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# **DRAFT Environmental Assessment**

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**For issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for incidental take of Fender's blue butterfly in Yamhill County.**

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**Yamhill Soil and Water  
Conservation District  
McMinnville, Oregon**

**U.S. Fish and Wildlife Service  
Portland, Oregon**

**December 2014**

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**Title for Proposed Action:** Environmental Assessment for issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for Incidental Take of Fender's Blue Butterfly in Yamhill County.

**Unit of Fish and Wildlife Service Proposing Action:** US Fish and Wildlife Service, Portland, Oregon.

**Legal Mandate for Proposed Action:** Endangered Species Act of 1973, as amended, Section 10(a)(1)(B), as implemented by 50 CFR 17.22 for endangered species; National Environmental Policy Act of 1969, as implemented by 40 CFR 1500, et. seq.

**Applicant:** Yamhill Soil and Water Conservation District.

**Date:** December 2014.

This document was prepared for U.S. Fish and Wildlife by staff at  
the Institute for Applied Ecology:  
Lorena Wisheart, Conservation Biologist  
Carolyn Menke, Conservation Biologist  
Tom Kaye, Executive Director & Senior Ecologist

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P.O. Box 2855  
Corvallis, OR 97339-2855  
(541)753-3099  
[www.appliedeco.org](http://www.appliedeco.org)

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# 1 Purpose and Need for Action

## 1.1 Introduction

The Willamette Valley provides habitat for the endemic and federally listed as endangered Fender's blue butterfly (*Icaricia icarioides fenderi*, "Fender's blue"). The Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. §§ 1531 et seq.) prohibits "take" of federally listed species like Fender's blue butterfly. The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect such species or to attempt to engage in any such conduct." Take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity is defined as "incidental take" and such take may be authorized by issuance of an Incidental Take Permit (ITP) (ESA § 10(a)(1)(B)).

Yamhill Soil and Water Conservation District (SWCD) has applied for an ITP from the U.S. Fish and Wildlife Service (USFWS) to cover activities on privately owned lands in Yamhill County within mapped butterfly habitat (the HCP Plan Area). If issued, the ITP would authorize incidental take of the endangered Fender's blue. Under ESA section 10(a)(2)(A), any application for an ITP must include a "conservation plan" detailing, among other things, the impacts of the incidental take allowed by the ITP on affected covered species and how the impacts will be minimized and mitigated. Yamhill SWCD has prepared a Habitat Conservation Plan (HCP) for Fender's blue on private lands in Yamhill County, the ("*Yamhill HCP for Fender's Blue Butterfly on Private Lands*" (Yamhill SWCD 2014)). The issuance of the ITP and implementation of the HCP is referred to throughout this document as the "Proposed Action."

This Environmental Assessment (EA) has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) to fulfill the USFWS's obligations to evaluate the impacts of, and alternatives to, the proposed issuance of an ITP and implementation of the proposed HCP.

## 1.2 Purpose

The purpose of the Proposed Action is:

- To respond to Applicant's application for an incidental take permit for the Covered Species [Fender's blue butterfly] related to activities that have the potential to result in take, pursuant to the requirements of ESA section 10(a)(1)(B) and its implementing regulations and policies.
- Protect, conserve, and enhance the Covered Species and their habitat for the continuing benefit of the people of the United States;
- Provide a means and take steps to conserve ecosystems depended on by the Covered Species; and
- Ensure the long-term survival of the Covered Species through protection and management of the species and its habitat.

## 1.3 Need

The need for the action is based on the potential that activities proposed by the Applicant that occur on privately owned lands within the Yamhill SWCD's outreach area (Yamhill County) that could result in the take of the Covered Species, thus the need for an incidental take permit.

The activities covered by the HCP are forage production, vineyard establishment and management, livestock grazing, timber establishment and management, voluntary habitat restoration, and activities associated with implementation of the HCP (See Chapter 2). Under the ITP, Yamhill SWCD would have

authorization to issue certificates of inclusion (take authorization) to private landowners. In return, Yamhill SWCD and participating private landowners will implement conservation measures set forth in the Yamhill SWCD HCP to mitigate these impacts to the maximum extent practicable. Private landowners needing to complete regular agricultural and forestry activities on lands comprising the HCP Plan Area (private lands in Fender's blue butterfly habitat; Figure 1.1) need the regulatory certainty over the next 50-years that the ITP provides. The ITP allows for a streamlined approach to the issuance of take for the Covered Species on lands covered in the ITP and would help ensure that landowners' ongoing and future activities are carried out in compliance with the ESA. The ITP will reduce the administrative and regulatory burden on landowners completing activities covered under the HCP, including forage production, vineyard establishment/management, livestock grazing, timber establishment/management, and habitat restoration, while enhancing prairie habitat for Fender's blue butterfly through targeted conservation and mitigation measures designed to increase the populations of this species over the ITP term.

In the absence of the ITP and HCP, private landowners wishing to complete the Covered Activities within the HCP Plan Area would need to obtain incidental take authorization for Fender's blue butterfly and its habitat on an individual, project-by-project basis for each of the covered activities in order to comply with the Act. Issuing take on a project-by-project basis would result in time delays and a patchwork of small, fragmented mitigation projects with little or no coordinated planning or County-wide consideration of Fender's blue butterfly and its habitat.

#### **1.4 Location and Scope**

Yamhill SWCD began the planning process by identifying a "Plan Area" for which incidental take coverage might be needed. The HCP Plan Area consists of approximately 3,169 ha (7,831 ac) of Fender's blue habitat on private lands in Yamhill County (Figure 1.1; See HCP Chapter 3). The Plan Area is also the study area for this EA.

Under the proposed action, incidental take coverage is being sought for the following activities (HCP Covered Activities):

- Forage production
- Livestock grazing
- Vineyard establishment and management (not including any structure construction)
- Timber establishment and management
- Voluntary habitat restoration
- HCP implementation (mitigation and monitoring)

Yamhill SWCD is seeking incidental take coverage for a term of 50 years.

##### **1.4.1.1 Decisions to be made by USFWS**

Under provisions of the ESA, the Secretary of the Interior (through the USFWS) may issue a permit for the incidental taking of a listed species if the application conforms to the issuance criteria identified in Section 10(a)(2)(B) of the ESA. In order to issue a permit, the ESA requires:

- The taking will be incidental;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;

- The applicant will ensure that adequate funding for the conservation plan and procedures to deal with unforeseen circumstances will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and
- That measures required under Section 10(a)(2)(A)(iv), if any, are met and such other assurances that may be required that the HCP will be implemented.

As a condition of receiving an ITP, an applicant must prepare and submit to the USFWS for approval an HCP containing the mandatory elements of Section 10(a)(2)(A). An HCP must specify the following:

- The impact that will likely result from the taking;
- What steps the applicant will take to minimize and mitigate such impacts, the funding available to implement such steps, and the procedures to be used to deal with unforeseen circumstances;
- What alternative actions to such taking the applicant considered, and the reasons why such alternatives are not proposed to be utilized; and
- Such other measures that the Secretaries may require as being necessary or appropriate for the purposes of the plan.

The ESA Section 10 assessment will be documented in the respective Section 10 findings document produced by the USFWS at the end of the process. If the USFWS makes the above findings, the USFWS will issue the ITP. In such case, the USFWS will decide whether to issue a permit conditioned on implementation of the proposed HCP as submitted or to issue a permit conditioned on implementation of the proposed HCP as submitted together with other measures specified by the agency. If the USFWS finds that the above criteria are not satisfied, the permit request shall be denied.

USFWS must evaluate the Proposed Action and No Action alternatives and determine whether this EA is adequate to support a Finding of No Significant Impact, or whether an Environmental Impact Statement (EIS) is necessary. The aspects of the human environment that may be affected by the Proposed Action and the No Action alternative are analyzed in Chapter 4 of the EA.

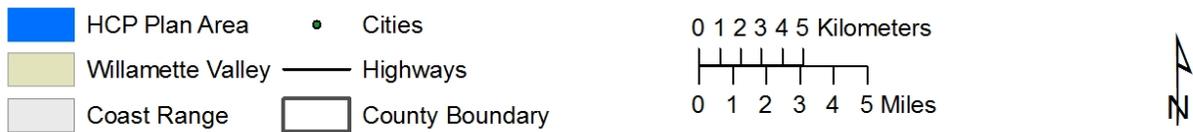
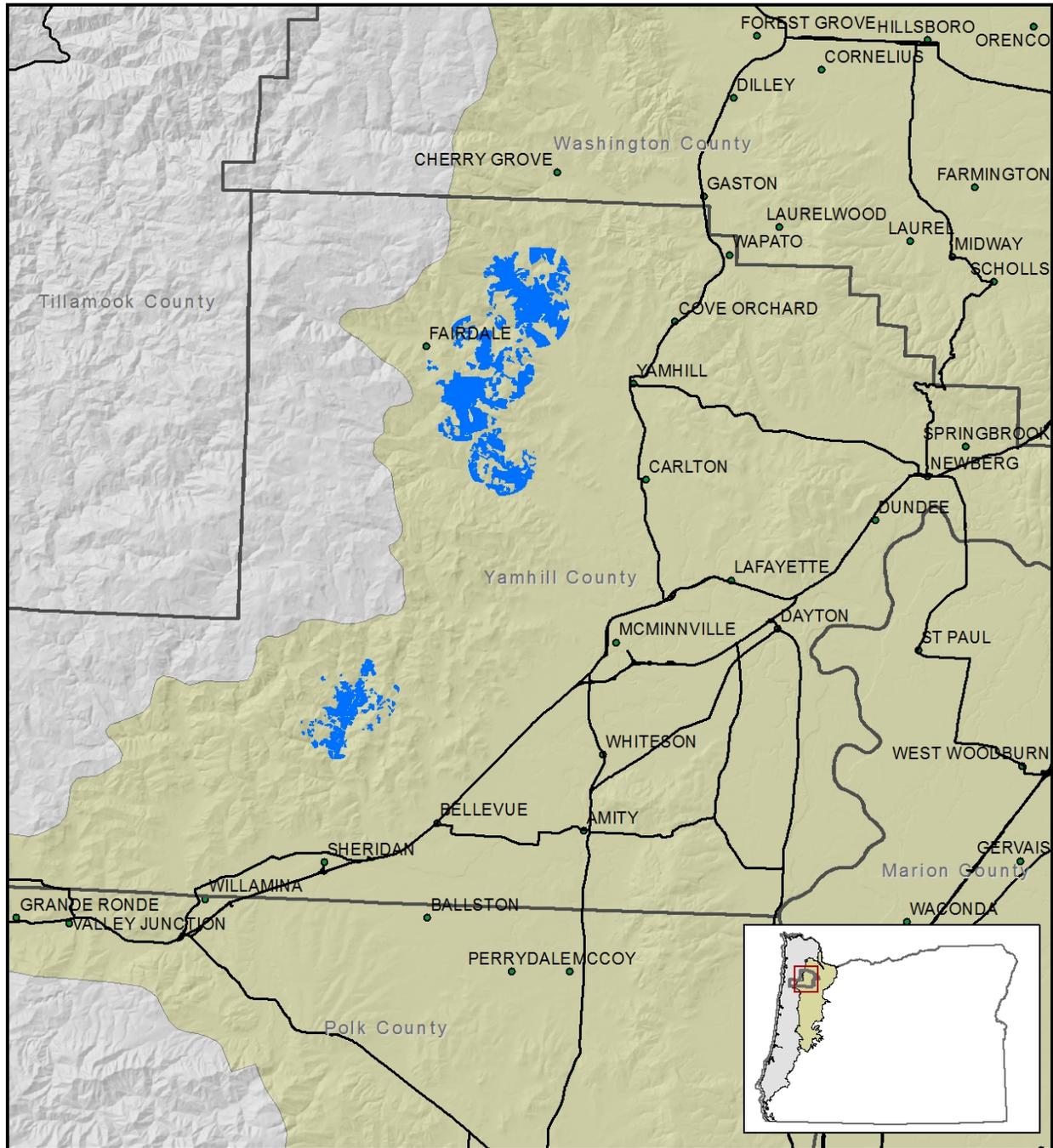


Figure 1.1 Plan Area for the Yamhill Habitat Conservation Plan for Fender's Blue Butterfly on Private Lands.

## 2 Alternatives

This EA considers three alternatives, the Proposed Action alternative, the individual permit alternative, and the No Action alternative. Additional alternatives were considered and rejected early in the planning process. These alternatives are briefly discussed in Section 2.3.

### 2.1 **Proposed Action Alternative**

The Proposed Action alternative consists of USFWS issuing Yamhill SWCD a 50-year ITP authorizing incidental take of Fender's blue butterfly. As a condition of the ITP, Yamhill SWCD will implement the Yamhill HCP for Fender's Blue Butterfly on Private Lands (Yamhill SWCD 2014). The HCP addresses Covered Activities for private landowners and Yamhill SWCD with the potential to affect Fender's blue butterfly and its habitat within the HCP Plan Area (Figure 1.1). The HCP includes Conservation Measures designed to minimize and mitigate, to the maximum extent practicable, take of Fender's blue butterfly resulting from the Covered Activities in the Plan Area (See Chapter 6 of the HCP).

#### 2.1.1 **Covered Activities**

The ITP is requested for impacts to Fender's blue butterfly and its habitat resulting from the following activities covered by the HCP:

##### 2.1.1.1 **Forage Production**

Grass, clover, and alfalfa hay production comprise the majority of forage production within Yamhill County. Forage production typically involves mowing the hay and laying it to dry during May through July. Once sufficiently dry, the hay is baled and transported off-site. More intensively managed hayfields may receive annual application of pesticides, fertilizers, and lime. Fields may be tilled or reseeded when pastures become less productive.

Currently, approximately 184 ha (455 ac) of land are in forage production in the Plan Area (USDA NASS 2007). Based on patterns in agricultural use between 1987 and 2007 (USDA 1987-2007) no growth in forage production is anticipated over the course of the ITP (Table 2.1).

##### 2.1.1.2 **Pasture and Livestock Grazing**

Animals pastured and grazed in Yamhill County include beef cattle, horses, sheep, llamas, alpacas, goats and hogs. The most intense grazing usually occurs from March through November, although some upland pastures (where Fender's blue may occur) may have better drained soils, making them viable for winter grazing. As of 2013, only two grazed sites in Yamhill County are known to support Fender's blue butterfly.

Yamhill SWCD will offer landowners wishing to graze livestock three options:

Grazing Option 1: The landowner may follow the Best Management Practices for grazing (HCP Chapter 6), and no impacts to Fender's blue will be assessed if they remain within the BMP guidelines.

Grazing Option 2: The landowner may request an exception from the BMPs, and graze outside the BMP parameters without being assessed any impacts and mitigation initially, if:

- a. They work with Yamhill SWCD to develop and follow a grazing management plan, and
- b. They are willing to have their pastures monitored regularly to track the effects of grazing on Fender's blue habitat (see Chapter 7). If, once sufficient data are available, the

grazing management being implemented is found to have no impacts on Fender's blue and its habitat, then that plan may be continued with no mitigation requirement. However, if regular monitoring indicates that the grazing plan is resulting in impacts to Fender's blue, and the landowner is unable or unwilling to promptly modify their practices, impacts may be assessed at that time, and mitigation will be required.

Grazing Option 3: The landowner may elect to graze as they wish but they will be assessed impacts and required to mitigate based on the area grazed and the best available information existing at that time to quantify the impacts of grazing on Fender's blue.

At current rates of expansion (USDA 1987-2007), the amount of land used for pasture and livestock grazing in the Plan Area is expected to grow from 162 ha (401 ac) to 292 ha (721 ac), just over 9 percent of the project area, over the course of the 50-year ITP term (Table 2.1).

#### **2.1.1.3 Vineyard Establishment and Management**

The HCP covers establishment of vineyards and management activities on those newly established vineyards. The majority of vineyards in Yamhill County occur on well-drained hillside soils, which is habitat with great potential for Fender's blue butterfly. Vineyard establishment generally removes native plant communities. Site preparation can involve land clearing, deep tillage (sub soiling) with multiple passes and mechanical and/or chemical weed control. This land use is not usually compatible with maintaining habitat appropriate for Fender's blue unless special precautions are employed ahead of site preparation. During and after vineyard establishment, vineyard maintenance includes continued application of fungicides and pesticides, which may involve chemical drift onto adjacent lands.

There are currently 134 ha (330 ac) of vineyards in the HCP Plan Area and an estimated remaining capacity of 405 ha (1000 ac) of land for new vineyards in the future. At predicted rates, new vineyards could be established on an estimated 8.1 ha (20 ac)/year in the HCP Plan Area.

The amount of vineyards in the Plan Area is expected to grow from 134 ha (330 ac) to 405 ha (1000 ac), nearly 18 percent of the project area, over the course of the 50-year ITP term (Table 2.1).

#### **2.1.1.4 Timber Establishment and Management**

The proposed HCP covers timber establishment as an activity only where land is being converted to forestry from another use (e.g., pasture or natural area). Management of forestlands is only covered only newly converted lands. Forestry has been a common land use within the County since it was first settled in the mid 1800's. One-third of the county is covered with commercial timber and logging and timber products are key to the economy of western Yamhill County. The primary timber species is Douglas-fir (*Pseudotsuga menziesii*), a conifer that creates an enclosed and shady understory.

Timber establishment tends to be incompatible with native upland prairie due to intensive site preparation and the heavy shade when forests mature. Pre-planting site preparation involves chemical treatment over the entire area or in planting strips or circles to remove competing species. Hand scalping can be used as an alternative to use of chemicals. Trees are spaced 2.4 m - 8.7 m (8 ft - 12 ft) apart. Post-planting maintenance can include mechanical or chemical weed control, pesticide application, fertilization and watering.

The amount of land used for timber in the project area is minimal, and over the term of the ITP new timber plantings are expected to encompass only 2% of the project area (Table 2.1).

**Table 2.1 Current and projected future land use within the HCP Plan Area (PA).**

	Estimated current area <sup>1</sup> (ac)	Current % of PA	Projected total increase <sup>2</sup> (ac)	Projected area in 50-years (ac)	Projected % of PA in 50 years
Forage production	455	5.8%	-	455	5.8%
Pasture/Livestock grazing	401	5.1%	320	721	9.2%
Vineyard	330	4.2%	1000	1330	17.0%
Timber	-	< 1	155	155	2.0%
<b>Total</b>	<b>1186</b>	<b>15.1%</b>	<b>1475</b>	<b>2661</b>	<b>34.0%</b>

<sup>1</sup> Vineyard acreage as of 2010, all other data as of 2007.

<sup>2</sup> Projected net increase for forage production and pasture/livestock grazing.

#### **2.1.1.5 Voluntary Habitat Restoration**

Voluntary (unrelated to mitigation) habitat restoration, enhancement and management activities, including mowing, prescribed burning and herbicide application for non-native species control may result in temporary adverse effects to Fender's blue butterfly (Russell and Schultz 2010, LaBar and Schultz 2012) but generally have long term benefits to the butterfly and its habitat. Yamhill SWCD estimates that (HCP Section 5.3.5) that up to 316.9 ha (783.1 ac) will be managed with prescribed fire during the HCP term, and that up to 633.8 ha (1566.2 ac) will be managed using herbicide application during the HCP term. Following the recommended restoration, enhancement and management guidelines described in the Programmatic Formal Consultation on Western Oregon Prairie Restoration (USFWS 2008b) will minimize the temporary adverse impacts and maximize the long term benefits from these activities.

#### **2.1.1.6 Habitat Conservation Plan Implementation Activities**

The proposed action includes take coverage for activities necessary to implement the Yamhill Fender's blue HCP for private lands, including but not limited, to monitoring and mitigation-related habitat restoration, enhancement, and management. These activities may result in temporary negative effects on habitat, but will have long-term benefits to Fender's blue butterfly.

Habitat restoration, enhancement, and management may involve mowing, herbicide application, prescribed burning, tree and shrub removal, planting native species, grazing, and road and trail decommissioning and restoration, species and habitat monitoring for conservation or mitigation purposes, and plant material collection. See Chapter 6 of the HCP for more information. Lands on which these activities will occur include those listed above, as well as the Yamhill SWCD Coordinated Mitigation Site, the Mount Richmond Conservation Easement.

#### **2.1.2 Rationale of the Proposed Alternative**

This alternative was selected as the Proposed Action because it will allow otherwise lawful activities by private landowners and the Yamhill SWCD in the HCP Plan Area, while offsetting potential adverse impacts to Fender's blue through minimization and mitigation measures.

The HCP identifies appropriate conservation measures to be taken by Yamhill SWCD and private landowners to avoid, minimize, and mitigate impacts to Fender's blue resulting from the activities covered in the HCP. Mitigation efforts include conducting habitat restoration, enhancement, and

management activities at Yamhill SWCD-coordinated mitigation areas. These mitigation areas will be owned by Yamhill SWCD or under conservation easement. Yamhill SWCD will coordinate habitat restoration, enhancement, and management activities at the mitigation areas for the duration of the ITP term.

Covered lands managed for the Covered Species will also provide suitable habitat for other prairie species, including those described in the Conservation Strategy for Fender's blue butterfly and Upland Prairie Habitat, a conservation measure of the HCP (HCP Chapter 6).

## **2.2 Individual Permits Alternative**

Under this alternative, Yamhill SWCD would not pursue a programmatic ITP and would not implement the HCP, but individual landowners could request ITP coverage from the USFWS. The USFWS would process requests for take authorization on a case-by-case basis, rather than Yamhill SWCD. The private landowner would need to survey their property during the butterfly's flight season (May to mid-June) and demonstrate their activities will not impact Fender's blue butterfly or its habitat, or if impacts are unavoidable, obtain the necessary take authorization from the USFWS and conduct any required mitigation. Each landowner who may impact Fender's blue butterfly and its habitat would complete their own habitat conservation plan, obtain their own permit and conduct and pay for their own mitigation, which could delay implementation of a covered activity anywhere from one to three years. Yamhill SWCD would also be required to get take coverage for any habitat restoration, enhancement, and management activities with potential to impact Fender's blue butterfly and its habitat.

No programmatic HCP and no coordinated enhancement of high quality Fender's blue butterfly habitat could result in a patchwork of uncoordinated mitigation projects with little or no landscape-scale consideration for impacts or benefits to the species.

## **2.3 No Action Alternative**

Under the No Action alternative, the status quo would be maintained. Yamhill SWCD would not pursue a programmatic ITP and would not implement the HCP. The extent of Covered Activities in the Plan Area would not be expected to vary from that occurring under the Proposed Action but landowners would be conducting such activities without USFWS authorization for incidental take of Fender's blue butterfly.

## **2.4 Alternatives Considered and Rejected**

Yamhill SWCD considered covering Taylor's checkerspot butterfly (*Euphydryas editha taylori*), a species listed as endangered in October 2013. Taylor's checkerspot habitat is similar to that of Fender's blue butterfly but there are no known populations of Taylor's checkerspot in Yamhill County. The only known occurrences of Taylor's checkerspot in Oregon are in Benton County. Surveys for Taylor's checkerspot were conducted in Yamhill County in 2012 and 2013 (Ross 2012, Ross 2013) and no populations were found. Because there is no need for incidental take coverage if the species is not present, the SWCD decided not to include Taylor's checkerspot as a Covered Species in the HCP.

### **2.4.1 Covered Activities Alternatives**

Yamhill SWCD considered covering activities beyond those currently included in the HCP, including home and farm building construction. However, unlike the other Covered Activities described in Chapter 3: Covered Activities, Yamhill SWCD typically does not provide technical assistance for such development activities so Yamhill SWCD elected not to cover these activities. Covering development activities would have increased the amount of incidental take requested.

### 2.4.2 Implementation Alternatives

While developing the HCP, Yamhill SWCD considered the role it was willing to serve in HCP implementation, specifically relating to coordination of mitigation and monitoring activities. Yamhill SWCD considered requiring all landowners to independently complete their own mitigation and monitoring, which would usually involve hiring contractors and biologists to complete the work. Although this option would have reduced the quantity of incidental take requested, Yamhill SWCD rejected this alternative and chose to offer SWCD coordinated mitigation and monitoring in addition to some on-site mitigation for several reasons, including:

- Pooling habitat enhancement together at fewer, larger mitigation sites will be more beneficial to Fender's blue butterfly. Such sites will have permanent protection from development, and through long term enhancement from mitigation (over the 50 year term of the HCP) will have the potential to reach a size and quality to contribute to the habitat networks required for the recovery (downlisting or delisting) of the butterfly (USFWS 2010a). Small fragmented mitigated sites across the landscape are not as biologically meaningful for Fender's blue butterfly, and are unlikely to contribute to its recovery.
- Because enhancing a larger quantity of habitat at a larger site is more cost effective than enhancing small fragments of habitat at many sites across the HCP Plan Area, the proposed Yamhill SWCD coordinated mitigation sites will likely make mitigation less expensive for landowners.
- Effectiveness monitoring is far less expensive to complete at a small number of larger mitigation sites than at a larger number of small mitigation sites. The proposed Yamhill SWCD coordinated mitigation sites, with monitoring completed by Yamhill SWCD, will make monitoring less expensive for landowners. Fewer mitigation sites will also make monitoring more feasible to complete within the narrow survey window for Fender's blue butterfly and its habitat.

