html accessed 22Sep11.

Otte, G. E., D. K. Setness, W. A. Anderson, F. J. Herbert, Jr., and C. A. Knezevich. 1974. Soil Survey of Yamhill Area, Oregon. United States Department of Agriculture-Soil Conservation Service, Washington, D.C.

Perry, Leonard. n.d. Salt damage to plants. University of Vermont Extension. Department of Plant and Soil Sciences.

Ross, Dana. 2011. Rare Butterfly Surveys on Yamhill County Roadsides At and Near Documented Kincaid's Lupine Sites. 2011 Report to Cardno ENTRIX. 14September2011. 11pp.

Salix Associates. 2011a. Yamhill County Roadside Kincaid's Lupine Site Surveys. June 2011. 11 pp.

Salix Associates. 2011b. Yamhill County Roadside Surveys for Kincaid's Lupine: 2 km Buffer Areas. July 2011. 2 pp.

Soil and Water Conservation District. 2011. Wildlife. Accessed on-line: http://www.yamhillswcd.org/wildlife.html 27Oct11.

U.S. Department of Agriculture. 2009. 2007 Census of Agriculture Report. Accessed on-line: http://www.agcensus.usda.gov/ 23Sep11

U.S. Census Bureau. 2011. 2010 Census Data for Yamhill County, Oregon. Accessed on-line: http://factfinder.census.gov/servlet/SAFFPopulation?_event=Search&_name=Yamhill+County&_state=04000US41&_county=Yamhill+County&_cityTown=Yamhill+County&_zip=&_sse=on&_lang=en&pctxt=fph 23Sep11

U.S. Environmental Protection Agency. 2002. Potential Environmental Impacts of Dust Suppressants: "Avoiding Another Times Beach". Expert Panel Summary Las Vegas, Nevada. May 30-31. 97pp.

U.S. Fish and Wildlife Service. 1996. Habitat Conservation Planning and Take Permit Processing Handbook. US Department of Interior Fish and Wildlife Service, US Department of Commerce National Oceanic and Atmospheric Administration and National Marine Fisheries Service.

U.S. Fish and Wildlife Service. 2000. Endangered Status for Erigeron *decumbens* var. *decumbens* (Willamette Daisy) and Fender's Blue Butterfly (*Icaricia icarioides fender*i) and Threatened Status for *Lupinus sulphureus* ssp. *kincaidii* (Kincaid's Lupine). FR (65): 3875-3890.

U.S. Fish and Wildlife Service. 2006a. Designation of Critical Habitat for the Fender's blue butterfly (*Icaricia Icarloldes fenderi*), *Lupinus sulphureus* spp. *kincaldii* (Kincaid's lupine), and Erigeron *decumbens* var. *decumbens* (Willamette daisy).

U.S. Fish and Wildlife Service. 2006b. Recovery Outline for *Lupinus sulphureus* subspecies *Kincaidii* (Kincaid's lupine). Portland, Oregon. 23 pp.

U.S. Fish and Wildlife Service. 2009. Critical Habitat Fact Sheet. Accessed at: http://www.fws.gov/midwest/Endangered/saving/CriticalHabitatFactSheet.html, January 22.

U.S. Fish and Wildlife Service. 2010. Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. U.S. Fish and Wildlife Service, Portland, Oregon. xi + 241 pp.

U.S. Fish and Wildlife Service. 2011. Species Fact Sheet: Kincaid's Lupine. Accessed online: http://www.fws.gov/oregonfwo/Species/Data/KincaidsLupine/ 02Sep11.

U.S. Geological Survey. 2011. Willamette Basin Ground-Water Study. Accessed online: http://or.water.usgs.gov/projs_dir/willgw/willpage.html 23Sep11

Vesely, D.G., and Rosenberg, D.K. 2010. Wildlife Conservation in the Willamette Valley's Remnant Prairie and Oak Habitats: A Research Synthesis. U.S. Forest Service and Bureau of Land Management, January 2010. 132 pp.

Walker, G.W. and MacLeod, N.S., 1991, Geologic Map of Oregon: U.S. Geological Survey, scale 1:500,000. Accessed online: http://mrdata.usgs.gov/sgmc/or.html 08Sep11.

Wilson, M.V. 1998a. Wetland prairie: contributed chapter, Part I the U.S. Fish and Wildlife Service Willamette Basin Recovery Plan. U.S. Fish and Wildlife Service, Oregon State Office. Portland, OR.

Wilson, M.V. 1998b. Upland prairie: contributed chapter, Part I the U.S. Fish and Wildlife Service Willamette Basin Recovery Plan. U.S. Fish and Wildlife Service, Oregon State Office. Portland, OR.

Yamhill County. n.d. Yamhill County Comprehensive Parks and Open Space Master Plan. 78pp.

Yamhill County. 2011. Yamhill County Zoning, ZoningComp.shp (GIS shapefile), Yamhill County, Oregon, August 10, 2011.

Personal Communications

Collins, Mikki. 2011. USFWS, personal communication, April 18, 2011, email to M. Klungle, Cardno ENTRIX. Information on known locations of Fender's Blue butterfly, Yamhill County, Oregon.

Perritt, Dan. USFWS, personal communication, June 16, 2011, email to M. Klungle, Cardno ENTRIX. Information on known locations of a new population of Kincaid's lupine and Fender's blue butterfly in Yamhill County, Oregon.