## 3 Description of the Affected Environment

This section provides an overview of the affected environment. The affected environment is considered the areas of Yamhill County affected by the HCP Covered Activities. Resources in Yamhill County that are potentially affected by the covered activities are discussed.

### 3.1 Physiographic Setting

The Plan Area is located in Yamhill County, which is situated in the Northern Willamette Valley, and bounded by Washington, Clackamas, Polk, Marion, and Tillamook Counties. Yamhill County is located within the Willamette Valley and Coast Range ecoregions. Fender's blue butterfly habitat is only found in the Willamette Valley ecoregion, and the Plan Area is entirely within the Willamette Valley ecoregion (Figure 3.1).

The Willamette Valley ecoregion is a low elevation, broad alluvial plain oriented north to south, encompassing 13,748 sq km (5,308 sq mi) (ODFW 2006). The ecoregion extends from the valley floor to the adjacent foothills and spans from north of Portland to south of Eugene (ODFW 2006). The Willamette Valley is approximately 193 km (120 miles) long and ranges from 32 to 64 km (20-40 miles) wide (ODFW 2006). The valley, located approximately 64 km (40 mi) inland from the Pacific Coast, is essentially flat and defined by the Coast Range along the west and the Cascade Range along the east. The Willamette River bisects the valley and is the main drainage system for the valley (ODFW 2006).

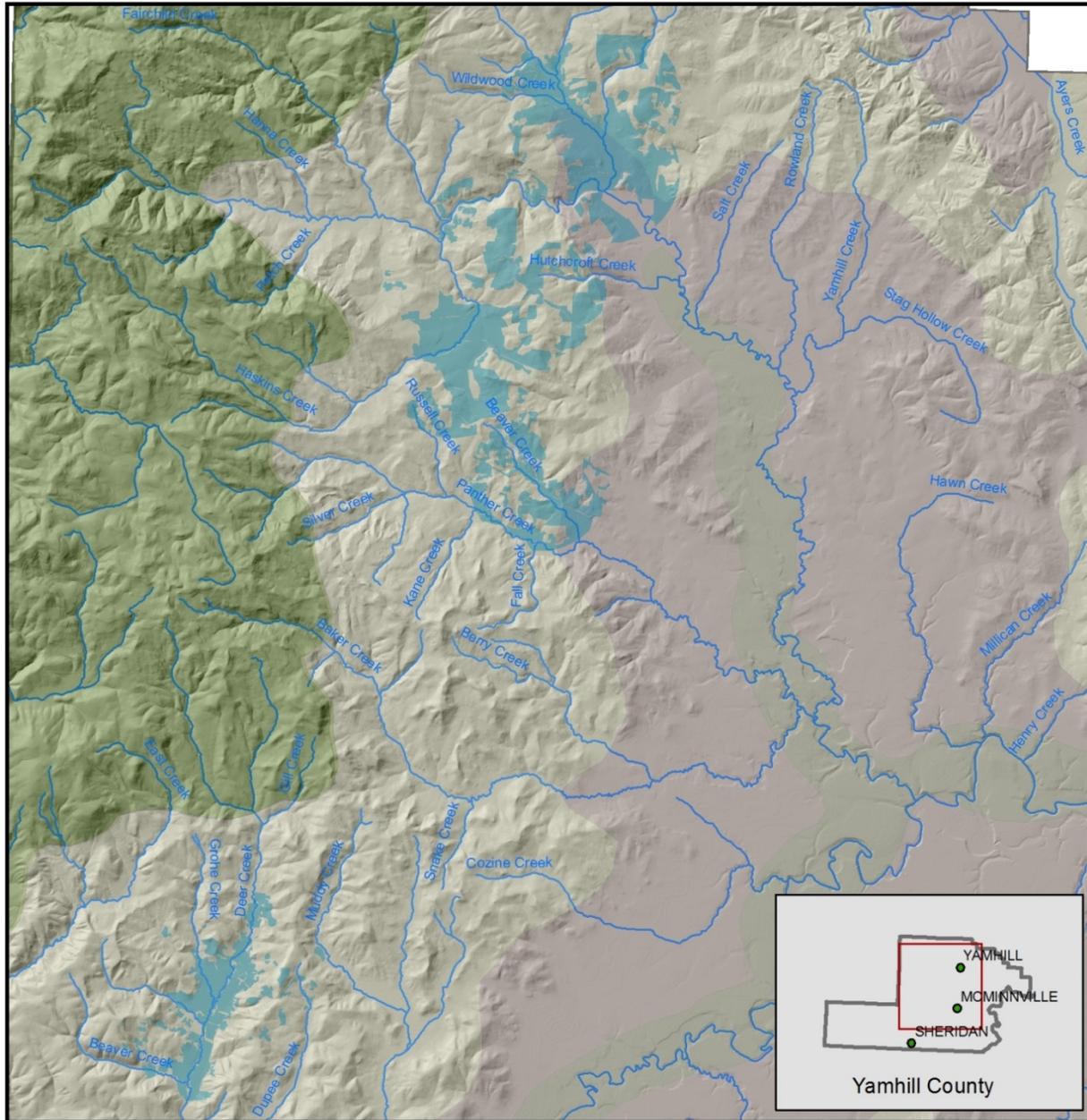
While the exact composition of natural communities within the Willamette Valley is not known, estimations of prairie habitat prior to European settlement included 300,000 ha (741,316 ac) of wet prairie habitat, 700,000 ha (1,729,738 ac) of upland prairie habitat, and 500,000 ha (1,235,527 ac) of oak savanna, comprising approximately 45% of the Willamette Valley ecoregion (Macdonald 2000). These native prairies were home to many species endemic to the Willamette Valley including Fender's blue butterfly.

Prior to European settlement of the Willamette Valley in the 1800s, the native Kalapuya tribe used fires to maintain prairie habitat and increase food production (Alverson 2005). As Euro-American settlers arrived, native habitats were converted to agricultural landscapes, annual burning ceased, those prairies not converted to crop lands or urban development began to be overtaken through forest succession and invasive species (ODFW 2006). Today, less than one percent of native prairie habitat within the Willamette Valley remains intact (Alverson 2005), making prairie habitat one of the rarest ecosystems in North America (Noss and Peters 1995).

### 3.2 Climate

Yamhill County, the center of which is located within 56 km (35 miles) the Pacific Ocean, is influenced by a maritime climate. Yamhill County has wet mild winters and warm dry summers with a long growing season (Taylor 2013). Half of the annual total precipitation occurs from December through February, with lesser amounts in the spring and fall, and very little precipitation during summer (Taylor 2013).

Extreme temperatures in the Willamette Valley are rare, with days of maximum temperature above 32°C (90°F) generally occurring only 5-15 times per year and below -17°C (0°F) temperatures occur only about once every 25 years (Taylor 2013). Mean high temperatures range 27-29°C (80-84°F) in the summer to about 4°C (40°F) in the coldest months, while average lows are generally around 10°C (50°F)



### Yamhill SWCD HCP Environmental Assessment

- HCP Plan Area
- Prairie Terraces
- Valley Foothills
- Willamette River and Tributaries Gallery Forest
- Coast Range
- Streams

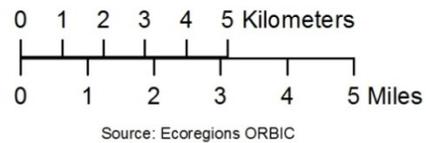


Figure 3.1 Topography and streams of the planning area.

in summer and -1°C (30°F) in winter (Taylor 2013). Although snow falls nearly every year, amounts are typically low, with the valley floor receiving an average of 13-25 cm (5-10 in) per year, mostly during December through February (Taylor 2013).

Severe storms are rare although occasional ice storms occur in northern portions of the Valley, resulting from cold air flowing westward through the Columbia Gorge (Taylor 2013). Major weather systems also bring high winds to the valley several times per year (Taylor 2013).

Relative humidity is highest during early morning hours, and is generally 80-100 percent throughout the year while humidity ranges from 70-80 percent in January to 30-50 percent in the summer (Taylor 2013).

Winters in the Willamette Valley tend to be cloudy, with typically over 80 percent cloud cover and an average of 26 cloudy days in January (Taylor 2013). Summer months are characterized by more sun with average cloud cover of less than 40 percent and more clear days than cloudy days in the peak of summer (Taylor 2013).

### **3.3 Topography and Soils**

The 1,860 square km (718 square mi) Yamhill County consists of gently sloping valley bottomland as well as forested uplands. The county extends from its eastern border at the Willamette westward to the Coast Range. The northern extent of the County is just 24 km (15 mi) southwest of Portland and the western boundary lies within 18 km (11 mi) of the Pacific Ocean (Yamhill County 2013a). The forested uplands make up two-thirds of the county, and are generally higher in elevation, reaching 1,036 m (3,400 ft) at Trask Mountain, the highest point in Yamhill County (Yamhill Partners 2013). Although a few minor streams in the coast range head west to the Pacific Ocean, drainage is primarily easterly, by streams and creeks feeding the Yamhill and Willamette Rivers (Kocher et al. 1917, Yamhill Partners 2013).

The valley bottomlands make up the remaining one-third of the county, with elevations ranging from 18 m (60 ft) above sea level at the Willamette River to about 123 m (400 ft) above sea level in the upper valleys of the tributaries of the Yamhill River (Kocher et al. 1917, Yamhill Partners 2013). The valley to foothill transitions are generally abrupt and steep, except along the North Yamhill River where the valley gently slopes to uplands extending three to four miles from the river (Kocher et al. 1917). The upland topography is largely characterized by well-rounded hills with gentle to steep slopes and with intervening narrow, deeply cut stream gorges (Kocher et al. 1917).

The HCP Plan Area occurs in two disjunct regions within the western foothills of central Yamhill County. The smaller, more southerly unit of the Plan Area (Gopher Valley) consists of habitat within or on the slopes of Gopher Valley, an approximately 7 km (4.3 mi) long valley that averages about 0.8 km (0.5 mi) in width at the valley floor. The approximately 506 ha (1,250 ac) of Plan Area in this unit is distributed over a roughly 1,560 ha (3,855 ac) geographic area. The larger, more northerly unit of the Plan Area (Turner Creek-Oak Ridge-Moores Valley) consists of a series of rolling ridges and small shallow valleys that are isolated from each other by swaths of forest. The 2,663 ha (6,580 ac) of Plan Area in this unit is patchily distributed over a roughly 6,300 ha (15,568 ac) geographic area.

The Willamette Valley is well known for its fertile soils that support agriculture and forestry (Oregon Explorer 2013). Upland prairies generally occur on well-drained silt loam or gravelly loam soils of low to moderate fertility (Apostol and Sinclair 2006). In the Willamette Valley, prairies are primarily on deep fertile soils highly valued for agriculture (Apostol and Sinclair 2006). The most common soil types in the Plan Area are Chehalem, Cove Hazelair, Peavine, and Willakenzie silty clay loams as well as Jory clay

loam (USDA NRCS SSURGO 2.2 Database) (See Table 3.1; Appendix A: List of Soils in the Yamhill SWCD HCP Plan Area).

**Table 3.1 Dominant soil types of the Plan Area. Source USDA NRCS SSURGO 2.2 Database.**

Soil Type	Acres	% of Plan Area
Chehalem silty clay loam	828.23	10.58%
Cove silty clay loam	422.78	5.40%
Hazelair silty clay loam	661.31	8.45%
Jory clay loam	524.38	6.70%
Peavine silty clay loam	2512.42	32.09%
Willakenzie silty clay loam	1220.01	15.58%

### 3.4 Upland Prairie Habitat

The lands covered in the Yamhill SWCD HCP for Fender's Blue Butterfly on Private lands consist primarily of upland prairie habitat. Upland prairies occur on well drained soils, often on dry slopes (ODFW 2006). These habitats are occupied by plant communities dominated by small stature bunchgrasses interspersed with forb species (Wilson 1998; Appendix B: Native Upland Prairie Vegetation).

After Euro-American settlement the landscape of the Willamette Valley underwent substantial change resulting in upland prairie persisting in less than 1% of its former area (Roth et al. 2004). The removal of regular burning allowed woody species and non-native plants to encroach (Wilson 1998). These new species shaded out prairie species or were able to out-compete them for water and other resources (Wilson 1998). While the exclusion of fire and spread of invasive non-native species continue to threaten upland prairies in the Willamette Valley, additional factors causing the loss and fragmentation of upland prairie habitats include conversion to agriculture, urban and rural residential development, and hydrological changes (Wilson 1998; Roth et al. 2004).

A wide variety of native and non-native plant species are found throughout upland prairies in the Willamette Valley. Although non-native grasses and forbs are now dominant, native grasses including Roemer's fescue (*Festuca roemeri*), California oatgrass (*Danthonia californica*) blue wildrye (*Elymus glaucus*), Lemmon's needlegrass (*Achnatherum lemmonii*), and prairie junegrass (*Koeleria macrantha*) still persist in some areas (Wilson 1998). Native forbs that are important to upland prairie habitat include Oregon sunshine (*Eriophyllum lanatum*), slender cinquefoil (*Potentilla gracilis*), Tolmie star-tulip (*Calochortus tolmiei*), and wild strawberry (*Fragaria virginiana*) (Wilson 1998).

### 3.5 Wildlife and Fish

The Willamette Valley has a wide diversity of wildlife (mammals, amphibians, reptiles, birds) and fish, with many species found in prairie habitats. Many of these species may on occasion occupy the HCP Plan Area.

#### 3.5.1 Mammals

Thirty-one native mammal species are generally associated with grassland habitats of the Willamette Valley, but only four are specially adapted to prairie or savanna habitat (Vesely and Rosenberg 2010). The four species requiring grassland habitat are deer mouse (*Peromyscus maniculatus*), red fox (*Vulpes vulpes*), camas pocket gopher (*Thomomys bulbivorus*), and gray-tailed vole (*Microtus canicaudus*) the

latter two of which are endemic to the Willamette Valley (Vesely and Rosenberg 2010). Greater habitat complexity in woodland habitats provides for greater mammalian diversity compared to open grasslands. Fifty native mammalian species are estimated to use oak or mixed oak and Douglas fir woodlands in the Willamette Valley (Vesely and Rosenberg 2010).

Several non-native, mammalian species are widely established throughout upland habitats in the Willamette Valley, including eastern cottontail (*Sylvilagus floridanus*) and Virginia opossum (*Didelphis virginiana*), which are common in oak woodland and prairie habitats (Vesely and Rosenberg 2010).

Mammals known to occur in Yamhill County are identified in Appendix C.

### 3.5.2 Amphibians and Reptiles

Sixteen species of reptiles are known to inhabit the Willamette Valley ecoregion, while nine species of reptiles are known to occur specifically in native upland prairie and neighboring oak savanna and oak forest habitats of the valley (Wilson 1998). Prairies, savannas, and open woodlands with dry soils, are the habitats most utilized by reptiles in the Willamette Valley (Vesely and Rosenberg 2010). The southern alligator lizard (*Gerrhonotus multicarinatus*) is the most commonly occurring of these species. Snakes are encountered much less frequently, with the western rattlesnake (*Crotalus viridis*) nearly extirpated from the Willamette Valley, and the gopher snake (*Pituophis melanoleucus*) and sharptailed snake (*Contia tenuis*) scarcely observed. The loss of open habitats due to succession to closed canopy conditions may be restricting the range and numbers of reptiles in the Willamette Valley (Pacific Wildlife Research Inc. 1999). Reptiles occurring in Yamhill County are identified in Appendix C.

Thirteen species of amphibians are native to the Willamette valley, with only two species associated with grassland habitats; the long-toed salamander (*Ambystoma macrodactylum*) and the Pacific treefrog (*Pseudacris regilla*) (Vesely and Rosenberg 2010). Both species require aquatic habitat at least seasonally (Vesely and Rosenberg 2010).

Amphibians occurring in Yamhill County are identified in Appendix C.

### 3.5.3 Birds

The Willamette Valley is located in the Pacific Flyway and provides important habitat for migrating and wintering waterfowl, shorebirds, and landbirds, and significant breeding populations of ducks and songbirds (Roth et al. 2004). Wetlands and agricultural fields provide key habitat for many of these species while grassland-savanna and oak woodlands provide habitat for more than 100 breeding migratory land bird species (Roth et al. 2004).

At least six species of birds that once occupied Willamette Valley grasslands no longer breed in the valley or have been entirely extirpated from the region, they include the sandhill crane (*Grus canadensis*), burrowing owl (*Athene cunicularia*), Lewis' woodpecker (*Melanerpes lewis*), Say's phoebe (*Sayornis saya*), lark sparrow (*Chondestes grammacus*) and black-billed magpie (*Pica hudsonia*) (Vesely and Rosenberg 2010). The streaked horned lark (*Eremophila alpestris strigata*) and Oregon vesper sparrow (*Pooecetes gramineus affinis*) were once common in the Willamette Valley but now only occur in local populations (Vesely and Rosenberg 2010).

Non-native bird species commonly occurring 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 and Rosenberg 2010).

Birds occurring in Yamhill County are identified in Appendix C.

### 3.5.4 Invertebrates

At least 24 species of butterflies once occurred in the Willamette Valley, with seven of those species extinct by 1998, and six others restricted to remnant pockets of prairie (Wilson 1998). The six species of butterfly restricted to prairie habitat include Fender's blue butterfly, checkered skipper (*Pyrgus ruralis*), Sonora skipper (*Polites sonora*), anise swallowtail (*Papilio zelicaon*), Acmon blue (*Icaricia acmon*), and field crescent (*Phyciodes pratensis*) (Wilson 1998).

Wet prairies and vernal pools in grasslands support a rich variety of endemic arthropods, especially Carabidae (Vesely and Rosenberg 2010). The Oregon giant earthworm (*Driloleirus macelfreshi*) was once an important component of native prairies but is now limited to rare occurrences in mixed hardwood-conifer forests (Vesely and Rosenberg 2010).

### 3.6 Protected Species

Federally listed threatened and endangered species with the potential to occur in Yamhill County are identified in Table 3.2. Of the 15 listed, proposed, and candidate species in Table 3.2, only Fender's blue butterfly and Kincaid's lupine are currently known to occur in upland prairie habitat within the Plan Area.

**Table 3.2 Listed, proposed, and candidate species with the potential to occur in Yamhill County (USFWS 2013).**

Scientific Name	Common Name	Status
<b>Invertebrates</b>		
<i>Icaricia icarioides fenderi</i>	Fender's blue butterfly	Endangered
<i>Euphydryas editha taylori</i>	Taylor's checkerspot butterfly	Endangered
<i>Speyeria zerene hippolyta</i>	Oregon silverspot butterfly	Threatened
<b>Birds</b>		
<i>Brachyramphus marmoratus</i>	Marbled murrelet	Threatened
<i>Strix occidentalis caurina</i>	Northern spotted owl	Threatened
<i>Eremophila alpestris strigata</i>	Streaked horned lark	Threatened
<b>Mammals</b>		
<i>Arborimus longicaudus</i>	Red tree vole*	Candidate
<b>Fish</b>		
<i>Oncorhynchus tshawytscha</i>	Upper Willamette River spring chinook	Threatened
<i>Oncorhynchus mykiss</i>	Upper Willamette R. winter steelhead	Threatened
<b>Plants</b>		
<i>Erigeron decumbens var. decumbens</i>	Willamette daisy	Endangered
<i>Sidalcea nelsoniana</i>	Nelson's checkermallow	Threatened
<i>Howellia aquatilis</i>	Water howellia	Threatened
<i>Lupinus oregonus</i>	Kincaid's lupine	Threatened
<i>Lomatium bradshawii</i>	Bradshaw's desert parsley	Endangered
<i>Castilleja levisecta</i>	Golden paintbrush	Threatened

\*North Oregon Coast distinct population segment.

### 3.6.1 Covered Species

#### 3.6.1.1 Fender's blue butterfly

Fender's blue butterfly (*Icaricia icarioides fenderi*) was listed as endangered under the federal Endangered Species Act in 2000 (USFWS 2000a). A recovery plan was released in 2010 (USFWS 2010). Fender's blue butterflies are endemic to the Willamette Valley and found only in Washington, Linn, Lane, Benton, Polk, and Yamhill counties. In 2010 there were 17 documented populations (USFWS 2010). During the 2013 flight season, five populations were identified in Yamhill County, comprised of roughly 13 subpopulations (Yamhill SWCD unpublished data).

The USFWS designated critical habitat for the Fender's blue butterfly on October 31, 2006 (USFWS 2006). There are 28.9 ha (71.3 ac) of designated critical habitat for Fender's blue within Yamhill County, approximately 2.3 % of the total designated critical habitat for Fender's blue butterfly range-wide. The Plan Area intersects with critical habitat units FBB-1 (including subunit 1A and 1B) and FBB-2, and contains 20.5 ha (50.6 ac) of designated critical habitat for this species, or 1.6% of the total designated critical habitat for Fender's blue range wide (Figure 3.2).

Fender's blue butterfly is dependent upon upland prairie habitat supporting its primary larval host species, the threatened Kincaid's lupine, as well as other plants that can provide adequate nectar. Adult butterflies lay their eggs on the lupine leaves in May and June. Larvae hatch a few weeks later, feed on lupine leaves for a few weeks, and then go into diapause in the soil near the base of the lupine until the following February or March when the larvae emerge to feed on young lupine leaves and flowers. The larvae grow, pupate, and emerge as butterflies in early May, feeding on nectar provided by native and non-native prairie plant species.

The primary constituent elements of critical habitat for the Fender's blue butterfly (i.e., those physical and biological features essential to the conservation of the species) are: (1) early seral 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; (2) larval host-plants Kincaid's lupine, *L. arbustus* (longspur lupine), or *L. albicaulis* (sickle-keeled lupine); (3) adult nectar sources,<sup>1</sup> and (4) stepping-stone habitat, consisting of undeveloped open areas with the physical characteristics appropriate for supporting the short-stature prairie oak savanna plant community (well drained soils), within 1.2 miles (about 2 kilometers) of natal lupine patches (USFWS 2010a).

Primary threats to Fender's blue butterfly include habitat loss and fragmentation, decline in abundance of host and nectar species, and encroachment of tree, shrubs, and invasive species (ODFW 2006).

#### 3.6.1.2 Kincaid's lupine

Kincaid's lupine (*Lupinus oregonus*= *Lupinus sulphureus* ssp. *kincaidii*) was listed as threatened under the federal ESA in 2000 (USFWS 2000a). Kincaid's lupine is also listed as threatened by the Oregon

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<sup>1</sup> Nectar sources include *Allium acuminatum* (tapertip onion), *Allium amplexans* (narrowleaf onion), *Calochortus tolmiei*, *Camassia quamash*, *Cryptantha intermedia* (clearwater cryptantha), *Eriophyllum lanatum*, *Geranium oregonum* (Oregon geranium), *Iris tenax* (Oregon iris), *Linum angustifolium* (pale flax), *Linum perenne* (blue flax), *Sidalcea campestris* (meadow checker-mallow), *Sidalcea malviflora* ssp. *virgata*, *Vicia cracca* (bird vetch), *V. sativa* (common vetch), and *V. hirsuta* (tiny vetch).

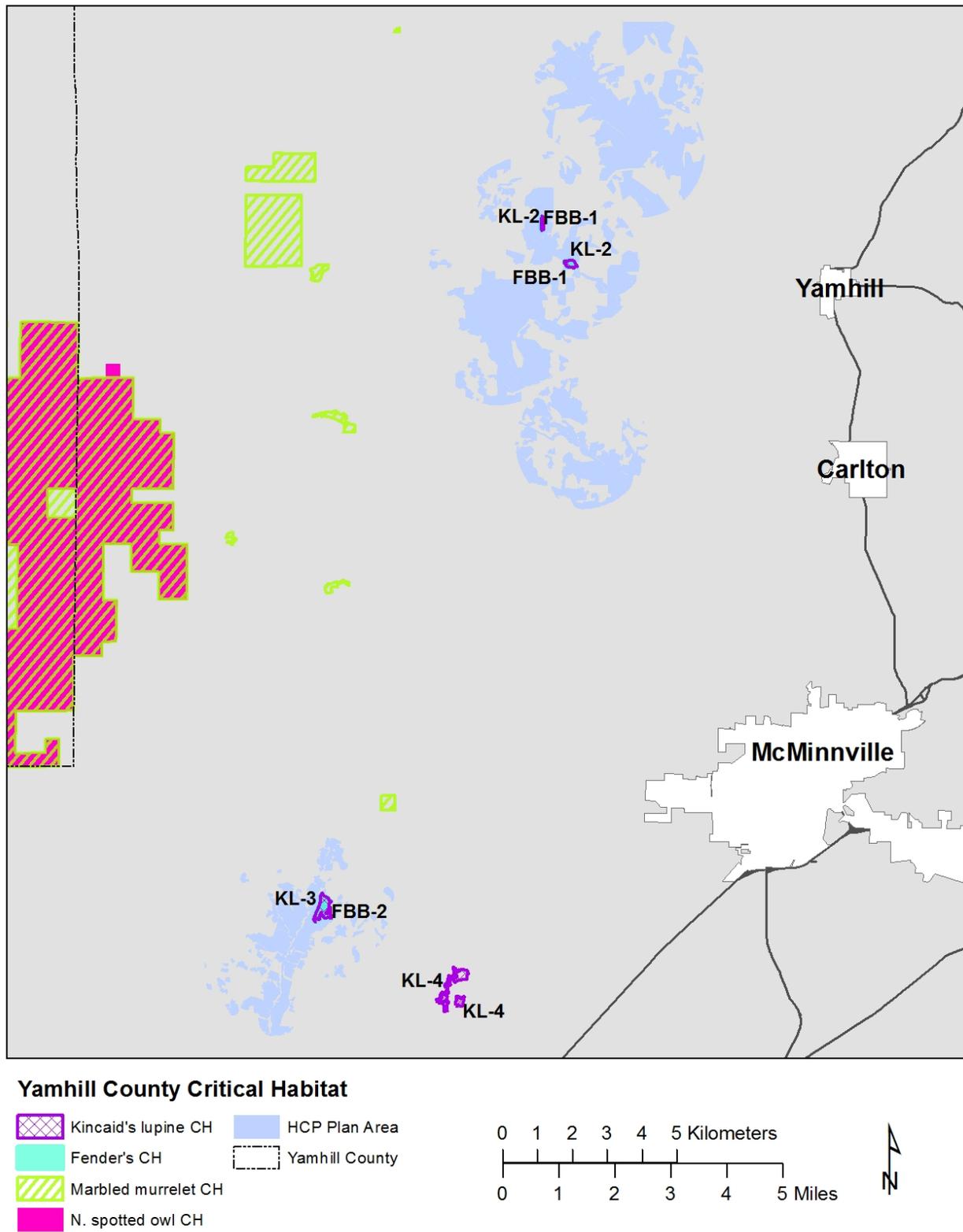


Figure 3.2 Critical habitat in the Plan Area.

Department of Agriculture (ODA 2013a). The USFWS released a recovery plan for Kincaid's lupine and other Willamette Valley prairie species in 2010 (USFWS 2010a).

Critical habitat was designated by USFWS for this species on October 31, 2006 (USFWS 2006). There are 57.3 ha (141.6 ac) of designated critical habitat for Kincaid's lupine within Yamhill County, approximately 19.6 % of the total designated critical habitat for Kincaid's lupine range-wide. The plan area contains 20.5 ha (50.6 ac) of designated critical habitat for this species, or 7 % of the total designated critical habitat for Kincaid's lupine range-wide (Figure 3.2). Kincaid's lupine critical habitat units KL-2 (including subunits 2A and 2B) and KL-3 intersect with the Plan Area. Units KL-4 and KL-5 are also located in Yamhill County, but are not within the Plan Area.

Kincaid's lupine is found in southwestern Washington, the Willamette Valley (Benton, Lane, Polk, Yamhill, Washington, and Linn counties), and Douglas County, typically in upland prairie habitat (USFWS 2008b). At the time of listing (2000), there were 54 known populations of Kincaid's lupine covering 158 ha (370 ac). In 2010, the FWS reported that 246 ha (608 ac) of Kincaid's lupine is known to occur at 164 sites (USFWS 2010a). As of spring 2011, 22 populations were known to occur in Yamhill County, with the majority of those occurring on private lands.

Primary threats to Kincaid's lupine include habitat loss and fragmentation due primarily to agriculture and urban development, tree and shrub encroachment, and the spread of invasive species (Wilson et al. 1997; ODFW 2006).

### 3.6.2 Other Protected Species Not Covered

The following species have the potential to occur in Yamhill County, but there are no known populations within the Plan Area and no impacts to these species are expected from the Proposed Action.

#### 3.6.2.1 Taylor's checkerspot butterfly

Taylor's checkerspot (*Euphydryas editha taylori*) was listed as endangered under the Federal ESA in October 2013 and critical habitat was designated (USFWS 2013a). Taylor's checkerspot occurs in Washington, Oregon and British Columbia as scattered populations in upland prairie and bald habitats (Kaye et al. 2007, USFWS 2013). Many of the remaining populations range-wide are in decline (Kaye et al. 2007).

Habitats occupied by Taylor's checkerspot vary in species composition and vegetation structure, as well as key resources such as host and nectar plants (Kaye et al. 2011). In Oregon, this species is limited to sites in Benton County, and the occupied habitat consists of meadow patches surrounded by Douglas-fir forests on south-facing hillsides (Kaye et al. 2011). The primary host species at the Oregon sites is *Plantago lanceolata* and nectar species include Virginia strawberry (*Fragaria virginiana*), common lomatium (*Lomatium utriculatum*), and western buttercup (*Ranunculus occidentalis*) (Kaye et al. 2007). Depending on local site and climatic conditions, the flight period begins in late April and extends into early July, lasting from 10- 45 days, the latter being documented at the Oregon sites (USFWS 2013a). Taylor's checkerspot butterfly is capable of flying over numerous potential habitat barriers, including roads, shrubs, changes in topography and even forests 20-30 m (66-98 ft) in height (Kaye et al. 2011).

The same factors affecting habitat availability for Fender's blue butterfly—especially residential and agricultural development, invasion of nonnative species, and fire suppression and encroachment of woody species—have also driven declines in suitable habitat for Taylor's checkerspot (see USFWS 2013a).

Taylor's checkerspot is not currently known to occur in the Plan Area or elsewhere in Yamhill County.

#### **3.6.2.2 Upper Willamette River Chinook**

The Upper Willamette River spring Chinook (*Oncorhynchus tshawytscha*) was listed as threatened on March 24, 1999 under the federal ESA (NMFS 1999a). This species is not listed under Oregon's ESA. A recovery plan is in progress. Critical habitat was designated by NMFS (2005) on September 2, 2005. The Upper Willamette River Chinook evolutionary significant unit includes all naturally spawned spring-run Chinook salmon populations in the Willamette River and its tributaries above the Willamette Falls (NMFS 1999a).

Adult Spring Chinook use the mid-Willamette River as an upstream migration corridor while juveniles use the main channel and its tributaries throughout the year. The first downstream migration of juveniles occurs in April with a later flush occurring in the fall. While some fish move downstream to the Columbia River, others persist in the Willamette River and its tributaries.

#### **3.6.2.3 Upper Willamette River Steelhead**

The Upper Willamette River winter Steelhead (*Oncorhynchus mykiss*) was listed as threatened on March 25, 1999 under the federal ESA (NMFS 1999b). This species is not listed under Oregon's ESA. A recovery plan is being prepared. Critical habitat was designated by the NMFS on September 2, 2005 (NMFS 2005).

This Upper Willamette River Steelhead distinct population segment includes all naturally spawned steelhead populations below natural and manmade impassable barriers in the Willamette River and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive) (NMFS 1999b). Winter steelhead do not spawn in the mid-Willamette River and juvenile steelhead utilize the mid-Willamette less than Chinook.

#### **3.6.2.4 Willamette daisy**

The USFWS listed Willamette daisy (*Erigeron decumbens*), an herbaceous perennial, as endangered in January, 2000 (USFWS 2000a). Critical habitat was designated for this species on October 31, 2006 (USFWS 2006). Critical habitat units for Willamette daisy have been designated in the following Oregon counties: Benton, Lane, Linn, Marion and Polk (USFWS 2006). A recovery plan was released in 2010 (USFWS 2010a). This plant is also listed as endangered by the state of Oregon.

Willamette daisy is endemic to the Willamette Valley and it has previously been collected from Benton, Clackamas, Lane, Linn, Marion, Polk, Yamhill, and Washington Counties (USFWS 2010a). The current range of the species is limited to Benton, Lane, Linn, Marion, and Polk Counties (USFWS 2010a).

Willamette daisy occurs in both wet prairies and upland prairies (USFWS 2010a). Threats to this species are similar include habitat loss due to urban and agricultural development, successional encroachment by trees and shrubs, competition with non-native species, and small population sizes (USFWS 2010a).

There are no known extant populations of Willamette daisy in the Plan Area or elsewhere in Yamhill County.

#### **3.6.2.5 Nelson's checkermallow**

Nelson's checkermallow (*Sidalcea nelsoniana*) is a perennial plant that was federally listed as threatened without critical habitat in 1993 (USFWS 1993). The most recent recovery plan was published in 2010 (USFWS 2010a). Oregon has also listed this plant as threatened (ODA 2013b) and Washington has listed it as endangered (WADNR 1997a). Nelson's checkermallow is known to have occurred in Benton, Clackamas, Linn, Marion, Polk, Tillamook, Yamhill and Washington Counties in Oregon as well as Cowlitz and Lee Counties in Washington (USFWS 2010a).

In the Willamette Valley, Nelson's checkermallow typically occurs in open prairie remnants along the margins of streams, ditches, roadsides, fence rows, drainage swales, in Oregon ash (*Fraxinus latifolia*) swales and meadows with wet depressions, or in fallow fields (USFWS 2013b; ODA 2013b). In the Willamette Valley this species is found in soils that range from gravelly, well drained loams to poorly drained, hydric clay soils (ODA 2013b).

Nelson's checkermallow is threatened by urban and agricultural development, ecological succession that results in shrub and tree encroachment of open prairie habitats and competition with invasive weeds. Pre-dispersal seed predation by weevils and threat of inbreeding depression are also factors affecting recovery of this species (USFWS 2010a).

There are no known populations of Nelson's checkermallow in the Plan Area.

#### **3.6.2.6 Golden paintbrush**

Golden paintbrush (*Castilleja levisecta*) is an herbaceous perennial that was listed as threatened, without critical habitat in 1997 (USFWS 2011). A recovery plan was released in 2010 (USFWS 2010a). Golden paintbrush is also listed as endangered in Oregon and Washington (ODA 2013c, WADNR 1997b). Golden paintbrush occurs in upland prairies, on generally flat grasslands (USFWS 2013c).

Although golden paintbrush historically occurred in Willamette Valley prairies throughout Linn, Marion and Multnomah Counties it has been extirpated from the State due to habitat modification related to urbanization and agriculture (USFWS 2013c). The last recorded sighting of a wild population of golden paintbrush was in Oregon in 1938 in Linn County (USFWS 2013c). While extensive reintroductions of the species have occurred in the Willamette Valley, there have been none to date in Yamhill County (Kaye et al. 2012).

#### **3.6.2.7 Bradshaw's desert parsley**

Bradshaw's desert parsley (*Lomatium bradshawii*), an herbaceous perennial, was listed as endangered under the federal ESA in 1988 (USFWS 1988). A recovery plan was released in 2010 (USFWS 2010a). This plant is also listed as endangered by States of Oregon (ODA 2013d) and Washington (WADNR 2013). The majority of Bradshaw's desert parsley populations in Oregon are located within a 16 km (10 mi) radius of Eugene.

Bradshaw's desert parsley is restricted to wet prairie habitats, especially on seasonally saturated or flooded prairies, which are found near creeks and small rivers in the southern Willamette Valley (USFWS 2010a). Bradshaw's desert parsley sites typically have heavy, sticky clay soils or seasonal hydric soils where there is a dense clay layer below the (USFWS 2010a). This plant also needs periodic grass fires or mowing, to reduce competition from weedy and shrubby plants (Pacific Biodiversity Institute 2013). The blooming period for this plant occurs in the spring, usually extending from April into early May (USFWS 2010a). Bradshaw's desert parsley generally responds favorably to disturbances such as fire (USFWS 2010a).

Populations have been severely reduced by agriculture and the remaining populations are threatened by urban development (Pacific Biodiversity Institute 2013), as well as pesticides, encroachment of woody and invasive species, herbivory, and grazing (USFWS 2010a).

Bradshaw's desert parsley is not currently known to occur in the Plan Area or elsewhere in Yamhill County.

### **3.7 Water Resources (Quantity and Quality)**

Yamhill County is located within the following four hydrological subbasins: Yamhill River Basin (HUC 17090008), Middle Willamette River Basin (HUC 17090007), Wilson-Trask-Nestucca Basin (HUC 17100203), and the Tualatin Basin (HUC 17090010) (Figure 3.3). The Plan Area is located entirely within the Yamhill River Basin, and is split between the North Yamhill River and lower South Yamhill River watersheds (Figure 3.4).

Water quality in Oregon is measured by criteria established the Oregon Department of Environmental Quality (ORDEQ). Two sources of water pollution affecting water quality are point source pollution (also known as end of pipe discharge) and non-point source pollution (generally storm water runoff). Too much runoff can cause erosion, flooding, and pollution of streams and other water bodies, thereby affecting beneficial uses of those streams. Beneficial uses of water for the Willamette Basin include (ORDEQ 2005):

- Public and private domestic water supply
- Industrial water supply
- Irrigation and livestock watering
- Fish and aquatic life
- Wildlife, hunting, and fishing
- Boating
- Water contact recreation
- Aesthetic quality
- Hydro Power
- Commercial navigation and transportation

The City of McMinnville gets its drinking water from surface runoff impounded in McGuire Reservoir (in the Nestucca River Watershed) and Haskins Reservoir (in the North Yamhill River Watershed), located in the Coast Range Mountains and (ORDEQ 2013b). Water travels through Idlewild Creek and Haskins Creek. The City of Sheridan gets its water from Stoney Mountain Springs and the South Yamhill River in the Lower South Yamhill River Watershed (City of Sheridan 2013; ORDEQ 2013a). The drinking water supply for the City of Carlton is conveyed from Panther Creek Reservoir in the North Yamhill River Watershed (City of Carlton 2012). The drinking water for the City of Yamhill is supplied by an intake on Turner Creek in the North Yamhill River Watershed (ORDEQ 2013a).

Beneficial uses for tributaries of the Willamette River include: Public Domestic Water Supply, Private Domestic Water Supply, Livestock Watering, Fish and Aquatic Life, Fishing, Boating, Hydro Power, Aesthetic Quality, Industrial Water Supply, Irrigation, Water Contact Recreation, and Wildlife and Hunting (ORDEQ 2005).

#### **3.7.1 Water Quality Limited Streams**

The water quality of the Upper Willamette River sub-basin is primarily influenced by agriculture, although municipal and industrial point sources and urban non-point sources also affect water quality (Primozych and Bastasch 2004). Agricultural and forestry-related non-point sources of pollution in the Yamhill Basin include erosion from agricultural, rural, and forestlands and stream banks as well as contaminated runoff from livestock and other agricultural operations (Yamhill River Subbasin Local Advisory Committee 2009). Non-point source pollutants maybe carried to surface water or groundwater through rainfall, irrigation runoff, and seepage (Yamhill River Subbasin Local Advisory Committee 2009).

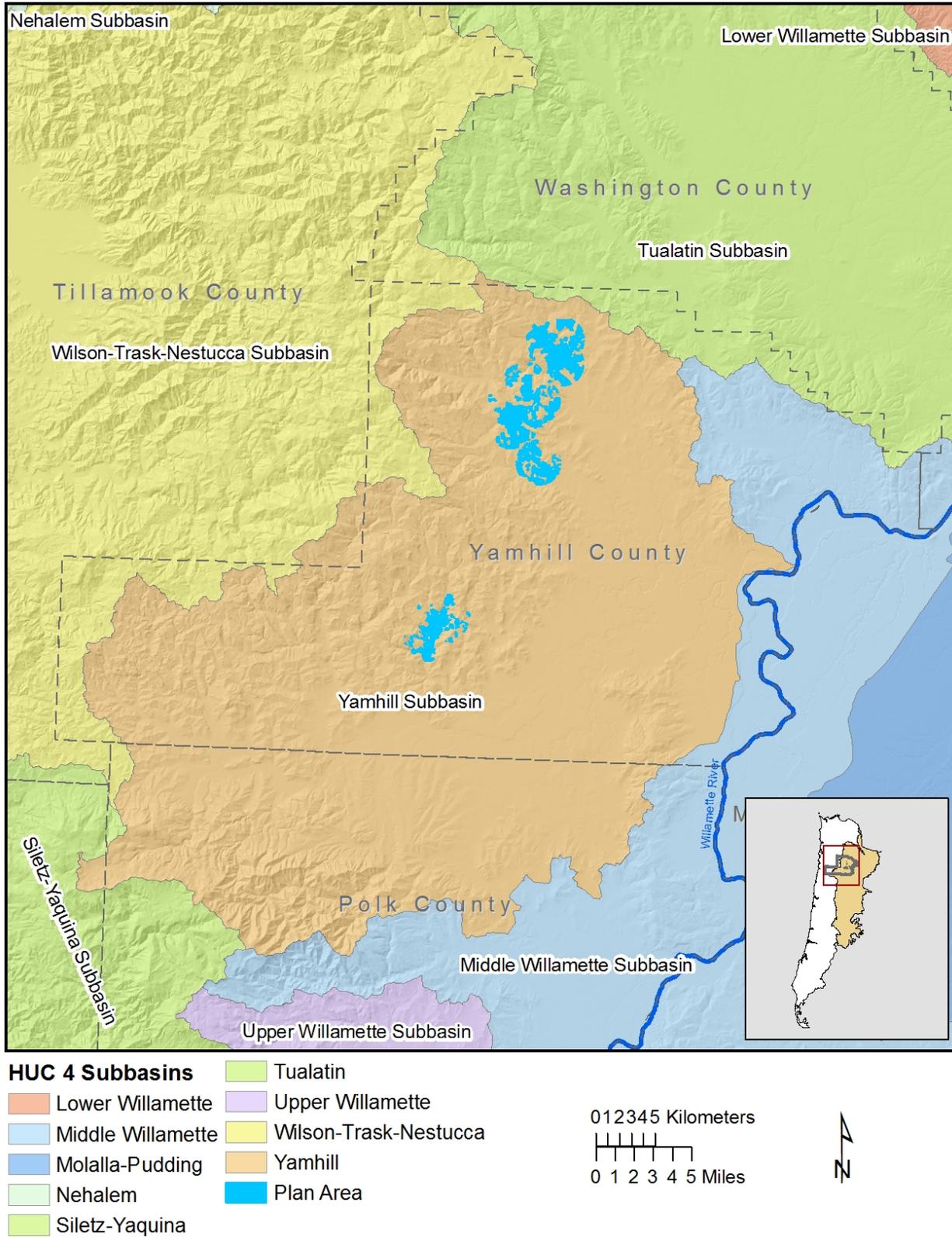
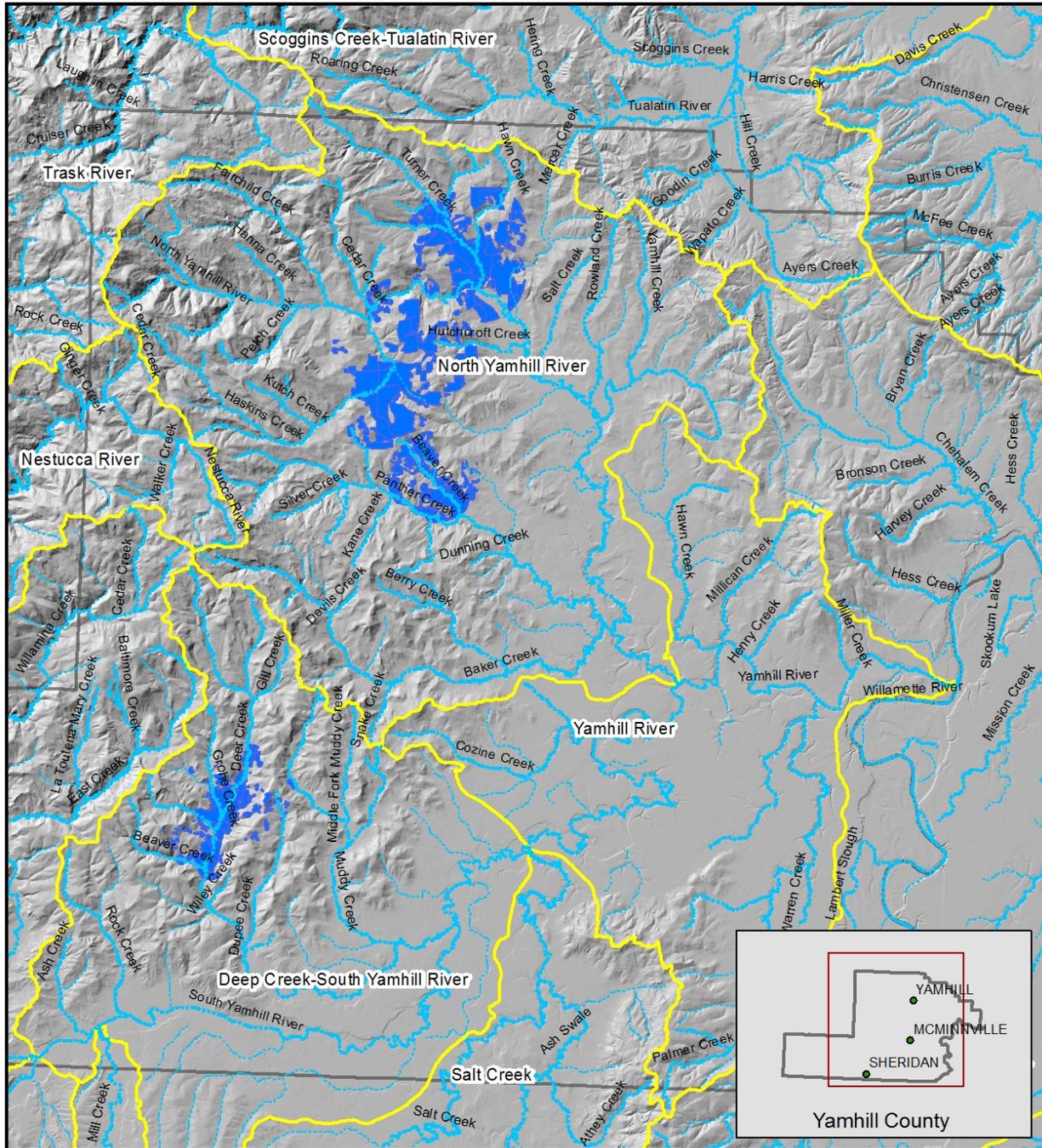


Figure 3.3 Hydrologic subbasins of Yamhill County.



- HUC 5 Watersheds
- Streams
- Plan Area
- Yamhill County Boundary

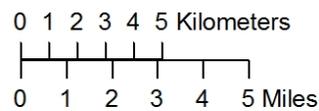


Figure 3.4 Watersheds of the Plan Area.

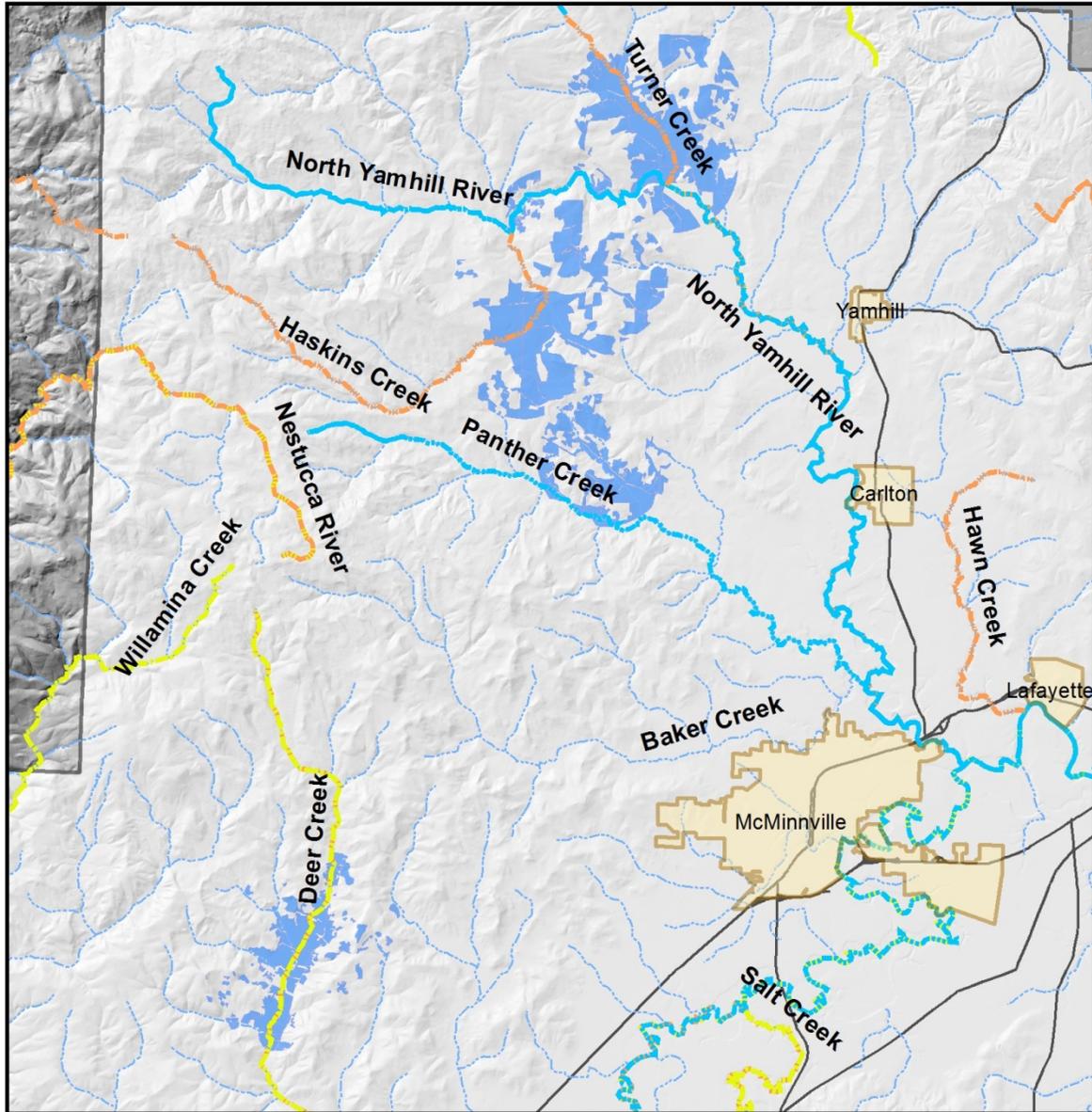
Several water bodies within Yamhill County (Table 3.3) and the Plan Area (Table 3.4, Figure 3.5) are on the ORDEQ's list of water quality limited streams (303d). Water quality limited streams are water bodies failing to meet water quality standards. Total Maximum Daily Loads (TMDLs) usually must be developed for all waterbodies on the 303d list approved by ORDEQ and EPA (Yamhill River Subbasin Local Advisory Committee 2009). TMDLs represent the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet the water quality standard for the particular pollutant.

**Table 3.3 EPA 303(d) water quality limited streams in Yamhill County.**

Stream Name	
Baker Creek	Mill Creek
Cedar Creek	Nestucca River
Champoeg Creek	Niagara Creek
Chehalem Creek	North Yamhill River
Chehalem Creek Tributary	Panther Creek
Chicken Creek	Salt Creek
Deer Creek	South Yamhill River
E. Fork of S. Fork Trask River	Turner Creek
Haskins Creek	West Fork Palmer Creek
Hawn Creek	Willamette River
Heaton Creek	Willamina Creek
Little Nestucca River	Williams Canyon
McFee Creek	Yamhill River

**Table 3.4 Water quality limited streams in the Plan Area.**

Waterbody	Parameter	Season	Status
<b>Deer Creek</b>	Phosphorus	May 1-Oct. 31	TMDL Approved
	Temperature	Summer	303(d) list
	Fecal Coliform	Year-round	303(d) list
<b>N. Yamhill River</b>	Phosphorus	May 1-Oct. 31	TMDL Approved
	Temperature	Summer	303(d) list
	Fecal Coliform	Fall/Winter/Spring	303(d) list
	Dissolved Oxygen	Jan. 1-May 15	303(d) list
	Iron Manganese	Year-round	303(d) list
	<i>E. coli</i>	Fall/Winter/Spring	303(d) list
<b>Panther Creek</b>	Temperature	Summer	303(d) list
<b>Turner Creek</b>	Temperature	Summer	303(d) list



**OR Streams Water Quality**

- Cat 4A: Water quality limited, TMDL approved
- Cat 4B: Water quality limited, other control measures
- Cat 4C: Water quality limited, not a pollutant
- Cat 5: Water quality limited, 303(d) list, TMDL needed
- TMDL approved
- Water quality limited not needing a TMDL
- Streams
- Plan Area

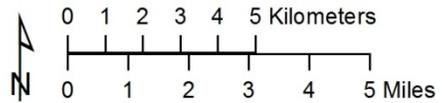


Figure 3.5 Water quality limited streams in the Plan Area.

### 3.7.2 Water Quality Management on Agricultural and Forestry Lands

The Agricultural Water Quality management Act (codified at ORS 568.900-.933) requires the reduction of pollution from agricultural sources in Oregon. Oregon Department of Agriculture enforces water pollution prevention and control for agricultural activities under the Oregon Administrative rules for the Yamhill River Subbasin (OARs 603-095-0500 through 603-095-0560) and Oregon Administrative Rules (OARs 603-090-0060 through 603-090-0120). A water quality management plan has been developed for agricultural activities in the Yamhill Subbasin (Yamhill River Subbasin Local Advisory Committee 2009). The plan applies to all lands in the Yamhill Basin currently in agricultural use, as well as agricultural lands which are not currently being managed as such. The plan emphasizes voluntary actions by landowners and operators to control factors affecting water quality while the Administrative Rules provide Prevention and Control Measures that serve as minimum standards that must be met on all agricultural and rural lands (Yamhill River Subbasin Local Advisory Committee 2009). The Prevention and Control Measures address erosion prevention and sediment control, nutrients, and pesticides among other factors.

The Oregon Forest Practice Act (ORS 527.16–527.992) and Forest Practice Administrative Rules (see Oregon Administrative Rules Chapter 629) regulate forestry on private lands in Oregon. The forest practices rules include rules for water protection (ORS 527.765 and 527.770; OAR Chapter 629; Divisions 635, 640, 645, 655, and 660).

### 3.7.3 Water Quantity

About 20% of crop land in Yamhill County is irrigated (Barney & Worth, Inc. 2009). Most of the high-value crops grown in the County, including wine grapes, tree fruits and nuts, specialty vegetable seeds and berries, require supplemental irrigation (Barney & Worth, Inc. 2009). Two irrigation districts serve the County and both districts are limited to existing water users, they cannot accept new irrigators due to restricted water supply (Barney & Worth, Inc. 2009). New users seeking to irrigate their crops must obtain water from wells (Barney & Worth, Inc. 2009).

### 3.7.4 Groundwater

Groundwater is stored in aquifers at various depths below the earth's surface, yet linked to surface water supplying the base flow of most Oregon's wetlands, streams, rivers, and lakes (ORDEQ 2013a). Groundwater provides drinking water for many rural residents in the state, including those in Yamhill County. Ground water can be contaminated from a number of sources including, but not limited to: (1) improperly installed or old domestic wells, (2) poorly maintained septic systems, (3) improperly applied pesticides or pesticide spills, (4) household chemicals and cleaning products, and (5) excess nitrogen fertilizers, including manure and lawn fertilizers (ORDEQ 2013a).

The northern Willamette Valley contains many sources of groundwater that are isolated in volcanic rock (ORWRD 2013). Willamette Valley aquifers are in the Columbia River Basalt group, and heavy pumping from this group and another geologic unit, the Troutdale Formation, have caused groundwater declines resulting in 12 "groundwater limited areas" in the valley (ORWRD 2013).

Yamhill County is comprised of the following hydrogeologic units: Low Yield Bedrock Unit, Willamette Silt Unit, Columbia River Basalt (CRB) Unit and the Basin Fill Sediment Unit. The ground water within the Low Yield Bedrock Unit is at risk for high salinity. The Low Yield Unit has low storage capacity, and while users generally have sufficient water for domestic uses, with wells typically yield less than 10 gallons per minute, with 5 gallons per minute more common. Many wells are unable to provide sufficient water

beyond household uses. Most of the private property within the HCP Plan Area is located within the Low Yield Bedrock Unit.

The Chehalem Mtn. CRB, Parrett Mtn. CRB, and Eola Hills CRB are aquifers with restriction classifications. No area in Yamhill County is considered a groundwater critical area (ODA 2012).

### **3.7.5 Wetlands**

The Willamette Valley, including parts of Yamhill County, historically contained extensive and diverse wetland complexes, including wet prairies, forest wetlands, backwater sloughs, permanent marshes, and scrub-shrub wetlands (Roth et al. 2004). More than 85% of the wetlands within the Willamette Valley ecoregion have been lost to agricultural conversion, flood control, and urbanization (Roth et al. 2004, ODFW 2006). Remaining wetlands are highly degraded from altered water regimes, invasive plant and animal disturbance, and pollution (ODFW 2006).

In Oregon, both the U.S. Army Corps of Engineers and the Oregon Department of State Lands have jurisdiction over wetland fill and/or removal projects. No wetland delineations or determinations were conducted as part of the HCP; however in general, wet prairies are not included as covered lands in the HCP. Some wet prairies may constitute jurisdictional wetlands and any impacts to wetlands meeting jurisdictional requirements would require separate authorization from the appropriate agency.

## **3.8 Air Quality and Noise**

The Oregon Department of Environmental Quality (ORDEQ) and U.S. Environmental Protection Agency (EPA) have jurisdiction over air quality and noise.

### **3.8.1 Air Quality**

National Ambient Air Quality Standard (NAAQS) have been established to protect public health (primary standards) and welfare (secondary standards) (CAA § 109(b), 42 U.S.C. § 7408). The primary NAAQS are set to allow “an adequate margin of safety” necessary to protect public health from pollutants which cause or contribute to air pollution and which may reasonably be anticipated to endanger public health or welfare (“criteria pollutants;” CAA § 108). The EPA has established NAAQS for six criteria pollutants: Ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen oxide (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), Particulate Matter (PM<sub>10</sub>, and Lead (Pb) (ORDEQ 2013b). Ozone is generally considered a regional pollutant as it affects air quality on a regional scale (ORDEQ 2011). Pollutants such as CO, NO<sub>2</sub>, SO<sub>2</sub>, and Pb are considered to be local pollutants accumulating in the air locally (ORDEQ 2011). PM<sub>10</sub> is considered to be both a localized and a regional pollutant (ORDEQ 2011). The pollutants of greatest concern in Oregon are smog, fine particulate matter (from wood smoke, other combustible sources, cars, and dust), and hazardous air pollutants or “air toxics” (ORDEQ 2011).

The ORDEQ monitors the air quality in Oregon, and identifies those areas not meeting the NAAQS. Those areas are determined to be in “nonattainment.” If an area has a history of being in nonattainment, but is now meeting the NAAQS, that area is considered to be a “maintenance area” (ORDEQ 2013b). Areas in which pollutant concentrations exceed allowable ambient air quality standards are designated as nonattainment areas for that pollutant. Maintenance areas are areas that had a history of nonattainment, but are now consistently meeting the NAAQS. Maintenance areas have been re-designated by the EPA from "nonattainment" to "attainment with a maintenance plan," or designated by the Environmental Quality Commission (ORDEQ 2013b).

No portion of Yamhill County is in a nonattainment or maintenance area (ORDEQ 2013c, ORDEQ 2013d). Yamhill County meets the NAAQS for lead, ozone, sulfur dioxide, carbon monoxide, and particulates, and has pollutant concentrations at levels that are generally considered “good” (ORDEQ 2011). Portland is classified as a nonattainment area for carbon monoxide (CO) and ozone. PM2.5 exceeded the health standard in other regions of Oregon, but not in the plan Area (Portland Metro is the nearest area exceeding the health standard) (ORDEQ 2011). The ozone (smog) levels did not exceed the federal health standard in any Oregon community (ORDEQ 2011).

The Willamette Valley is prone to air pollution as a result of climatic and physiographic conditions. Suspended particulates from a number of sources, including automobiles, dust, field and slash burning, and industry process losses, pose the largest air pollution problem for Yamhill County (Yamhill County 1996a). Cars, trucks and farming and logging equipment and activities combined with wood stoves likely contribute the majority of air pollutants in the Plan Area.

The Clean Air Act also established Prevention of Significant Deterioration program, which prevents areas that currently have clean air from being degraded. No degradation of air quality or visibility is permitted in Class I areas, which are wilderness areas and national parks (Visibility Protection Plan for Class I Areas OAR 340-200-0040, sect. 5.2). There are no wilderness areas or national parks, and no Class I areas, within or in close proximity to the Plan Area.

### **3.8.2 Noise**

There are no major noise sources in the project area. Traffic noise is limited given that roads in the Plan Area are rural residential or farm roads that typically support only one or two lanes of traffic. Noise receptors are for the most part people who live or work in rural and agricultural settings and work within or adjacent to the covered lands. Wildlife, where present, could be sensitive to noise, particularly during nesting and breeding.

## **3.9 Cultural and Historical Resources**

The prehistoric record extends human activities back about 8,000 years and changes in the Willamette Valley since Euro-American settlement are widely attributed to the elimination of fire and changes in land use activity in the last 150 years. The open oak savanna grasslands of the Willamette Valley were maintained through anthropogenic fire (Sowards 2007). The Kalapuya Tribe, which collectively consisted of many related bands, occupied the Willamette Valley and routinely burned to aid the growth of some species used for subsistence, including tarweed, camas, and white oak, and to facilitate hunting and gathering of others (Sowards 2007).

The Yamels, or Yamhills, comprised six of the bands, and spoke the Tualatin-Yamhill dialect, one of three Kalapuyan dialects (Ruby et al. 2010). The earliest non-native settlers entered the Yamhill region in 1814 (Marschner 2008). Most of the early settlers were employees of fur trading companies but by the 1840's many American immigrants were arriving in Oregon via the Oregon Trail, and settling in present day Yamhill County (Yamhill County 2013b). The area eventually became the agricultural center of the Willamette Valley and by the 1860's almost all of the farm land in Yamhill County had been claimed (Yamhill County 2013a).

By 1845 there were more Euro-American settlers in the Willamette Valley than Kalapuya (Yamhill County 2013b). The Kalapuya populations were significantly declining, in large part due to the spread of illnesses introduced by the settlers (Yamhill County 2013b). In 1855, the Yamhill signed a treaty in which they agreed to live in the Willamette Valley until the government established a reservation for them

(Ruby et al. 2010). On June 30, 1857, the government created the 24,281 ha (60,000 ac) Grand Ronde reservation, located in the upper Yamhill River area (Ruby et al. 2010). The Yamhill population declined severely in the late 1800s, numbering as few as 90 members in 1890 and only five in 1910 (Ruby et al. 2010).

### 3.10 Land Use and Ownership and Socio-Economic Factors

#### 3.10.1 Land Use Patterns and Trends

Dominant land uses in the primarily rural Yamhill County are agriculture and forestry (Yamhill Partners 2013b). Approximately a third of the soils in the County are considered “prime agricultural land” with many soils once used for pasture or timber production now supporting vineyards (Yamhill Partners 2013). Land use changes in the County over the last three decades have included a 12% reduction in cropland under production and significant changes in the types of crops grown (Yamhill Partners 2013). There are approximately 2,115 farms in Yamhill County, with 73,186 ha (180,846 ac) of land in farms and an average farm size of 35 ha (86 ac) (USDA 2007). An estimated 63.5% of the County’s agricultural lands in farms are used for cropland, 19.8% for woodlands, 9.5% for pasture, and 7.2 % for other use (USDA 2007). In the Yamhill Basin, over 50% of the lands are used for farming or rangeland and 45% are used for forestry (Table 3.5). In 2011 the top five commodities in Yamhill County based on gross sales were nursery crops, wine grapes, dairy products, tall fescue, and wheat (Worksource Oregon 2011). The increases in lands used for vineyards and growth of the county’s wine industry have also increased tourism to the area (Yamhill Partners 2013).

**Table 3.5 Land use in the Yamhill basin (Yamhill River Subbasin Local Advisory Committee 2009).**

Land Use	Area (ha)	Area (ac)	Percent of Area
Irrigated farmland	15,526	38,365	7.80%
Non-irrigated farmland	62,838	155,275	31.57%
Range/Pasture	25,467	62,931	12.79%
Forest	90,366	223,300	45.39%
Urban	3,237	8,000	1.63%
Still Water	261	645	0.13%
Other	1,376	3,400	0.69%
<b>Total</b>	<b>199,072</b>	<b>491,916</b>	

Yamhill County has enacted a zoning ordinance in order to “promote the public health, safety, and general welfare and to implement the goals and policies of the Yamhill County Comprehensive Plan 1974” (Yamhill County Zoning Ordinance, No. 310, 1982, sect. 103.01). The Zoning Ordinance provides that “no lands shall be used . . . except in conformity with th[e] ordinance” (Yamhill County Zoning Ordinance, No. 310, 1982, sect. 103.02). Over 40% of the county is zoned for Exclusive Farm Use, while nearly a third is zoned for Commercial Forestry (Yamhill County 2010, Figure 3.6). Zoning districts in the Plan Area largely consist of agriculture and forestry designations, with less than 1% of the area designated as low density residential or public use (Table 3.6, Figure 3.7, Figure 3.8).

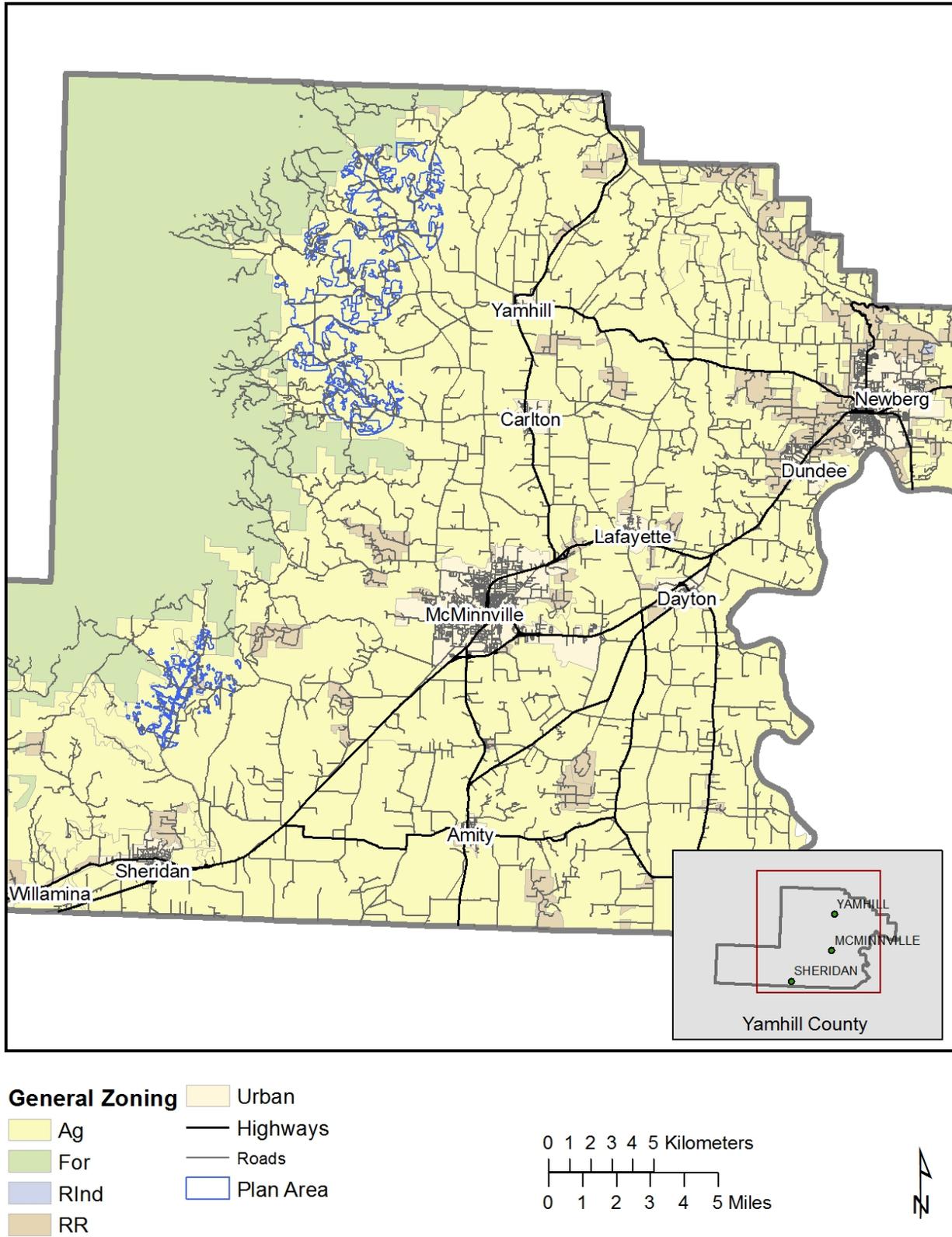


Figure 3.6 General zoning classifications in Yamhill County.

Table 3.6 Zoning Classifications in the Plan Area.

Zoning Classification		Area (ac)	Area (ha)	Percent of Plan Area
<b>Agriculture/Forestry District</b>				
	AF-20	295.64	119.64	3.77%
	AF-40	452.64	183.18	5.78%
	AF-80	1344.15	543.96	17.16%
<b>Exclusive Farm Use District</b>				
	EF-20	349.10	141.28	4.46%
	EF-40	259.99	105.21	3.32%
	EF-80	4352.93	1761.57	55.58%
<b>Forestry District</b>				
	F-80	704.26	285.00	8.99%
<b>Public Assembly/Institutional District</b>				
	PAI	21.86	8.85	0.28%
<b>Parks, Recreation, and Open Spaces District</b>				
	PRO	0.04	0.02	0.00%
<b>Public Works/Safety District</b>				
	PWS	0.10	0.04	0.00%
<b>Very Low Density Residential District</b>				
	VLDR- 5	51.2	20.92	0.66%
<b>Total</b>		<b>7831.2</b>	<b>3169.66</b>	

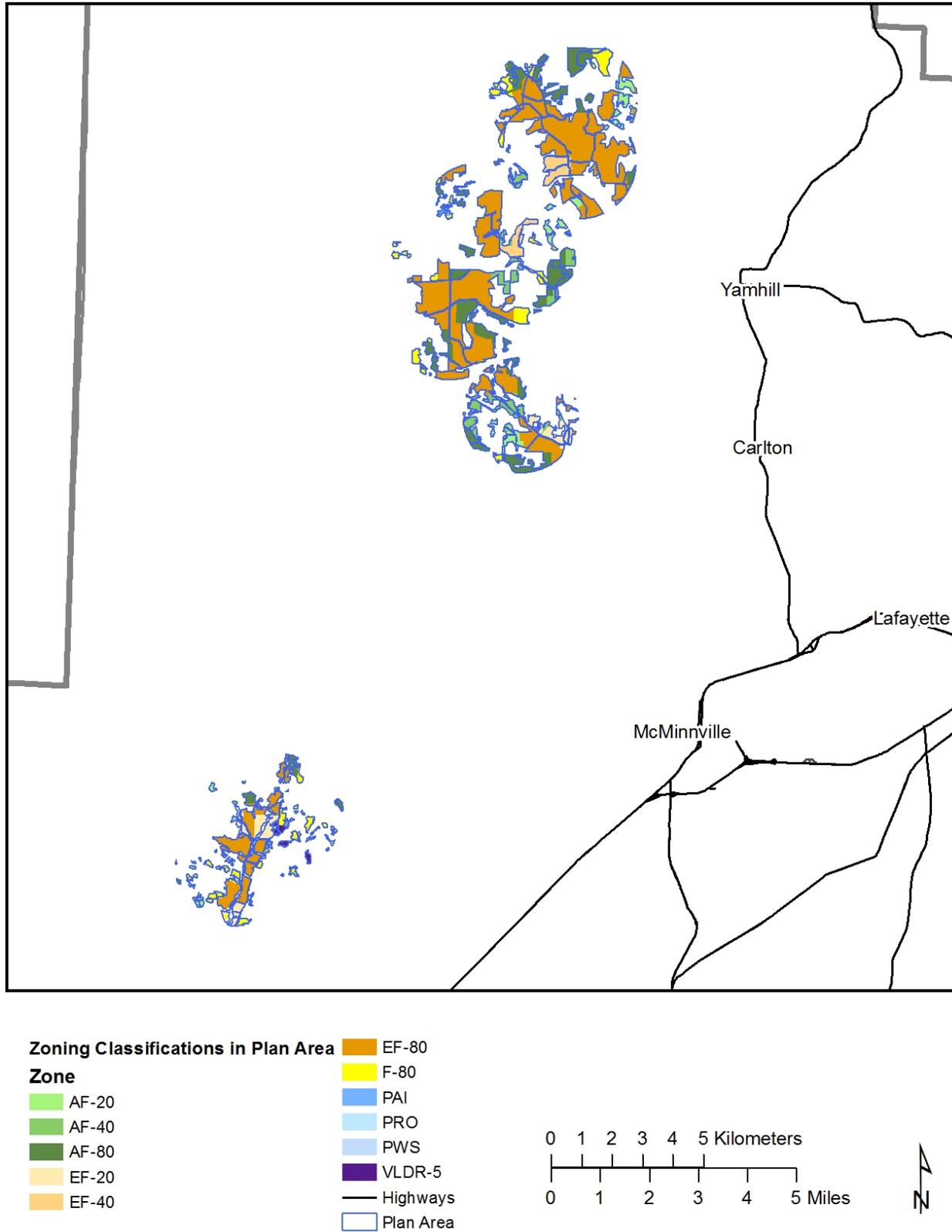


Figure 3.7 Zoning classifications in the Plan Area.

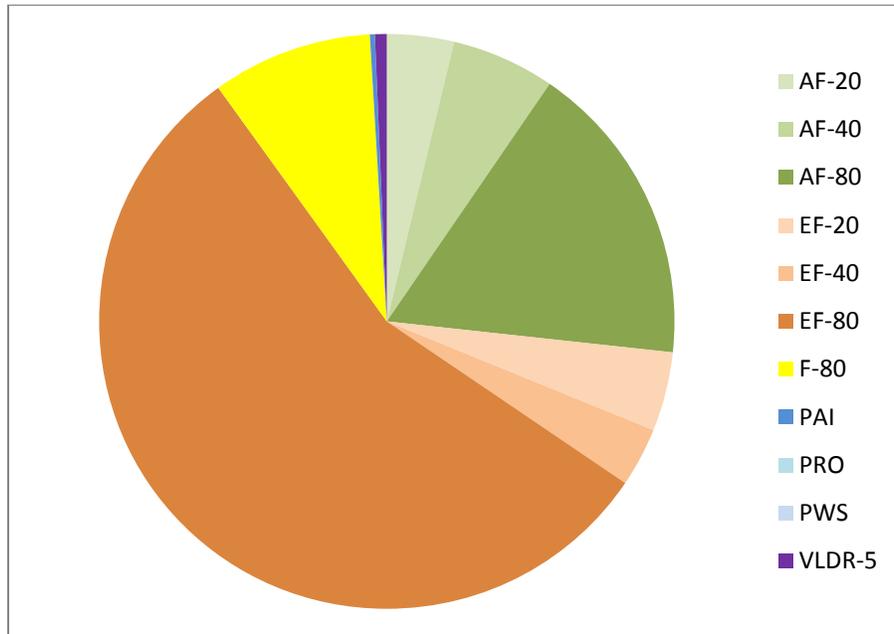


Figure 3.8 Zoning Classifications in the Plan Area by Percentage.

The Yamhill basin consists of a mix of private, federal, and tribal lands. Private lands make up the majority of the basin though, with nearly 90% of lands in private ownership (Table 3.7, Figure 3.9). The Plan Area consists entirely of privately-owned lands (Figure 3.9). Federally owned lands within the Yamhill basin occur primarily in forested areas of the coast range, and tribal lands are also found well outside of the Plan Area.

Table 3.7 Land ownership in the Yamhill basin (Yamhill County and a portion of Polk County) (Yamhill River Subbasin Local Advisory Committee 2009).

Ownership	Area (ac)	Area (ha)	Percent of Area
Federal	43,786	17,720	8.90%
State	2,459	995	0.50%
Tribal	10,000	4,047	2.03%
Private	435,671	176,310	88.57%
<b>Total</b>	<b>491,916</b>	<b>199,072</b>	

3.10.2 Socio-Economic

After World War II Yamhill County experienced a significant amount of population growth, with the population doubling between the years 1960 (32, 478) and 1980 (84,992; Tucker 2002). Yamhill County continues to grow, especially as a result of “spillover” from the Portland Metropolitan area (Yamhill County 1996). The 2012 estimated population of Yamhill County is 100,255 people (U.S. Census Bureau 2013).

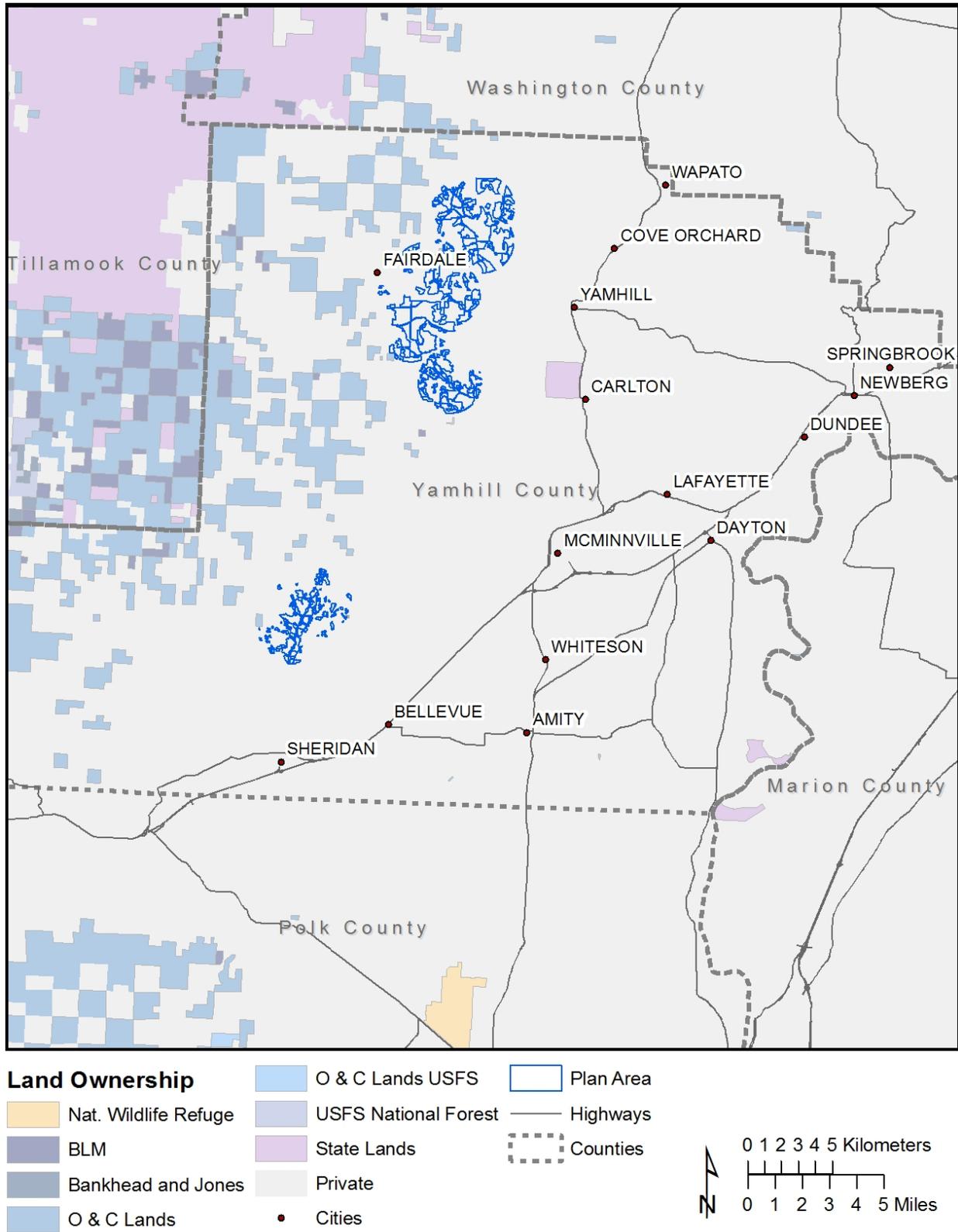


Figure 3.9 Land ownership patterns in Yamhill County.

Yamhill County is the 10th most populated county in the state. The population within the county is largely distributed among McMinnville (32,535) and Newberg (22,396), the two largest cities in the county (U.S. Census Bureau 2013). Twenty-four percent of the population is 18 years or younger, 14.5 % are 65 or older, 49.8% are female and 50.2% are male (U.S. Census Bureau 2013). Non-hispanic, non-latino white residents make up 78.5% of the population, hispanic or latino persons represent 15.3%, 2.9% of the population in Yamhill County identify with two or more races, 2% are American Indian or Alaska Native, and 1% are black or African American (U.S. Census Bureau 2013).

Nearly 87% of the population in the County has graduated from high school and 22.5% have a Bachelor's degree or higher (U.S. Census Bureau 2013). The median household income for 2007-2011 was \$53,819, with 12.8% of the County's population living below the poverty level (U.S. Census Bureau 2013). In 2012 162 building permits were issued in the County (U.S. Census Bureau 2013).

Various tribes and bands from Western Oregon were removed from their homes in the mid-19th century and relocated to the Grand Ronde reservation. The reservation is located in southwestern Yamhill County and northwestern Polk County and is owned by the Confederated Tribes of the Grand Ronde Community of Oregon.

Schools in closest proximity to the Plan Area:

- Gales Creek Elementary School, 9125 Northwest Sargent Road, Gales Creek
- Delphian School, 20950 Southwest Rock Creek Road, Sheridan
- Academic Potential Charter School, 19915 Southwest Muddy Valley Road, McMinnville
- Head Start of Yamhill County, 1500 West Main Street, Sheridan
- Yamhill Carlton High School
- Dispensational Theological Seminary, 55330 Southwest Lovegren Drive, Gaston
- Elizabeth Perry Montessori, 53097 SW Patton Valley Rd., Gaston

There are nursing homes, senior care facilities, and hospitals in Forest Grove, McMinnville, Sheridan and other larger cities in the region.

### **3.11 Transportation**

The Plan Area does not overlap any major highways or transportation routes. The main state highways in Yamhill County are Oregon 99W, Oregon Route 47, and Oregon Route 18. Oregon 99W is a state highway that runs north-south through the Willamette Valley from Eugene to Portland. The highway passes through Yamhill County, including the towns of Amity, McMinnville, Lafayette and Newberg. Oregon Route 47 is a state highway that runs from McMinnville, north through Yamhill County, to the city of Lafayette. Oregon Route 18 runs southwest from the town of Dayton, through McMinnville and Sheridan, and then to the coast. Transportation routes in the Plan Area consist primarily of County and privately-owned or maintained roads.

Ongoing or planned construction on major transportation routes in Yamhill County include the Highway 99W Newberg Dundee Bypass and OR 240-OR 18 pavement preservation project (ODOT 2013a, ODOT 2013b). The bypass will be an 11-mile, four-lane highway around Newberg and Dundee (ODOT 2013a). Preconstruction activities including installation of stormwater retention areas and placement of fill dirt is occurring in 2013 while construction of the roadway and bridges is scheduled for 2014 to 2016 (ODOT 2013). The pavement preservation project will involve repaving the road surface, upgrading ADA ramps, replacing signs and roadside markers, and upgrading guardrails (ODOT 2013b).

County roadsides are maintained by the Yamhill County Public Works Department. Yamhill County has an approved Habitat Conservation Plan that covers road maintenance activities on County roads and rights-of-way (Yamhill County 2013).

## 4 Environmental Consequences

This section addresses the effects the Proposed Action alternative and the No Action alternative would have on the affected environment described in Chapter 3 of the EA. Environmental Consequences are summarized in Appendix D.

### 4.1 Climate

#### 4.1.1 Proposed Action

##### 4.1.1.1 Forage Production

Forage production activities would have no measurable impact on regional climate. Agricultural activities involve use of vehicles for soil tillage and harvesting of crops and soil management activities (e.g., fertilization, application of livestock manure, production of nitrogen fixing crops, retention of crop residues, irrigation, drainage, tillage practices, and fallowing of land). These activities would result in the production of carbon dioxide and nitrous oxide (USEPA 2013). However, the amount of greenhouse gases generated from agricultural production activities in the Plan Area are estimated to be negligible compared to emissions from other agricultural and non-agricultural sources in the region.

##### 4.1.1.2 Pasture and Livestock Grazing

Livestock grazing will result in production of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) with the highest rate of production occurring from enteric fermentation by livestock during digestion (USEPA 2013). However, pasture and livestock grazing are already occurring in the Plan Area. The amount of land used for pasture and livestock grazing in the Plan Area is expected to grow from 162 ha to 292 ha (399 ac to 721 ac) over the course of the 50-year ITP term, but this increase is expected irrespective of whether the ITP is issued.

Use of vehicles for managing pasture and livestock management would also result in the production of carbon dioxide and nitrous oxide (USEPA 2013). However, the amount of greenhouse gases generated from vehicle use related to pasture and livestock grazing activities in the Plan Area is estimated to be negligible, especially compared to emissions from other sources in the region.

##### 4.1.1.3 Vineyard Establishment and Management

Use of vehicles for soil preparation and management, planting and harvesting of crops, and other vineyard management activities will result in the production of carbon dioxide and nitrous oxide (EPA 2009). The amount of greenhouse gases generated from vehicle use during establishment and management of vineyards covered under the HCP is estimated to be negligible, especially compared to emissions from other sources in the region.

##### 4.1.1.4 Timber Establishment and Management

Use of two-stroke engines in lawnmowers, trimmers, leaf blowers and chainsaws can be a substantial source of greenhouse gas emissions (USEPA 2013). Use of these machines to manage timber areas covered under the HCP is expected to be minimal, and while they will contribute to the region's greenhouse gas emissions, that contribution will be insignificant relative to other emission sources in the region.

Use of vehicles for preparing the soil, planting, managing for pests, applying herbicides, and harvesting trees will result in the production of carbon dioxide and nitrous oxide. However, the amount of

greenhouse gases generated from timber establishment and management activities in the Plan Area are estimated to be negligible compared to emissions from other sources in the region.

#### **4.1.1.5 Voluntary Habitat Restoration and HCP Implementation Activities**

Prescribed burning and mowing may release greenhouse gases into the atmosphere. However, utilization of these techniques would have no measurable impact on regional climate. While prescribed burning will add CO<sub>2</sub> emissions, the carbon is estimated to be recaptured the next growing season (USEPA 2013). Prescribed burning will also result in the production of CH<sub>4</sub>, CO, NO<sub>x</sub>, and N<sub>2</sub>O. This production, however, is anticipated to be minor compared to other sources of CH<sub>4</sub> and N<sub>2</sub>O, such as enteric fermentation, soil management, and manure management.

Yamhill SWCD anticipates that no more 10% of the Project Area will be treated with a regular prescribed fire program. The Proposed Action calls for burning no more than 1/3 of the habitat at a site in any given year, resulting in individual sites being burned no more than 10 times during the 50 year HCP ITP term.

Lawnmowers, trimmers, chainsaws and other equipment with two-stroke engines may be used to control brush and non-native species. Greenhouse gas emissions resulting from use of this type of equipment for voluntary habitat restoration in the Plan Area is expected to be negligible, and no impacts to climate are expected.

#### **4.1.2 No Action**

##### **4.1.2.1 Agriculture and Forestry**

Impacts to the climate from the production of greenhouse gases from these activities are anticipated to be similar to those under the Proposed Action alternative.

##### **4.1.2.2 Voluntary Habitat Restoration and HCP Implementation**

Under the No Action alternative, fewer greenhouse gases will be produced from habitat restoration, enhancement, and management activities. Impacts to the climate from the production of greenhouse gases are expected to be the same for the No Action alternative as for the Proposed Action alternative.

## **4.2 Topography and Soils**

Neither alternative is expected to adversely affect the topography or soils in the Plan Area. Some soil compaction is possible due to use of heavy equipment but these impacts are expected to be relatively insignificant because most of the lands have already been under agricultural production for many years. No changes topographical changes in the Plan Area are anticipated from either alternative.

## **4.3 Upland Prairie Habitat**

All of the alternatives, including the No Action, would result in minor impacts to upland prairie and oak savanna habitat in the Willamette Valley due to the ongoing effects of the Covered Activities. Effects to the composition, structure, or health of conifer forest, wetland, or riparian vegetation communities are expected to be negligible because the Covered Activities focus on upland prairie and oak savanna habitats.

#### **4.3.1 Proposed Action**

Although some short-term minor adverse impacts are expected, the Proposed Action would result in moderate long-term benefits to upland prairie habitat by offsetting the impacts to prairie habitat through concentrated habitat restoration at a high value habitat site under conservation easement, as

well as general habitat conservation and enhancement efforts and voluntary measures to reduce impacts over time.

#### **4.3.2 No Action**

Similar to the Proposed Action, some short-term minor adverse impacts are expected due to ongoing effects of the Covered Activities. Lack of a coordinated effort to implement Conservation Measures could result in greater adverse effects on upland prairie habitat.

### **4.4 Wildlife and Fish**

#### **4.4.1 Proposed Action**

The effects of the Covered Activities would be negligible and would not result in long-term negative impacts to wildlife or fish populations. The Covered Activities include agriculture and forestry-related actions on lands already utilized for such purposes. While some lands may have been fallow or relatively undisturbed in recent years, most of the land in the Plan Area has already been developed for agricultural or forestry purposes. As a result, the Proposed Action is not expected to adversely impact wildlife in the Plan Area.

Some long-term indirect benefits to wildlife that depend on upland prairie habitat are expected due to minimization of impacts and implementation of long-term habitat conservation and enhancement measures.

#### **4.4.2 No Action**

As with the Proposed Action, the No Action alternative is likely to have negligible, if any, adverse effects on wildlife and fish. There may be fewer long-term benefits to wildlife that utilize upland prairie habitat because less habitat restoration and enhancement is expected under the No Action alternative.

### **4.5 Protected Species**

#### **4.5.1 Covered Species – Fender's blue butterfly**

Impacts to Fender's blue butterfly from the Covered Activities are described in more detail in Chapter 5 of the HCP. The impacts are summarized in the discussion below.

##### **4.5.1.1 Proposed Action**

Within the HCP Plan Area, the Covered Activities (described in Chapter 4 of the HCP) are likely to result in impacts to Fender's blue habitat. The scale and degree of impacts will vary with the timing, extent and other details of the Covered Activity. In collaboration with the Technical Advisory Committee and the USFWS, and with feedback from the Stakeholder Advisory Committee, the Yamhill SWCD has developed a set of Best Management Practices (BMPs) (HCP Chapter 6: Conservation Measures). The BMPs set forth guidelines for conducting Covered Activities to avoid or reduce impacts at sites with Fender's blue habitat, and are derived from the USFWS Biological Opinion for Prairie Restoration (USFWS 2008b). Current and ongoing research into land management practices within Fender's blue habitat contributed to the BMPs, and they will continue to be updated through the process of Adaptive Management (HCP Chapter 7: Monitoring and Adaptive Management).

Though some aspects of agricultural or forestry processes may be beneficial or neutral to prairie habitats (e.g., mowing for hay or certain types of livestock grazing management strategies), others (e.g.,

conversion of prairie to vineyard or forest) will likely result in permanent destruction of Fender's blue butterfly habitat.

#### 4.5.1.1.1 Forage Production

Forage production typically involves mowing the grass, alfalfa, or clover and laying it in windrows to dry during May-July, although more intensively managed hayfields may receive annual application of pesticides, fertilizers and lime. Occasional tilling and reseeded (pasture improvement) may occur when pastures become less productive. Improved pastures and alfalfa or clover fields may have little to no remaining Fender's blue habitat after years of tilling and seeding; site surveys may reveal that such pastures lack butterfly habitat and will not need incidental take coverage. However, where Fender's blue butterfly is present in hay fields, landowners may avoid impacts through complying with the BMPs for forage production (HCP Chapter 6). By restricting the timing of mowing and the amount of occupied sites that can be mowed the BMPs will ensure most impacts to Fender's blue and Kincaid's lupine will be avoided. The BMPs also direct landowners to ensure availability of nectar reserves or else mitigated for impacts to nectar sources (See HCP section 6.2.1)

Because lupine is toxic to most livestock and has to be excluded from hay and forage, any lupine that previously grew in areas used for forage production has likely already been excluded. Most impacts to Fender's blue habitat from future forage production will therefore be limited to mowing of nectar species, except cases where a landowner elects to remove lupine from a pasture as part of pasture improvement. Impacts to Kincaid's lupine from forage production are expected to occur at ten or fewer sites, and affect 5 m<sup>2</sup> (54 ft<sup>2</sup>) of lupine or less per site, therefore Yamhill SWCD requested impacts to a total of 50 m<sup>2</sup> (540 ft<sup>2</sup>) of lupine.

To avoid impacting nectar species, the BMPs for mowing and forage production (HCP Chapter 6) require that haying occur after June 30 (too late for quality hay production), unless the landowner is able to provide an unmowed 'nectar reserve' for Fender's blue that retains, at a minimum, the 20 mg/m<sup>2</sup> needed by the butterfly (USFWS 2010). The nectar reserve would replace the nectar impacted on the site, allowing the remainder of the habitat to be hayed or mowed for other forage purposes. An estimated 40% of landowners will be willing and able to provide the 'nectar reserve' and avoid impacts and mitigation responsibilities. As a result, Yamhill SWCD requests take of up to 60% of the native nectar available in forage production areas of the nectar zone, or native nectar plants producing 79 g sugar (Table 4.1). Impacts to non-native nectar are expected for plants producing 166 g sugar (Table 4.1).

Haying or mowing can also benefit Fender's blue butterfly indirectly by improving habitat quality. Haying removes plant material, which prevents plant litter accumulation that can hinder plant growth and reproduction. Thus, forage production may result in some positive indirect benefits to Fender's blue butterfly through improvements in habitat quality.

Mowing for fire protection and weed control, not forage production, is also covered under the HCP. This type of mowing has, in most cases, been occurring regularly in the past, or is likely to have neutral to positive effects on Fender's blue butterfly. No take is requested for mowing for fire safety or weed control.

**Table 4.1 Estimated impacts to Fender's blue habitat from Covered Activities over the 50-year HCP ITP term, in acres and square meters of foliar (leaf) cover (at 100% lupine ground cover).**

	Kincaid's Lupine	Native Nectar (g sugar)	Exotic Nectar (g sugar)
Forage production	0.01 ac (50 m <sup>2</sup> )	79	166
Pasture/Livestock grazing	0.16 ac (657 m <sup>2</sup> )	74	156
Vineyard establishment/ management	0.63 ac (2,562 m <sup>2</sup> )	126	266
Timber Establishment/ management	0.10 ac (398 m <sup>2</sup> )	45	94
<b>Total</b>	<b>0.91 ac (3,667 m<sup>2</sup>)</b>	<b>324 g</b>	<b>682 g</b>

#### 4.5.1.1.2 Pasture and Livestock Grazing

The best available science regarding grazing impacts on Fender's blue butterfly suggests that grazing does not significantly reduce butterfly egg survival or lupine abundance. Results from future research and monitoring data gathered for HCP will inform grazing management under the Plan, and changes will be made to the BMPs as needed in order to ensure negative impacts are avoided to the maximum extent practicable.

Poorly managed grazing can be detrimental to maintaining upland prairie. Grazing may also have direct adverse effects including crushing butterfly eggs or larvae, trampling of Kincaid's lupine, and consumption or trampling of nectar plants. Specific impacts to Fender's blue butterfly from pasture and livestock grazing activities will be site and season specific, and will vary with type of livestock, the season and/or frequency of pasture use, and the type and quantity of forage available. Through implementation of a grazing plan that includes seasonal rotations/exclusions and herd size monitoring, pasture and livestock grazing can potentially be compatible with Fender's blue habitat. Livestock grazing can also indirectly benefit Fender's blue butterfly by improving habitat quality through reductions in the height and dominance of non-native vegetation in pastures.

The HCP describes three different options that may be selected by those grazing livestock in the Plan Area in areas where host plants or nectar plants (where used by the butterfly) are present. As of 2013, only one confirmed site and one likely site in Yamhill County support Fender's blue, therefore there may be few cases where such coverage is required. It is anticipated that a portion of adverse impacts to Fender's blue butterfly will be reduced or avoided through landowner compliance with timing restrictions on grazing (see HCP Chapter 6). Where impacts to host plants or nectar species are unavoidable, landowners will be required to mitigate for impacts on-site or off-site.

The grazing options and their projected use are described in Table 4.2. Overall projected impacts from grazing are described in Table 4.1.

**Table 4.2 Impacts to Fender's blue butterfly host and nectar plants within the pasture areas (and areas projected to become pasture) of the HCP Plan Area over the course of the ITP. Estimates based on total grazing area (including lands converted to grazing during permit term) of 292 ha (721 ac), average lupine occupancy of 0.0633% and average nectar plant sugar densities of 12.7 g sugar/acre (native nectar plants), and 27.6 g sugar/acre (non-native nectar plants).**

Grazing Option	Estimated % of Grazing Lands		Description of anticipated impacts	Take Requested		
	Selecting this Option	Having Impacts		Kincaid's lupine	Native Nectar Sugar	Exotic Nectar Sugar
1: Avoid Impacts through BMPs	20%	0%	None	None	None	None
2: Graze outside BMPs, with Grazing and Monitoring Plan	65%	50% of those selecting this Option.	Impacts to 75% of host and nectar species in area.	449.5 m <sup>2</sup> 0.11 ac	51 g	107 g
3: Graze and request direct Impacts	15%	100% of those selecting this Option		207 m <sup>2</sup> 0.05 ac	23 g	49 g

#### 4.5.1.1.3 Vineyard Establishment and Management

Vineyard establishment generally removes native plant communities. Site preparation can involve land clearing, deep tillage (sub soiling) with multiple passes and mechanical and/or chemical weed control. This land use is not usually compatible with maintaining habitat appropriate for Fender's blue unless special precautions are employed ahead of site preparation. During and after vineyard establishment, vineyard maintenance includes continued application of fungicides and pesticides, which may involve chemical drift onto adjacent lands.

Vineyard establishment is the covered activity anticipated to have the greatest amount of growth (average 8.1 ha (20 ac) per year). Based on an average lupine occupancy of 0.0633%, loss of 2,562 m<sup>2</sup> (0.63 ac) of Kincaid's lupine is expected over the course of the ITP (Table 4.1). Roughly 5.3% of the potential vineyard land in the HCP Plan Area is in the nectar zone, and vineyard establishment and management is expected to impact 21.5 ha (53.2 ac) in the nectar zone. Based on an average native nectar sugar content of 12.7 g/acre this may result in loss of native nectar species producing 126 g sugar over the 50 year permit term. Impacts to introduced nectar plants are expected to result in the loss of 266 g sugar over the course of the ITP (Table 4.1).

Impacts from fungicide and pesticide drift will be addressed on a case by case basis when new vineyards are established proximal to butterfly resources. BMPs will be developed and implemented as information becomes available on the chemical effects to Fender's blue and its habitat.

#### 4.5.1.1.4 Timber Establishment and Management

Timber establishment is also generally not compatible with native upland prairie due to intensive site preparation and heavy shading of the understory. Chemical treatment or hand scalping during pre-planting site preparation is typically used to remove competing species. Post-planting maintenance can include mechanical or chemical weed control, pesticide application, fertilization, and watering. Chemical drift onto adjacent lands may occur.

Although shading of prairie species may not occur until trees reach at least 20 years in age, the HCP effects analysis assumes immediate and permanent loss of prairie species in the planted area. Based on typical Kincaid's lupine abundance, nectar zone area, and typical native and exotic nectar species abundance, habitat loss from timber establishment and management is expected to result in take of 398 m<sup>2</sup> of Kincaid's lupine, native nectar species producing 45 g sugar, and exotic nectar species producing 94 g sugar (Table 4.1).

There may be some impacts from pesticide drift, but these are expected to be minimal. Impacts to Fender's blue butterfly and its habitat will be addressed on a case by case basis when new timber plantations are established in close proximity to butterfly populations. BMPs will be established as information is collected about the effects of pesticide drift on Fender's blue and its habitat.

#### 4.5.1.1.5 Voluntary Habitat Restoration

Voluntary (unrelated to mitigation) habitat restoration, enhancement, and management activities, including mowing, prescribed burning and herbicide application for non-native species control may result in temporary adverse (negative) effects on habitat and Fender's blue (Russell and Schultz 2010, LaBar and Schultz 2012) but generally have long term benefits to Fender's blue butterfly.

Minor adverse impacts are expected from on-going restoration activities over the course of the ITP Term. These adverse impacts are expected to be short-term. Restoration and habitat management activities are expected to have a long-term benefit to Fender's blue that far outweighs the short-term impacts. Short-term adverse impacts will be avoided or greatly minimized by following the recommended restoration, enhancement, and management guidelines described in the Programmatic Formal Consultation on Western Oregon Prairie Restoration (USFWS 2008a, USFWS 2008b).

Of the 3,169 ha (7,831 ac) within the Plan Area, an estimated 10%, will be treated with a regular prescribed fire program to restore habitat and stimulate Kincaid's lupine growth. A regular prescribed burning regime would involve burning no more than 1/3 of the habitat at a site each year, likely resulting in a site being burned a maximum of 10 times during the 50-year HCP ITP term. Prescribed burning may result in 100% mortality of butterfly larvae in burned areas. Burning is also predicted to result in mortality to 5% of the seeds in the soil seed bank and produced by existing Kincaid's lupine and nectar plants.

Yamhill SWCD estimates that 20% of the 3,169 ha (7,831 ac) within the Plan Area will be managed for exotic plant control through herbicide application (HCP Chapter 5.3.5). Chemical treatments can largely avoid negatively impacting Kincaid's lupine, native nectar species and Fender's blue, but incidental exposure may result in the death or injury of some butterfly larvae (<5% estimated; USFWS 2008a,b).

Host and nectar plant materials collection and planting activities may also have short-term adverse impacts, but the long-term benefits to Fender's blue include increased nectar and host plant availability. Collection limits in the HCP (HCP Table 5.4 and section 5.3.6.3) will help ensure that Kincaid's lupine and native nectar plant populations are not adversely affected by plant materials collection. The HCP also requires consultation with a qualified specialist to determine the number of seeds or other materials needed for proposed restoration projects.

Total estimated short-term adverse effects to Fender's blue butterfly from projected voluntary habitat restoration activities over the course of the 50-year HCP are summarized in Table 4.3 (see HCP Table 5.3 and associated text for more information).

**Table 4.3 Estimated short-term adverse effects to Fender's blue butterfly from projected voluntary habitat restoration and HCP implementation activities conducted over the course of the 50-year HCP and ITP (impacts are considered “short-term” because the activities will benefit Fender’s blue butterfly and its habitat over the long term).**

	Total impacts over 50 yr HCP		
	Fender's blue	Kincaid's lupine	Nectar plants
<b>Voluntary Habitat Restoration</b>	All eggs/larvae in 21,063 m <sup>2</sup> (5.21 ac)	47,242 seeds	1,481,843 seeds
<b>Mitigation Habitat Restoration</b>	All eggs/larvae in 35,582 m <sup>2</sup> (8.78 ac)	72,304 seeds	897,120 seeds (native impacts), 1,644,335 seeds (exotic impacts)
<b>Monitoring</b>	All eggs/larvae in 300 m <sup>2</sup> (0.07ac)	300 m <sup>2</sup> (0.07ac)	Plants producing 36 g sugar (native impacts), 65 g sugar (exotic impacts)

#### 4.5.1.1.6 HCP Implementation Activities

HCP implementation activities with the potential to affect Fender's blue butterfly and its habitat include monitoring and habitat restoration and enhancement for mitigation. Monitoring will include species presence/absence and abundance surveys and monitoring activities associated with habitat restoration, enhancement and management. Monitoring will require foot traffic in Fender's blue butterfly habitat, which could result in crushing or trampling of Kincaid's lupine or Fender's blue butterfly larvae. These adverse effects, if they occur, will be short-term, and will be outweighed by the positive effects of adapting management in response to monitoring data. Monitoring activities for Fender's blue butterfly that require any netting or other handling of Fender's blue butterfly are not covered under this HCP, and require an ITP issued by USFWS to biologists who have completed required training.

Habitat restoration, enhancement, and management for mitigation purposes may have some short-term adverse effects on Fender's blue butterfly. Impacts from mowing and planting will be avoided through timing restrictions, but as with voluntary habitat restoration activities, some butterfly larvae, Kincaid's lupine plants, and nectar plants could be crushed or otherwise impacted during burning and spraying. Despite these short-term impacts, positive long-term benefits to the butterfly are expected because competition with non-native species will be reduced and host plant or nectar plant availability will be improved.

Total estimated short-term adverse effects to Fender's blue butterfly from HCP implementation activities over the course of the 50-year HCP are summarized in Table 4.3 (see HCP Table 5.3 and associated text for more information).

4.5.1.1.7 Critical Habitat

The HCP Plan Area intersects critical habitat units for Fender’s blue butterfly and Kincaid’s lupine as described by the USFWS (2006) (Figure 3.2). Effects to each unit and effects to the primary constituent elements (PCEs; physical or biological features essential to the conservation of a species for which its designated or proposed critical habitat is based on) of these species’ habitats are described below and summarized in Table 4.4.

**Table 4.4 Summary of effects to critical habitat under Proposed Action alternative.**

Action	FBB-1A & 1B	FBB-2	KL-2A & 2B	KL-3	KL-4A & 4B
Forage production	LAA (if occurs)				
Grazing	LAA (if occurs)				
Conversion to Vineyard	LAA (if occurs)				
Conversion to Timber	LAA (if occurs)				
Habitat restoration, enhancement and management	NLAA (entirely beneficial)				

LAA: Likely to adversely affect; NLAA Not likely to adversely affect; NE: Not applicable or no effect.

The Plan Area contains 20.5 ha (50.6 ac), 1.6 % of total designated critical habitat for Fender’s blue butterfly range-wide, and 20.5 ha (50.6 ac), 7 % of the total designated critical habitat for Kincaid’s lupine range-wide. A portion of the critical habitat areas within the Plan Area occur adjacent to roadsides. Yamhill County roadside rights-of-way are not covered under the Yamhill SWCD HCP for Private Lands, and no impacts to critical habitat in those rights-of-way will result from the Covered Activities or are covered in the ITP associated with the HCP.

The primary constituent elements of critical habitat for Kincaid’s lupine are: (1) early seral upland 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; and (2) the presence of insect outcrossing pollinators with unrestricted movement between existing lupine patches (USFWS 2010a).

**Units FBB–1A and 1B:** These units encompass approximately 2.5 ha (6.25 ac) and 5.75 ha (14 ac) respectively, and are located along a roadside in northern Yamhill County. FBB–1A represents the northern most designated critical habitat for Fender’s blue(USFWS 2006), though the current range of Fender’s blue butterfly is now known to extend into Washington County (Hicks 2012). 1.9 ha (4.6 ac) and 4.7 ha (11.6 ac), respectively, of subunits 1A and 1B are within the HCP Plan Area and outside the Yamhill County right-of-way.

Grazing, forage production, conversion to timber or vineyard and habitat restoration are all Covered Activities that could occur in the Plan Area within this unit over the course of the 50-year ITP term. The agricultural activities would likely further reduce the quality of early seral upland prairie habitat and oak savanna quality (FBB PCE 1), and potentially remove Kincaid's lupine (FBB PCE 2) and native nectar species (FBB PCE 3). At this time subunits FBB 1A and 1B have limited functionality as stepping stones (FBB PCE 4), since both units are greater than 2 km (1.2 mi) from a Fender's blue population on a site secured for conservation.

**Unit FBB-2:** This unit consists of approximately 21 ha (51 ac) of private lands within southern Yamhill County and contains habitat within the Yamhill Oaks/Pugh tract owned by The Nature Conservancy and protected for conservation values including Fender's blue butterfly habitat. This FBB population provides the foundation for the existence of the species in this portion of its range in Gopher Valley; and there is surrounding prairie habitat available for population expansion. Approximately 13.9 ha (34.3 ac) of FBB-2 are in the HCP Plan Area.

Covered Activities likely to affect this unit include habitat restoration activities on the property owned and managed by The Nature Conservancy. These activities may be permitted through the HCP, or through a separate USFWS permit, and may have short term impacts to Fender's blue butterfly from crushing (tractor mowing and seeding) or mortality from prescribed fire or herbicides, but these will serve to enhance the early seral prairie conditions (FBB PCE 1), promote expansion of the Kincaid's lupine (FBB PCE 2) and increase native nectar species (FBB PCE 3). Expansion of the Kincaid's lupine at the site may serve to contribute to the stepping stone/metapopulation structure (FBB PCE 4) in this unit and within Gopher Valley. All activities will follow the guidelines set forth in the BA and BO for prairie habitat restoration in areas with Fender's blue butterfly (USFWS 2008a, USFWS 2008b). Conversion to timber, vineyard or grazing or forage production outside the BMPs on the private land within the unit and not under The Nature Conservancy ownership may serve to remove prairie (FBB PCE 1) or cause declines in Kincaid's lupine (FBB PCE 2) or native nectar species (FBB PCE 3) and reduce stepping stone/metapopulation structure (FBB PCE 4) for Fender's blue butterfly.

**Unit KL-2:** This unit includes subunits KL-2A and KL-2B, and encompass approximately 8.25 ha (16.25 ac) of private land and roadside in northern Yamhill County (USFWS 2006), overlapping 100% with FBB - 1 (described above). Threats to the unit include roadside maintenance activities, invasive species and encroachment by woody species. The Plan Area includes a total of 6.6 ha (16.2 ac) of KL-2.

Grazing, forage production, conversion to timber or vineyard and habitat restoration are all Covered Activities that could occur in the Plan Area portion of this unit over the course of the 50-year ITP term. If completed within the BMPs, grazing and forage production may serve to maintain or enhance the short-grass habitat stature that provides habitat conditions essential to the conservation the species (KL PCE 1) (USFWS 2006). Habitat restoration is likely to increase pollinator activity (KL PCE 2), unless there are direct impacts to a ground nest. Conversion to timber, vineyard or grazing or forage production outside the BMPs may serve to remove prairie (KL PCE 1) or cause declines in pollinator habitat (KL PCE 2).

**Unit KL-3:** Unit KL-3 consists of approximately 21 ha (51 ac) of private lands and is comprised of several populations of Kincaid's lupine scattered along the east and west sides of Gopher Valley Road (USFWS 2006). This population is threatened by the presence of invasive species; the relatively small, isolated nature of the population; and impacts associated with roadside maintenance activities (USFWS 2006). 100 % of KL-3 is included in Unit FBB-2 (described above) (USFWS 2006).

Covered activities likely to affect this unit include habitat restoration activities on the property owned and managed by The Nature Conservancy. These activities may be permitted through the HCP, or through a separate USFWS permit, and may have short term impacts to Kincaid's lupine due to seed mortality from prescribed fire, but are likely to promote expansion of the lupine, enhance the prairie habitat (KL PCE 1) and increase resources for pollinators (KL PCE 2). All activities will follow the guidelines set forth in the BA and BO for prairie habitat restoration in areas with Fender's blue butterfly (USFWS 2008a, 2008b). Other agricultural and forestry uses are possible on the other privately owned land in the unit. Conversion to timber, vineyard or grazing or forage production outside the BMPs may serve to remove prairie (KL PCE 1) or cause declines in pollinator habitat (KL PCE 2).

**Unit KL-4:** This unit includes subunits KL-4A and 4B, which collectively consist of approximately 28 ha (69 ac) of private lands west of Muddy Valley Road and south of Eagle Point Road (USFWS 2006). This unit is not located within the Plan Area.

#### **4.5.1.2 No Action**

Under the No Action alternative, there would likely be a similar quantity of impacts from the activities proposed for coverage in the HCP, and they would occur either without incidental take coverage or under the coverage of individual HCP permits. There would likely be fewer short-term adverse impacts to Fender's blue butterfly as a result of voluntary habitat restoration activities, as there would be less outreach and education about Fender's blue butterfly conservation and habitat restoration, and fewer landowners may opt to have their property surveyed for the presence of the butterfly.

However, there would also be fewer long-term benefits to Fender's blue butterfly and designated critical habitat because mitigation would not be coordinated, there would be less outreach and education about Fender's blue butterfly conservation and habitat restoration, and fewer landowners may opt to have their property surveyed for the presence of the butterfly.

#### **4.5.2 Other Protected Species**

##### **4.5.2.1 Taylor's checkerspot butterfly**

It is unlikely that the Covered Activities will affect this species because there are no known populations in Yamhill County. If Taylor's checkerspot is found to occur within the Plan Area, conservation measures in the HCP that are intended for Fender's blue will likely benefit Taylor's checkerspot as well, because the two species both rely on upland prairie habitats with short stature native grasses and native forbs to support adult life stages.

##### **4.5.2.2 Upper Willamette River spring Chinook and Upper Willamette River Steelhead**

There may be minimal short-term localized effects under both alternatives due to initial tilling and planting activities which can increase sediment runoff, but these effects will be relatively small in scale and are not likely to significantly or permanently affect in-stream flows or riparian or in-stream habitat quality.

##### **4.5.2.3 Willamette daisy**

No adverse impacts to Willamette daisy are expected under either alternative. Willamette daisy is not known in the Plan Area and will not be adversely affected by the Covered Activities. Willamette daisy may benefit from habitat restoration activities if the species is reintroduced to Yamhill County in the future.

#### **4.5.2.4 Nelson's checkermallow**

No adverse impacts to Nelson's checkermallow are expected under either alternative. This species is not known to occur in the Plan Area. Nelson's checkermallow may benefit from habitat restoration activities if the species is introduced to habitat enhancement areas in the future.

#### **4.5.2.5 Golden paintbrush**

No adverse impacts to golden paintbrush are expected under either alternative. Golden paintbrush is not known to be present in the Plan Area and will not be adversely affected by the Covered Activities. Golden paintbrush may benefit from habitat restoration activities if the species is reintroduced to Yamhill County in the future.

#### **4.5.2.6 Bradshaw's desert parsley**

No adverse impacts to Bradshaw's desert parsley are expected under either alternative. Bradshaw's desert parsley is not known to occur in the Plan Area and will not be adversely affected by the Covered Activities. Bradshaw's desert parsley may benefit from habitat restoration activities if the species is reintroduced to Yamhill County in the future.

## **4.6 Water Resources**

Wetland impacts were not analyzed in the EA and most of the habitat covered by the HCP is upland prairie habitat. Landowners must seek authorization from the relevant agency, either Department of State Lands, or the Army Corps of Engineers, before conducting activities that may add pollutants (including fill dirt) from a point source to jurisdictional wetlands or other navigable waters.

### **4.6.1 Proposed Action**

#### **4.6.1.1 Agriculture and Forestry**

Livestock grazing can compact soils and remove vegetation, affecting infiltration of water into the soil and surface water runoff, which could affect water quality. The extent of these impacts will be dependent upon the type of vegetative cover, the amount of bare ground, the season of use, and the number of livestock on a site at any given time.

Herbicide application and runoff from soil erosion due to farm activities has the potential to enter surface water and ground water. Compliance with state and federal laws and regulations governing pesticide use and water quality will ensure impacts to water quality as a result of the Covered Activities are minimized.

Water consumption in a given year is not expected to increase significantly over the amount of water that has been used in previous years.

No increase in the amount of impervious surfaces is predicted because the HCP covers only agricultural and forestry-related activities and does not authorize construction of homes or commercial facilities. Some changes in the amount of storm water runoff are possible depending on the specific history of the land and the type of activity being applied. Lands previously used for grazing that are converted to vineyards or forest may result in increased runoff if vegetation is removed to prevent competition with grapes or trees. Adherence to local, state, and federal regulations will minimize the potential for increased levels of pollutants in storm water runoff.

#### **4.6.1.2 Habitat Restoration and HCP Implementation**

Habitat restoration, enhancement, and management activities would be conducted primarily in upland prairie habitats. Ground water is not expected to change as a result of these activities. Hydrological

impacts due to soil compaction associated with vegetation management activities would be negligible as impacts would be of short duration and low intensity, especially on well-drained soils.

Most habitat restoration, enhancement, and management activities are not anticipated to occur near waterbodies, although some sediment and ash could enter nearby streams or other water bodies as a result of ground disturbance or prescribed burns. Erosion is not expected to increase as a result of these activities. Impacts to water quality from habitat restoration activities are expected to be short term and relatively minor, long-term benefits to water quality are anticipated by improving upland habitat quality.

There is the potential for spills from motorized equipment or drift from herbicide application but these impacts will be minimized through compliance with water quality regulations and label instructions on pesticides as well as the BMPs outlined in the Biological Assessment/Biological Opinion for Western Oregon Prairie Restoration Activities (USFWS 2008a, 2008b).

#### **4.6.2 No Action**

Any impacts that would occur are anticipated to be similar to those under the Proposed Action alternative. Existing hydrology and water management are not expected to change from current conditions.

### **4.7 Air Quality and Noise**

#### **4.7.1 Proposed Action**

##### **4.7.1.1 *Agriculture and Forestry***

Agriculture and forestry activities are not anticipated to significantly impact air quality or significantly alter existing noise levels. Vehicle emissions from activities including soil tillage, fertilization, and other crop and pasture management activities are not expected to measurably alter air quality in the Plan Area or surrounding environment. Air quality impacts from farm use are relatively minor compared to emissions sources in the Portland metropolitan area.

Use of two-stroke engines in lawnmowers, trimmers, leaf blowers and chainsaws also many have relatively minor effects on the region's air quality. Some minor increases in noise level can be anticipated to result from periodic harvesting or managing activities but these activities are will be conducted only sporadically in rural farming and forestry-focused lands.

##### **4.7.1.2 *Voluntary Habitat Restoration and HCP Implementation Activities***

Prescribed burning and mowing may release fine particulates that could affect air quality, however, these activities will not significantly affect the region's air quality or noise environment. No more than 10% of the Project Area is expected to be treated with a regular prescribed fire program in a given year. The Proposed Action calls for burning no more than 1/3 of the habitat at a site in any given year, resulting in individual sites being burned no more than 10 times during the 50-year HCP ITP term. Burning will be conducted in compliance with state and local air quality rules and regulations, and will not be done if there is a potential to significantly impact air quality.

#### **4.7.2 No Action**

##### **4.7.2.1 *Agriculture and Forestry***

Impacts to air quality and noise from agriculture and forestry-related Covered Activities are anticipated to be similar to those under the Proposed Action alternative.

#### **4.7.2.2 Voluntary Habitat Restoration and HCP Implementation**

Under the No Action alternative there could be less prescribed burning or use of two-stroke engines for vegetation control. However, the restoration-related impacts to air quality and noise are anticipated to be minor compared to the other sources in the region.

### **4.8 Cultural and Historical Resources**

#### **4.8.1 Proposed Action**

The Proposed Action is not expected to result in significant adverse effects to cultural or historical resources. Landowners will be required to comply with all state and federal laws and regulations pertaining to cultural and historical resource protection.

Because archaeological surveys were not conducted as part of the Proposed Action, the extent of potential impacts is not known with certainty. Ground disturbing activities including tilling, grading, and plowing, planting could expose buried artifacts. Although most of the lands covered under the Proposed Action have already been subject to ground disturbing activities for many decades, landowners should ensure properties are surveyed for archaeological resources prior to undertaking new ground disturbing activities.

Habitat restoration activities, including prescribed burns and mowing, may also impact cultural resources. Mechanical brush control and establishment of fire lines and use of heavy equipment and motorized vehicles during prescribed burns could crush or expose artifacts.

#### **4.8.2 No Action**

Under the No Action alternative there could be less prescribed burning, planting, or mowing related to habitat restoration. However, if there are any restoration-related impacts to cultural and historical resources, they are expected to be relatively minor.

### **4.9 Land Use, Socio-economic Factors, and Environmental Justice**

#### **4.9.1 Proposed Action**

The Proposed Action will not affect land ownership or use. The Proposed Action does not propose or mandate changes in land ownership or changes in land use (e.g., agricultural to commercial or industrial). The HCP does accommodate changes in land management that are consistent with County Zoning designations. Landowners may shift from using lands for forage production to pasture or timber production, but only where such activities are authorized under the County's Comprehensive Land Use Plan and zoning designations. Shifts in management will not alter the rural character of the lands and will not significantly affect the socioeconomic conditions of the Plan Area or region.

The adverse and beneficial socioeconomic effects of the Proposed Action will be shared by all landowners and residents of the Plan Area, regardless of ethnic background or economic status. Neither alternative will result in disproportionately high or adverse human health or environmental effects on a minority population, low-income population, or Native American tribe because the activities covered are typical of agricultural activities in Yamhill County's rural communities. No negative effects to minority and/or low-income populations are expected.

The Proposed Action may increase employment opportunities in agriculture, forestry, and habitat management and restoration (personnel to mow, spray, assist with prescribed burns, etc.). Private

landowners will likely save money by obtaining incidental take coverage through the Yamhill SWCD HCP and ITP, rather than having to obtain their own ITP from the USFWS.

#### **4.9.2 No Action**

The financial cost of the No Action alternative is not certain as it would be borne by each individual landowner that chooses to seek ESA compliance. These landowners, however, will bear costs associated with developing and implementing individual HCPs and may face substantial time delays.

#### **4.10 Transportation**

The Proposed Action and No Action alternatives will not affect the development, use, or maintenance of transportation facilities.

#### **4.11 Cumulative Effects**

Cumulative effects are the effects that result from the incremental effects of the Proposed Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions (40 CFR 1508.7). This section analyzes cumulative effects of the alternatives when combined with the effects of other relevant past, present, and reasonably foreseeable future activities.

##### **4.11.1 Past and Present Actions**

The description of the affected environment provides existing information on the current condition of resources in the Plan Area and surrounding Yamhill basin that are the result of past and present actions and constitute the environmental baseline of the analysis of direct, indirect, and cumulative effects. Actions that are the primary factors responsible for the current environment in the Plan Area include:

- Agricultural and forestry management – management of lands for crop production as well as livestock grazing, including tillage and irrigation, are largely responsible for shaping the land use, ecological, and socioeconomic character of the area.
- Infrastructure development and management – the development of rural towns and larger cities, including associated transportation and utility infrastructure, in the Yamhill basin and surrounding valley have also contributed significantly to the current economic and ecological conditions in the region.
- Invasive species and tree and shrub encroachment – Introduction and spread of invasive plant species, combined with encroachment of trees and shrubs, has significantly reduced the quality and quantity of upland prairie habitat. Suppression of natural and human caused disturbance, including fire, has facilitated encroachment of Douglas-fir trees and other woody vegetation into historic prairies and oak savannas. These ecological changes represent significant factors affecting the conservation of prairie-dependent species in the Willamette Valley.
- Conservation and restoration activities – public and private land and habitat conservation efforts have contributed to shaping the land use, ecological, and socioeconomic character of the area.

The amount and quality of prairie habitat has declined substantially over the last 150 years due primarily to (1) land conversion activities (from prairie habitat to agricultural, residential, commercial, industrial, roadways), (2) proliferation of invasive species, and (3) tree and shrub encroachment resulting from suppression of natural and human caused disturbance regimes (fire). This loss of habitat has been a substantial factor in the decline of Fender's blue butterfly. The actual extent to which Fender's blue and

Kincaid's lupine populations have been lost is not known, but both species continue to be threatened by habitat loss.

Agricultural, industrial, and residential development have also contributed to water quality degradation, altered hydrologic regimes (damming and straightening of the Willamette River), air quality degradation (burning of fossil fuels to run vehicles, heat homes), and changes in soil features (disruption of soil profile due to grading, compaction and excavation).

#### **4.11.2 Reasonably foreseeable Activities**

Reasonably foreseeable future activities are actions and activities that are independent of the action alternatives, but could result in cumulative effects when combined with the effects of the alternatives. These activities are anticipated to occur regardless of which alternative is selected. "Reasonably foreseeable future actions" that could result in cumulative effects to Fender's blue butterfly and upland prairie habitat in the Willamette Valley include the following:

- Yamhill County Road Maintenance Activities HCP
- Private land development
- Climate change
- National Wildlife Refuge management
- Conservation Areas

##### **4.11.2.1 Yamhill County Road Maintenance Activities Habitat Conservation Plan**

Yamhill County Public Works (2013) prepared an HCP for county road activities affecting Fender's blue butterfly. The County was issued a 30-year ITP authorizing take of Fender's blue butterfly that is incidental to county road maintenance and prairie management activities. Yamhill County requested take for future impacts to Fender's blue butterfly and its habitat.

The Yamhill County Road Maintenance Activities HCP covers impacts to 1.41 hectares (3.48 acres) of Fender's blue butterfly habitat in the County right-of-way. The County identified 22.24 ha (54.93 ac) of land for mitigation; including 21.02 ha (51.94 ac) of land in T&E Special Maintenance Zones and 1.22 ha (2.99 ac) of land at Deer Creek Park, a County-owned park. The County will mitigate for impacts to Fender's blue butterfly habitat at a 2:1 mitigation ratio by enhancing 2.82 ha (6.96 ac); 2.41 ha (5.96 ac) habitat within the T&E special maintenance zones and 0.41 ha (1.00 ac) of Fender's blue butterfly and Kincaid's lupine habitat will be enhanced at Deer Creek Park.

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. At Deer Creek Park, Fender's blue butterfly habitat would be restored by planting Kincaid's lupine and nectar species.

##### **4.11.2.2 Private Land Development**

Although the population of Yamhill County is growing, much of that population growth is occurring in the in the largest cities of the County. Land in the Plan Area is zoned primarily for agriculture and forestry. While some rural residential development can be expected, the amount of private residential development in the Plan Area is expected to be relatively small.

#### **4.11.2.3 Climate Change**

Global-scale changes in climate have the potential to effect changes locally and regionally. “Climate change” refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007). Evidence of global climate change includes increases in average air and ocean temperatures, accelerated melting of glaciers, and rising sea levels (Bakke 2009). Changes in precipitation, temperature, and frequency and intensity of disturbances may require changes in irrigation practices and land use and may affect upland prairie habitat.

Although changes in precipitation and biodiversity are likely, the timing, magnitude, and nature of those changes in the Yamhill basin and surrounding Willamette Valley are not known with certainty. Temperature and precipitation has changed in Oregon over the last 50-100 years. Temperatures have increased in Oregon over the last 100 years by about 0.83°C (1.5°F), with stronger warming trends in winter months (Willamette Valley National Wildlife Refuge Complex 2011). Precipitation has also increased generally, and changes in snowpack and timing of peak runoff have been recorded (Willamette Valley National Wildlife Refuge Complex 2011). An additional 0.56-2.78°C (1-5°F) temperature increase is expected for the Pacific Northwest by 2050. Over that same period, modest changes in precipitation, including increases in winter and decreases in summer, are expected but this variability is currently expected to be within natural ranges (Willamette Valley National Wildlife Refuge Complex 2011).

#### **4.11.2.4 National Wildlife Refuge Management**

The Willamette Valley National Wildlife Refuge Complex Final Comprehensive Conservation Plan and Environmental Assessment were released in 2011 (Willamette Valley National Wildlife Refuge Complex 2011). This refuge complex includes Baskett Slough National Wildlife Refuge (closest to the Plan Area), William L. Finley NWR, and Ankeny NWR. The Refuge Complex was created to provide wintering habitat and sanctuary for the dusky Canada goose and other waterfowl and migratory birds. However, the refuges are also managed with goal of preserving native species and enhancing biodiversity. Fender's blue butterfly and Kincaid's lupine are present in Baskett Slough and Finley NWRs. Areas with these species present are managed for their continued conservation.

#### **4.11.2.5 Conservation Areas**

The Red Hills Conservation Area in Yamhill County was recently acquired by the Confederated Tribes of the Warm Springs. This 112 ha (277 ac) will be managed to promote oak savanna and other native habitat types in order to support wildlife populations.

Yamhill Oaks Preserve is a 255 ha (630 ac) parcel in the Gopher Valley area of Yamhill County that is managed by The Nature Conservancy. Fender's blue butterfly and Kincaid's lupine are present at the site. The Nature Conservancy manages the property to support the conservation of both species as well as the upland prairie habitat type.

The Mount Richmond Conservation Easement is a 115 ha (284 ac) property in northern Yamhill County that is managed by Yamhill Soil and Water Conservation District. Fender's blue butterfly and Kincaid's lupine are present at the site in upland prairie habitats. The site also supports oak savanna, conifer-mixed hardwood forest, riparian, wetland and wet prairie conservation values. Habitat restoration, enhancement and management at his site is identified in the YSWCD HCP as a conservation measure.

Additional conservation properties relevant to Fender's blue butterfly are discussed in detail in Appendix B of the HCP: Conservation Strategy for Fender's Blue Butterfly and Associated Habitats in Yamhill County.

### **4.11.3 Cumulative Effects of the Alternatives**

The potential cumulative effects of the Proposed Action, when combined with the effects of past, present, and reasonably foreseeable future actions, are described below. Resources with no cumulative effects are not discussed further.

#### **4.11.3.1 Proposed Action**

##### 4.11.3.1.1 Agricultural and Forestry Activities

Impacts resulting from past agricultural and timber-related use of lands in the Plan Area have included soil compaction from farm equipment and other heavy-equipment, grazing, and planting of agricultural crops; loss of native prairie habitat, loss of topographic relief from grading; and channelization of drainage ways. Additional prairie habitat (both in and outside the HCP Plan Area) could be lost through land conversion activities, but the majority of the Covered Activities are anticipated to occur on lands that have already been altered by past agricultural development. Because the scope of the Proposed Action is relatively limited, cumulative effects from the Covered Activities to climate, topography/soil, vegetation, protected species, wildlife and fish, water resources, air quality, cultural, socio-economic, and transportation resources are expected to be minor.

##### 4.11.3.1.2 Habitat Conservation and Restoration and HCP Implementation

Past, present, and reasonably foreseeable conservation and land management actions, including NWR management, private land conservation, and future Yamhill SWCD coordinated mitigation sites and HCP-related habitat restoration and management are likely to benefit upland prairie vegetation and Fender's blue butterfly habitat by promoting the protection and stewardship of high-quality, diverse, native vegetation. Prairie habitat, including habitat supporting Fender's blue butterfly, could be lost if landowners fail to manage encroaching invasive species and woody vegetation.

The Proposed Action would result in cumulative benefits by further encouraging stewardship throughout the Willamette Valley. Habitat restoration, enhancement, and management activities would benefit prairie habitat and prairie-dependent species, including several Threatened and Endangered species. These activities are expected to have negligible cumulative impacts on climate, topography/soil, vegetation, wildlife and fish, protected species, water resources, air quality, cultural, socio-economic, and transportation resources.

#### **4.11.3.2 No Action**

Cumulative impacts from forage production, pasture and grazing, vineyard establishment and management, and timber establishment and management under the No Action alternative are not anticipated to be significantly different from those identified under the Proposed Action alternative. The same amount of land will likely be utilized for these purposes whether or not the HCP is approved.

## **4.12 Summary of Effects**

Fender's blue butterfly and Kincaid's lupine will be affected by the Covered Activities under the Proposed Action. Some Fender's blue butterflies may be directly affected by trampling, burning, or chemical exposure. Fender's blue butterflies will also be indirectly affected through impacts to Kincaid's lupine and nectar sources. However, most adverse effects under the Proposed Action are likely to be similar to the effects under the No Action alternative. Furthermore, voluntary habitat restoration and

mitigation-related restoration activities are likely to benefit Fender's blue butterfly, Kincaid's lupine, and other upland prairie species.

The Covered Activities could also affect critical habitat designated for Fender's blue butterfly and Kincaid's lupine. The effects on upland prairie habitat, host plants, and nectar sources would be similar to impacts identified for Kincaid's lupine.

The impacts to climate, topography/soil, vegetation, wildlife and fish, threatened and endangered species, water resources and quality, air quality, cultural and archaeological resources, socio-economic and environmental justice, and transportation from forage production, pasture and grazing, vineyard establishment, and timber establishment in the Plan Area are all insignificant. The Proposed Action is anticipated to result in adverse impacts to 0.91 ac (3,667 m<sup>2</sup>) Kincaid's lupine, 1,278 g native nectar, and 2,777 g exotic nectar.

While the habitat restoration, enhancement, and management activities would have short term negative effects on prairie vegetation and threatened and endangered prairie species, there will be long-term benefits to Fender's blue butterfly and other species depending on upland prairie habitat.

## 5 Consultation and Coordination with Others

The consultation and coordination process focused on public and agency involvement throughout the development of the HCP. Stakeholder and Technical Advisory Committees were formed to help direct development of the HCP. The HCP process included public meetings, presentations, and outreach materials. Ultimately the final decisions regarding the HCP were made by Yamhill SWCD Board of Directors.

### 5.1 Yamhill SWCD

The Yamhill SWCD is managed by seven elected, unpaid directors representing five geographical areas of the County; there are also two at-large representatives (Yamhill SWCD 2003). Nonelected associate directors help provide leadership and direction in management of natural resource conservation programs. Funding for district staff, administration and programs comes from a tax base, grants, and contributions from County, state, and private sources (Yamhill SWCD 2003).

The Yamhill SWCD exists to support the wise use of soil, water and other natural resources and assist landowners in Yamhill County with implementing conservation practices (Yamhill SWCD 2003). The mission of the Yamhill SWCD is to “Conserve, restore, and protect Yamhill County’s natural resources by providing technical, financial, and educational assistance to citizens, landowners, and businesses” (Yamhill SWCD 2013). SWCD achieves this mission in part by sponsoring a variety of activities, including native plant sales, woodland tours, and landowner and student workshops (Yamhill SWCD 2003). SWCD and NRCS technical assistance is available to assist individuals and landowners with conservation needs (Yamhill SWCD 2003).

### 5.2 Public Meetings

Two public meetings were held in McMinnville, Oregon, to help guide the preparation of the HCP. An introductory meeting was held on February 16, 2011, and an additional public meeting was held on April 2, 2014, during the period Yamhill SWCD made the draft HCP available for public comment.

### 5.3 Public Outreach

Public outreach included development of newsletters, newspaper articles, brochures, letters to private landowners within the HCP Plan Area, private landowner workshops and field tours, and a website, plus numerous presentations. Between 2010 and 2014, Yamhill SWCD staff and consultants made over 30 presentations, mailings, and other methods of public contact (HCP Appendix D).

### 5.4 Stakeholder Advisory Committee

Yamhill SWCD established a Stakeholder Advisory Committee to advise the Yamhill SWCD from the perspective of local landowners and land managers. Meetings were held on January 24, 2012, March 20, 2012, and December 11, 2012. The role of the Stakeholder Advisory Committee was to advise the Yamhill SWCD regarding identification of the Plan Area, covered species, and Covered Activities, as well as establishing conservation measures, outlining implementation strategies, and reviewing Plan alternatives.

## **5.5 Technical Advisory Committee**

Yamhill SWCD established a Technical Advisory Committee composed of Yamhill SWCD staff, and experts in the fields of Fender's blue butterfly biology and ecology as well as rangeland ecology and management. Meetings were on February 22, 2012, and January 16, 2013.

## **5.6 HCP Planning Team**

The Yamhill Habitat Conservation Plan for Fender's Blue Butterfly on Private Lands was developed by Yamhill SWCD and its contractor, the Institute for Applied Ecology (IAE). Yamhill SWCD and IAE met regularly with representatives from the U.S. Fish and Wildlife Service to seek guidance on preparation of the HCP. The Environmental Assessment was developed by Yamhill SWCD and its contractor, IAE, on behalf of the U.S. Fish and Wildlife Service.

## **5.7 Public Review of Draft Environmental Assessment**

The draft Environmental Assessment was available for 45-day public review and comment. A Notice of Availability was published in the *Federal Register* and provided to interested parties, agencies, and news media, and the draft EA and HCP were posted on the USFWS' website (<http://www.fws.gov/oregonfwo/>) and Yamhill SWCD website (<http://www.yamhillswcd.org>). Copies of the draft EA and HCP are available at USFWS' Oregon Fish and Wildlife Office for persons requesting copies of the document. Contact information for the Oregon Fish and Wildlife Office is included below.

Oregon Fish & Wildlife Office  
2600 S.E. 98th Ave, Ste 100  
Portland, OR 97266  
Phone: 503-231-6179  
Fax: 503-231-6195

## 6 Glossary and Acronyms

**Adverse modifications:** A direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.

**Candidate species:** Candidate species are plants and animals for which the U.S. Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

**Certificate of Inclusion:** This is a document issued by Yamhill SWCD that enrolls a landowner into the HCP for purposes of obtaining coverage under the incidental take permit.

**Conservation:** As defined by Section 3 of the ESA, to use and the use of all methods and procedures necessary to bring any endangered or threatened species to the point at which the measures provided are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resource management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, regulated taking.

**Conservation measure:** A specific conservation tool employed in a specific location. May include, but is not limited to, habitat acquisition and habitat restoration.

**Cooperative Agreement:** An agreement between Yamhill SWCD and anyone wishing to obtain incidental take coverage under the Yamhill SWCD Incidental Take Permit. The agreement will specify the obligations of the parties.

**Covered Activity:** These are activities that are included in the HCP and covered for incidental take by the incidental take permit.

**Covered Species:** These are species that are included in the HCP and covered for incidental take by the incidental take permit.

**Critical habitat:** Specific areas within the geographic area occupied by the species on which are found those physical and biological features essential to the conservation of the species and which may require special management considerations or protection.

**Critical sensitive species:** Species for which listing as threatened or endangered is appropriate if immediate conservation action are not taken or a species at risk throughout its range, or a disjunct population (geographically isolated).

**Cumulative effects:** Impacts on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes the action.

**Ecoregion:** A relatively large land and water area containing geographically distinct assemblages of natural communities, with approximate boundaries. These communities share a large majority of their species, dynamics, and environmental conditions, and function together effectively as a conservation unit at the continental and global scales.

Ecosystem: A discrete unit that consists of living and nonliving parts, interacting to form a stable system.

Effectiveness Monitoring: Monitoring to determine whether the restoration or enhancement techniques are meeting the management objective.

Endangered species: Those species threatened with extinction throughout all, or a significant portion, of their range. Species can be listed as endangered or threatened for a number of reasons, including disease or predation. Natural or human factors affecting chances for survival: over utilization for commercial, scientific, or recreational purposes, or current or threatened destruction of habitat or range.

EPA: Environmental Protection Agency

Federal Nexus: The federal Endangered Species Act requires that federal agencies (including the U.S. Fish and Wildlife Service) ensure, in consultation with the U.S. Fish and Wildlife Service (USFWS), that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered and threatened species or result in the destruction or adverse modification of habitat of such species that is determined critical by the USFWS.

Habitat: The living place of a species or community characterized by its physical or biotic properties.

Habitat Conservation Plan (HCP): A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species. The plan usually includes measures to minimize impacts, and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to other areas. The HCP is required before an incidental take permit will be issued.

Harass: To intentionally or negligently, through act or omission, create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, and sheltering.

Harm: To perform an act that kills or injures wildlife; may include significant modification of habitat or degradation when it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.

Host plant: A particular plant species required of butterflies during egg laying and for food during the larvae and pupae life stage.

Impacts: Impacts may be negative or positive. Negative impacts are ecological stresses to a species and the source of that stress. Positive impacts are impacts whose net effect is beneficial to the species, and may include such activities as mowing or burning.

Incidental take: Take that results from, but is not the purpose of, carrying out an otherwise lawful activity.

Incidental take permit: A Permit issued under section 10(a)(1)(B) of the ESA to a non-federal party undertaking an otherwise lawful project that might result in the take of a threatened or endangered species. An application for an incidental take Permit is subject to certain requirements, including preparation of habitat conservation plan.

- Indirect effect: An effect caused by the action, but taking place later in time than the action or further removed in distance, but is still reasonably certain to occur (foreseeable) (See 40 CFR 1508.8).
- Invasive species: Those species present in a specified region only as a direct or indirect result of human activity.
- Listed species: A species, subspecies, or distinct population segment that has been added to the federal list of endangered and threatened wildlife and plants.
- Monitoring: Repeated measurements carried out in a consistent manner so that observations are comparable over time.
- Native species: Those species present in part or all of a specified range without direct or indirect human intervention, growing within their native range and natural dispersal potential.
- Nectar Plant: A particular plant species required of adult butterflies for food/energy.
- Plan Area: Area of land covered under the HCP, including private lands within potential habitat for Fender's blue butterfly, determined by mapping grassland and oak habitat within the 2km (1.2 mi) flight distance (dispersal distance) of known populations of the butterfly.
- Primary Constituent Element (PCE): A physical or biological feature essential to the conservation of a species for which its designated or proposed critical habitat is based on, such as space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the species historic geographic and ecological distribution.
- Population: A group of individuals of a species living in certain areas maintaining some degree of reproductive isolation.
- Range: The geographic area a species is known to or believed to occupy.
- Species: A group of organisms resembling one another, and includes subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate, fish, or wildlife that interbreeds when mature.
- Species of Concern: An informal term referring to a species that may need conservation action due to declining population sizes. Similar terms include "species at risk" and "imperiled species". Such species receive no legal protection, nor is there any guarantee that the species will be listed in the future.
- Take: To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, and sheltering.
- Terms and conditions: Required actions described in an incidental take permit under section 10 or Incidental Take Statement intended to implement the Reasonable and Prudent Measures under section 7.
- Threatened species: A species that is likely to become endangered in the foreseeable future.

USFWS: United States Fish and Wildlife Service.

Viable: A viable population has a sufficient number of individuals, reproduction by those individuals, and habitat conditions to persist over time.

Watershed: An area of land draining to a common point.

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**Appendix A. Soils in the Yamhill Fender's blue butterfly HCP Plan Area (PA).**

Soil Type	Hectares	Acres	% of PA
Carlton silt loam, 0 to 7 % slopes	17.81	44.00	0.56%
Carlton silt loam, 12 to 20 % slopes	10.36	25.61	0.33%
Carlton silt loam, 7 to 12 % slopes	11.58	28.62	0.37%
Chehalem silty clay loam, 3 to 12 % slopes	335.17	828.23	10.58%
Chehalis silty clay loam	27.66	68.34	0.87%
Chehalis silty clay loam, overflow	48.69	120.32	1.54%
Cloquato silt loam	46.43	114.73	1.47%
Cove clay	5.39	13.32	0.17%
Cove silty clay loam	11.66	28.82	0.37%
Cove silty clay loam, fan	98.32	242.96	3.10%
Cove silty clay loam, thick surface	61.11	151.00	1.93%
Dupee silt loam, 12 to 20 % slopes	1.49	3.69	0.05%
Dupee silt loam, 3 to 12 % slopes	16.61	41.04	0.52%
Grande Ronde silty clay loam	14.63	36.15	0.46%
Hazelair silty clay loam, 2 to 7 % slopes	111.34	275.12	3.51%
Hazelair silty clay loam, 7 to 20 % slopes	148.56	367.10	4.69%
Hazelair silty clay loam, acid variant, 2 to 7 % slopes	7.73	19.09	0.24%
Jory clay loam, 12 to 20 % slopes	59.34	146.63	1.87%
Jory clay loam, 2 to 7 % slopes	18.94	46.80	0.60%
Jory clay loam, 20 to 30 % slopes	37.26	92.06	1.18%
Jory clay loam, 30 to 60 % slopes	57.23	141.43	1.81%
Jory clay loam, 7 to 12 % slopes	39.44	97.46	1.25%
Knappa silty clay loam, 0 to 7 % slopes	32.18	79.51	1.02%
Laurelwood silt loam, 30 to 60 % slopes	0.02	0.04	0.00%
McBee silty clay loam	21.05	52.01	0.66%
Nekia clay loam, 2 to 7 % slopes	5.05	12.49	0.16%
Nekia clay loam, 7 to 20 % slopes	52.40	129.49	1.65%
Newberg silt loam	0.90	2.23	0.03%
Olyic silt loam, 30 to 60 % slopes	0.75	1.85	0.02%
Olyic silt loam, 60 to 90 % slopes	0.09	0.22	0.00%
Panther silty clay loam, 4 to 20 % slopes	74.96	185.24	2.37%
Peavine silty clay loam, 12 to 20 % slopes	264.32	653.15	8.34%
Peavine silty clay loam, 2 to 12 % slopes	199.66	493.37	6.30%
Peavine silty clay loam, 20 to 30 % slopes	137.33	339.36	4.34%
Peavine silty clay loam, 30 to 60 % slopes	65.04	160.72	2.05%
Peavine silty clay loam, moderately shallow, 2 to 7 % slopes	53.75	132.83	1.70%
Peavine silty clay loam, moderately shallow, 7 to 20 % slopes	296.63	732.99	9.36%
Shale rock land	15.14	37.41	0.48%
Steiwier silty clay loam, basalt substratum, 5 to 20 per cent slopes	2.99	7.38	0.09%

Soil Type	Hectares	Acres	% of PA
Stony land	1.95	4.83	0.06%
Wapato silty clay loam	193.47	478.07	6.11%
Willakenzie silty clay loam, 12 to 20 % slopes	90.06	222.54	2.84%
Willakenzie silty clay loam, 2 to 12 % slopes	127.59	315.27	4.03%
Willakenzie silty clay loam, 20 to 30 % slopes	75.19	185.81	2.37%
Willakenzie silty clay loam, 30 to 45 % slopes	25.39	62.74	0.80%
Willakenzie silty clay loam, moderately shallow, 2 to 7 % slopes	25.57	63.19	0.81%
Willakenzie silty clay loam, moderately shallow, 7 to 20 % slopes	149.92	370.46	4.73%
Woodburn silt loam, 0 to 7 % slopes	2.93	7.24	0.09%
Yamhill silt loam, 12 to 20 % slopes	18.96	46.84	0.60%
Yamhill silt loam, 2 to 7 % slopes	6.85	16.93	0.22%
Yamhill silt loam, 20-30 % slopes	5.16	12.74	0.16%
Yamhill silt loam, 30 to 50 % slopes	12.54	30.98	0.40%
Yamhill silt loam, 7 to 12 % slopes	11.55	28.53	0.36%
Yamhill silt loam, moderately shallow, 7 to 20 % slopes	11.79	29.13	0.37%

## Appendix B. Native vegetation of Willamette Valley upland prairies (Wilson 2006).

Scientific Name	Common Name
<b>TREES AND SHRUBS</b>	
<i>Quercus garryana</i>	Oregon white oak
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Rhus diversiloba</i>	Poison oak
<i>Rosa gymnocarpa</i>	Baldhip rose
<b>GRASSES</b>	
<i>Elymus glaucus</i>	blue wild rye
<i>Festuca idahoensis</i> var. <i>roemeri</i>	Roemer's fescue
<i>Danthonia californica</i>	California oatgrass
<i>Achnatherum lemmonii</i>	Lemmon's needlegrass
<i>Koeleria macrantha</i>	prairie junegrass
<i>Bromus carinatus</i>	California brome
<i>Elymus trachycaulus</i>	slender wheatgrass
<b>FORBS</b>	
<i>Achillea millefolium</i>	yarrow
<i>Agoseris grandiflora</i>	Bigflower agoseris
<i>Allium amplexans</i>	narrowleaf onion
<i>Apocynum androsaemifolium</i>	spreading dogbane
<i>Aquilegia formosa</i>	western columbine
<i>Aster hallii</i>	Hall's aster
<i>Balsamorhiza deltoidea</i>	deltoid balsamroot
<i>Brodiaea coronaria</i>	crown brodiaea
<i>Calochortus tolmiei</i>	Tolmie star-tulip
<i>Cirsium callilepis</i>	fewleaf thistle
<i>Clarkia amoena</i>	farewell-to-spring
<i>Clarkia gracilis</i>	slender clarkia
<i>Comandra umbellata</i>	bastard toadflax
<i>Convolvulus nyctagineus</i>	nightblooming false bindweed
<i>Daucus pusillus</i>	American wild carrot
<i>Delphinium menziesii</i>	Menzie's larkspur
<i>Dichelostemma congestum</i>	ookow
<i>Dodecatheon hendersonii</i>	Henderson's shooting star
<i>Epilobium paniculatum</i>	tall annual willowherb
<i>Eriophyllum lanatum</i>	Oregon sunshine
<i>Erythronium oregonum</i>	giant white fawnli
<i>Fragaria virginiana</i>	mountain strawberry
<i>Fritillaria lanceolata</i>	checker lily
<i>Geranium oregonum</i>	Oregon germanium
<i>Grindelia integrifolia</i>	Oregon gumweed
<i>Habenaria elegans</i>	elegant piperia
<i>Iris tenax</i>	toughleaf iris
<i>Lathyrus holochlorus</i>	thinleaf pea
<i>Lomatium macrocarpum</i>	bigseed biscuitroot

Scientific Name	Common Name
<i>Lomatium nudicaule</i>	barestem bisquitroot
<i>Lomatium utriculatum</i>	common lomatium
<i>Lotus purshiana</i>	American's bird's foot trefoil
<i>Lupinus arbustus</i>	spur lupine
<i>Lupinus bicolor</i>	minature lupine
<i>Madia elegans</i>	common madia
<i>Madia gracilis</i>	slender tarweed
<i>Marah oreganus</i>	wild cucumber
<i>Plectritis congesta</i>	shortspur seablush
<i>Potentilla gracilis</i>	slender cinquefoil
<i>Prunella vulgaris var lanceolata</i>	lance self-heal
<i>Ranunculus occidentalis</i>	western buttercup
<i>Sanicula bipinnatifida</i>	purple sanicle
<i>Sidalcea campestris</i>	meadow checkermallow
<i>Sidalcea virgata</i>	rosy checkermallow
<i>Silene hookeri</i>	Hooker's silene
<i>Sisyrinchium douglasii</i>	Douglas' blue-eyed grass
<i>Triteleia hyacinthina</i>	white brodiaea
<i>Vicia americana</i>	American vetch
<i>Wyethia angustifolia</i>	California compass plant
<i>Zigadenus venenous</i>	death camas

Source: Wilson and OSU 2006.

**Appendix C. Wildlife of Yamhill County.****MAMMALS**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat</b>
American beaver	<i>Castor canadensis</i>	Aquatic
Bairds shrew	<i>Sorex bairdi</i>	Cool, moist, conifer and deciduous forests; damp meadows; mossy banks of small streams; sphagnum bogs; marshes
Big brown bat	<i>Eptesicus fuscus</i>	Deciduous (more common) and coniferous forests; artificial structures; meadows; pastures; urban areas
Black bear	<i>Ursus americanus</i>	Mixed deciduous-coniferous forests with dense understories
Black rat	<i>Rattus rattus</i>	Typically where there is human activity (sewers, barns, etc.); rarely in agricultural areas, pastures, and riparian areas.
Black-tailed deer	<i>Odocoileus hemionus</i>	Brushy areas at edges of forests and chaparral thickets.
Black-tailed jack rabbit	<i>Lepus californicus</i>	Open habitats, including lower coastal valleys, pastures, fields, and forest edges.
Bobcat	<i>Lynx rufus</i>	Dense forests, thickets, and clear-cuts
Brush rabbit	<i>Sylvilagus bachmani</i>	Grassy meadow edges with dense brushy cover nearby.
Bushy-tailed woodrat	<i>Neotoma cinerea</i>	Wide range of habitats including mature coniferous forests and deserted buildings.
California ground squirrel	<i>Spermophilus beecheyi</i>	Open, grassy areas among other habitat types; pastures, roadsides; oak woodlands; chaparral; disturbed areas in forests.
California myotis	<i>Myotis californicus</i>	Edges of tree clumps, open water, cliff faces, tree crevices, caves, artificial structures.
Camas pocket gopher	<i>Thomomys bulbivorus</i>	Grassy areas, pastures, roadsides, agricultural areas.
Coast mole	<i>Scapanus orarius</i>	Meadows; deciduous riparian woodland; sagebrush scrub; coniferous forests.
Common gray fox	<i>Urocyon cinereoargenteus</i>	Wooded areas, especially open broadleaf and riparian forests.
Common porcupine	<i>Erethizon dorsatum</i>	
Common raccoon	<i>Procyon lotor</i>	Agricultural and urban areas with trees and brush for cover.
Coyote	<i>Canis latrans</i>	Grasslands; open habitats in forests.
Creeping vole	<i>Microtus oregoni</i>	Brushy areas in moist coniferous forest.
Deer mouse	<i>Peromyscus maniculatus</i>	Found throughout all Oregon habitat types, especially early successional areas.
Douglas's squirrel	<i>Tamiasciurus douglasii</i>	Coniferous forests and wooded suburbs.
Dusky-footed woodrat	<i>Neotoma fuscipes</i>	Brushy undergrowth of forests, woodlands, and chaparral; riparian areas.

Common Name	Scientific Name	Habitat
Eastern cottontail	<i>Sylvilagus floridanus</i>	Pastures, grasslands, riparian forests, open woodlands, suburbs, croplands, and marshes with bushes or other cover nearby.
Eastern fox squirrel	<i>Sciurus niger</i>	Riparian woodlands, suburbs, urban parks.
Eastern gray squirrel	<i>Sciurus carolinensis</i>	Older deciduous, coniferous-deciduous forests, and forested bottomlands.
Elk	<i>Cervus elaphus</i>	Forests; meadows; mountain valleys; foothills; agricultural areas.
Ermine	<i>Mustela erminea</i>	Brushy areas and forest edges.
Fisher	<i>Martes pennanti</i>	Mature, closed-canopy coniferous forests with deciduous trees; riparian corridors.
Fringed myotis	<i>Myotis thysanodes</i>	Wide variety of habitats, especially forested and riparian areas.
Gray-tailed vole	<i>Microtus canicaudus</i>	Pastures and other grassy areas; agricultural areas.
Hoary bat	<i>Lasiurus cinereus</i>	Coniferous and deciduous forests; riparian corridors; brushy areas in forests.
House mouse	<i>Mus musculus</i>	Man-made structures in developed areas and some riparian areas, croplands, abandoned pastures, and highway right-of-ways.
Little brown myotis	<i>Myotis lucifugus</i>	Moist forests and riparian woodlands.
Long-eared myotis	<i>Myotis evotis</i>	Forested habitats and forested edges, especially conifer forests and willow and alder forests.
Long-legged myotis	<i>Myotis volans</i>	Coniferous forests; oak and mixed evergreen woodlands.
Long-tailed vole	<i>Microtus longicaudus</i>	Moist riparian vegetation and thickets in forests; forest-meadow transitions.
Long-tailed weasel	<i>Mustela frenata</i>	Riparian areas; brushy areas in forests; open areas.
Mink	<i>Neovison vison</i>	Aquatic and riparian habitats; abandoned beaver lodges.
Mountain beaver	<i>Aplodontia rufa</i>	Brushy thickets in early to mid-successional deciduous and coniferous forests.
Mountain lion	<i>Puma concolor</i>	Various habitats, from dense forests to open woodlands and canyons.
Muskrat	<i>Ondatra zibethicus</i>	Aquatic habitats.
Northern flying squirrel	<i>Glaucomys sabrinus</i>	Coniferous, mixed, and deciduous forests; also found feeding on the ground along streams and at forest-meadow edges.
Northern river otter	<i>Lontra canadensis</i>	In and along streams, lakes, swamps, marshes, and the seashore.
Norway rat	<i>Rattus norvegicus</i>	Areas associated with human activity; rarely in agricultural areas, pastures, and riparian areas away from human development.
Nutria	<i>Myocastor coypus</i>	Aquatic habitats.

Common Name	Scientific Name	Habitat
Pacific jumping mouse	<i>Zapus trinotatus</i>	Wet, grassy areas, marsh areas, thickets along streams.
Pacific shrew	<i>Sorex pacificus</i>	Humid forests, marshes, and thickets, often near riparian vegetation.
Pacific water shrew	<i>Sorex bendirii</i>	Moist forests, swamps, marshes, and riparian areas.
Red fox	<i>Vulpes vulpes</i>	Open habitats, including meadows and grasslands interspersed with patches of brush or timber.
Red tree vole	<i>Arborimus longicaudus</i>	Dense, moist coniferous forests.
Shrew-mole	<i>Neurotrichus gibbsii</i>	Various habitats with thick vegetation cover and water or moist soil; wet meadows; ravine bottoms; marsh edges.
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Older conifer forests.
Snowshoe hare	<i>Lepus americanus</i>	Coniferous forests with appropriate brushy cover.
Striped skunk	<i>Mephitis mephitis</i>	Brushy or rocky areas; open pastures; usually near water.
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Roosts in buildings, caves, mines, and bridges.
Townsend's chipmunk	<i>Neotamias townsendii</i>	Riparian zones of coniferous forests.
Townsend's mole	<i>Scapanus townsendii</i>	Moist areas in pastures, grasslands, meadows, lawns, open forests.
Townsend's vole	<i>Microtus townsendii</i>	Marshy areas; wet meadows; wet pastures; riparian thickets.
Trowbridges shrew	<i>Sorex trowbridgii</i>	Deciduous and coniferous forest interiors, less often in riparian areas and ravines.
Vagrant shrew	<i>Sorex vagrans</i>	Deciduous and coniferous forests.
Virginia opossum	<i>Didelphis virginiana</i>	Various habitats, often near water.
Western gray squirrel	<i>Sciurus griseus</i>	Deciduous or broadleaf evergreen woodlands.
Western pocket gopher	<i>Thomomys mazama</i>	Open, grassy meadows and wet pastures in mountain forests.
Western red-backed vole	<i>Myodes californicus</i>	Douglas-fir, western hemlock, and Sitka spruce forests.
Western spotted skunk	<i>Spilogale gracilis</i>	Brushy areas in a variety of habitat types.
Yuma myotis	<i>Myotis yumanensis</i>	Wide variety of habitats including oak woodlands and older Douglas-fir forests.

Source: Csuti, et al. 1999.

**REPTILES**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat</b>
Common garter snake	<i>Thamnophis sirtalis</i>	Wet meadows, along water courses, open valleys, deep coniferous forests
Gopher snake	<i>Pituophis catenifer</i>	Meadows, sagebrush flats, forest edges, fence rows.
Northern alligator lizard	<i>Elgaria coerulea</i>	Humid areas, including meadow edges in coniferous forests and riparian zones.
Northwestern garter snake	<i>Thamnophis ordinoides</i>	Thickets and talus slopes.
Pacific pond turtle	<i>Actinemys marmorata</i>	Aquatic habitats.
Painted turtle	<i>Chrysemys picta</i>	Aquatic habitats.
Racer	<i>Coluber constrictor</i>	Meadows, sagebrush flats, forest edges, fence rows.
Ringneck snake	<i>Diadophis punctatus</i>	Wooded areas; open, grassy, or brushy areas; open, rocky canyons.
Rubber boa	<i>Charina bottae</i>	Various habitats including foothill woodlands and grasslands.
Sharptail snake	<i>Contia tenuis</i>	Moist areas in coniferous forest, deciduous woodlands, chaparral, and grasslands.
Southern alligator lizard	<i>Elgaria multicarinata</i>	Oak-grassland areas and edges of pine forests.
Western fence lizard	<i>Sceloporus occidentalis</i>	Wide variety of habitats, including grasslands and coniferous forests.
Western skink	<i>Eumeces skiltonianus</i>	Rocky areas with some moisture.
Western terrestrial garter snake	<i>Thamnophis elegans</i>	Wooded areas; open, grassy, or brushy areas; open, rocky canyons.

Source: Csuti, et al. 1999.

**AMPHIBIANS**

<b>Common Name</b>	<b>Scientific Name</b>
Bullfrog	<i>Rana catesbeiana</i>
Clouded salamander	<i>Aneides ferreus</i>
Coastal tailed frog	<i>Ascaphus truei</i>
Columbia torrent salamander	<i>Rhyacotriton kezeri</i>
Dunn's salamander	<i>Plethodon dunni</i>
Ensatina	<i>Ensatina eschscholtzii</i>
	<i>Ambystoma</i>
Long-toed salamander	<i>macrodactylum</i>
Northwestern salamander	<i>Ambystoma gracile</i>
Oregon spotted frog	<i>Rana retiosa</i>
Pacific chorus frog	<i>Pseudacris regilla</i>
Pacific giant salamander	<i>Dicamptodon tenebrosus</i>
Red-legged frog	<i>Rana aurora</i>
Roughskin newt	<i>Taricha granulosa</i>
Southern torrent salamander	<i>Rhyacotriton variegatus</i>
Western redback salamander	<i>Plethodon vehiculum</i>
Western toad	<i>Bufo boreas</i>

Source: Csuti, et al. 1999.

**BIRDS**

<b>Common Name</b>	<b>Scientific Name</b>
Acorn woodpecker	<i>Melanerpes formicivorus</i>
American bittern	<i>Botaurus lentiginosus</i>
American coot	<i>Fulica americana</i>
American crow	<i>Corvus brachyrhynchos</i>
American dipper	<i>Cinclus mexicanus</i>
American goldfinch	<i>Carduelis tristis</i>
American kestrel	<i>Falco sparverius</i>
American pipit	<i>Anthus rubescens</i>
American robin	<i>Turdus migratorius</i>
American wigeon	<i>Anas americana</i>
Anna's hummingbird	<i>Calypte anna</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Band-tailed pigeon	<i>Patagioenas fasciata</i>
Barn owl	<i>Tyto alba</i>
Barn swallow	<i>Hirundo rustica</i>
Barred owl	<i>Strix varia</i>
Barrows goldeneye	<i>Bucephala islandica</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Bewicks wren	<i>Thryomanes bewickii</i>
Black oystercatcher	<i>Haematopus bachmani</i>
Black-capped chickadee	<i>Poecile atricapillus</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Black-throated gray warbler	<i>Dendroica nigrescens</i>
Blue-winged teal	<i>Anas discors</i>
Brewers blackbird	<i>Euphagus cyanocephalus</i>
Brown creeper	<i>Certhia americana</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Bufflehead	<i>Bucephala albeola</i>
Bullocks oriole	<i>Icterus bullockii</i>
Burrowing owl	<i>Athene cunicularia</i>
Bushtit	<i>Psaltriparus minimus</i>
California quail	<i>Callipepla californica</i>
Canada goose	<i>Branta canadensis</i>
Canvasback	<i>Aythya valisineria</i>
Cassins auklet	<i>Ptychoramphus aleuticus</i>
Cassins vireo	<i>Vireo cassinii</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chestnut-backed chickadee	<i>Poecile rufescens</i>
Chipping sparrow	<i>Spizella passerina</i>

Common Name	Scientific Name
Cinnamon teal	<i>Anas cyanoptera</i>
Clarks grebe	<i>Aechmophorus clarkii</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Common merganser	<i>Mergus merganser</i>
Common nighthawk	<i>Chordeiles minor</i>
Common raven	<i>Corvus corax</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Coopers hawk	<i>Accipiter cooperii</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Downy woodpecker	<i>Picoides pubescens</i>
Dusky flycatcher	<i>Empidonax oberholseri</i>
Eared grebe	<i>Podiceps nigricollis</i>
European starling	<i>Sturnus vulgaris</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Fork-tailed storm-petrel	<i>Oceanodroma furcata</i>
Fox sparrow	<i>Passerella iliaca</i>
Gadwall	<i>Anas strepera</i>
Glaucous-winged gull	<i>Larus glaucescens</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Gray jay	<i>Perisoreus canadensis</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Ardea alba</i>
Great horned owl	<i>Bubo virginianus</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Green heron	<i>Butorides virescens</i>
Green-winged teal	<i>Anas crecca</i>
Hairy woodpecker	<i>Picoides villosus</i>
Hammonds flycatcher	<i>Empidonax hammondii</i>
Harlequin duck	<i>Histrionicus histrionicus</i>
Hermit thrush	<i>Catharus guttatus</i>
Hermit warbler	<i>Dendroica occidentalis</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Horned grebe	<i>Podiceps auritus</i>
Horned lark	<i>Eremophila alpestris</i>
House finch	<i>Carpodacus mexicanus</i>
House sparrow	<i>Passer domesticus</i>
House wren	<i>Troglodytes aedon</i>
Huttons vireo	<i>Vireo huttoni</i>
Killdeer	<i>Charadrius vociferus</i>
Lazuli bunting	<i>Passerina amoena</i>

Common Name	Scientific Name
Leachs storm-petrel	<i>Oceanodroma leucorhoa</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
Lesser scaup	<i>Aythya affinis</i>
Lewiss woodpecker	<i>Melanerpes lewis</i>
Lincolns sparrow	<i>Melospiza lincolnii</i>
Long-eared owl	<i>Asio otus</i>
Macgillivrays warbler	<i>Oporornis tolmiei</i>
Mallard	<i>Anas platyrhynchos</i>
Marsh wren	<i>Cistothorus palustris</i>
Mountain quail	<i>Oreortyx pictus</i>
Mourning dove	<i>Zenaida macroura</i>
Nashville warbler	<i>Vermivora ruficapilla</i>
Northern flicker	<i>Colaptes auratus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Northern harrier	<i>Circus cyaneus</i>
Northern pintail	<i>Anas acuta</i>
Northern pygmy-owl	<i>Glaucidium gnoma</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Northern shoveler	<i>Anas clypeata</i>
Olive-sided flycatcher	<i>Contopus cooperi</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Osprey	<i>Pandion haliaetus</i>
Pacific slope flycatcher	<i>Empidonax difficilis</i>
Pelagic cormorant	<i>Phalacrocorax pelagicus</i>
Peregrine falcon	<i>Falco peregrinus</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pigeon guillemot	<i>Cephus columba</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine siskin	<i>Carduelis pinus</i>
Purple finch	<i>Carpodacus purpureus</i>
Purple martin	<i>Progne subis</i>
Red crossbill	<i>Loxia curvirostra</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Red-breasted sapsucker	<i>Sphyrapicus ruber</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Redhead	<i>Aythya americana</i>
Red-necked grebe	<i>Podiceps grisegena</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ring-necked duck	<i>Aythya collaris</i>

Common Name	Scientific Name
Ring-necked pheasant	<i>Phasianus colchicus</i>
Rock pigeon	<i>Columba livia</i>
Rock wren	<i>Salpinctes obsoletus</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Rufous hummingbird	<i>Selasphorus rufus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Short-eared owl	<i>Asio flammeus</i>
Song sparrow	<i>Melospiza melodia</i>
Sora	<i>Porzana carolina</i>
Spotted owl	<i>Strix occidentalis</i>
Spotted sandpiper	<i>Actitis macularius</i>
Spotted towhee	<i>Pipilo maculatus</i>
Stellers jay	<i>Cyanocitta stelleri</i>
Streaked horned lark	<i>Eremophila alpestris strigata</i>
Swainsons thrush	<i>Catharus ustulatus</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Tree swallow	<i>Tachycineta bicolor</i>
Trumpeter swan	<i>Cygnus buccinator</i>
Tufted puffin	<i>Fratercula cirrhata</i>
Turkey vulture	<i>Cathartes aura</i>
Varied thrush	<i>Ixoreus naevius</i>
Vaux's swift	<i>Chaetura vauxi</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Virginia rail	<i>Rallus limicola</i>
Warbling vireo	<i>Vireo gilvus</i>
Western bluebird	<i>Sialia mexicana</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Western kingbird	<i>Tyrannus verticalis</i>
Western meadowlark	<i>Sturnella neglecta</i>
Western screech-owl	<i>Megascops kennicottii</i>
Western scrub-jay	<i>Aphelocoma californica</i>
Western tanager	<i>Piranga ludoviciana</i>
Western wood-pewee	<i>Contopus sordidulus</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
White-tailed kite	<i>Elanus leucurus</i>
Wild turkey	<i>Meleagris gallopavo</i>

<b>Common Name</b>	<b>Scientific Name</b>
Willet	<i>Catoptrophorus semipalmatus</i>
Willow flycatcher	<i>Empidonax traillii</i>
Wilsons snipe	<i>Gallinago delicata</i>
Wilsons warbler	<i>Wilsonia pusilla</i>
Winter wren	<i>Troglodytes troglodytes</i>
Wood duck	<i>Aix sponsa</i>
Wrentit	<i>Chamaea fasciata</i>
Yellow warbler	<i>Dendroica petechia</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-breasted chat	<i>Icteria virens</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>

Source: Csuti, et al. 1997.

**Appendix D. Summary of Environmental Consequences.** (Fender's blue butterfly = FBB, Kincaid's lupine = KL)

	HCP Alternative	No Action Alternative
<b>Climate</b>		
Forage production	Minor ongoing effects due to greenhouse gas emissions from vehicles and other equipment.	Impacts are expected to be similar to the Proposed Action because forage production activities will continue even absent an HCP.
Pasture/Livestock grazing	Minor ongoing effects due to greenhouse gas emissions from livestock (methane emissions from cattle), vehicles, and other equipment.	Impacts are expected to be similar to the Proposed Action because pasture and livestock grazing activities will continue even absent an HCP.
Vineyard establishment/management	Minor ongoing effects due to greenhouse gas emissions from vehicles and other equipment.	Impacts are expected to be similar to the Proposed Action because vineyards will be established even absent an HCP.
Timber establishment/management	Minor ongoing effects due to greenhouse gas emissions from vehicles and other equipment.	Impacts are expected to be similar to the Proposed Action because timber lands will be established even absent an HCP.
Voluntary habitat restoration	Minor ongoing effects due to greenhouse gas emissions from mowers and other equipment use. Very little acreage will be treated for habitat restoration. The amount of mowing for voluntary habitat restoration is expected to be minimal, especially when compared to other sources of greenhouse gases in the region.	Impacts are expected to be similar to the Proposed Action.
HCP implementation	Minor ongoing effects due to greenhouse gas emissions from vehicles and other equipment.	Expected to be similar to proposed action. While the HCP conservation measures would not be implemented, there would likely be case-specific mitigation which would require similar habitat restoration and management activities compared to the Proposed Action. Mowing for mitigation-related habitat enhancement would generate minor but ongoing greenhouse gas emissions.
<b>Topography/soils</b>		

<b>HCP Alternative</b>		<b>No Action Alternative</b>
Forage production	Soil compaction is possible due to use of heavy equipment but these impacts are expected to be relatively insignificant because most of the lands have already been under agricultural production for many years.	Impacts are expected to be similar to the Proposed Action.
Pasture/ Livestock grazing	Soil compaction is possible due to use of heavy equipment but these impacts are expected to be relatively insignificant because most of the lands have already been under agricultural production for many years.	Impacts are expected to be similar to the Proposed Action.
Vineyard establishment/ management	Soil compaction is possible due to use of heavy equipment but these impacts are expected to be relatively insignificant because most of the lands have already been under agricultural production for many years.	Impacts are expected to be similar to the Proposed Action.
Timber establishment/ management	Soil compaction is possible due to use of heavy equipment but these impacts are expected to be relatively insignificant because most of the lands have already been under agricultural production for many years.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	A relatively small amount of soil compaction is possible due to use of heavy equipment for mowing, brush control, and prescribed fires. No changes to topography are expected.	No impacts to soil or topography are expected.
HCP implementation	A relatively small amount of soil compaction is possible due to use of heavy equipment for mowing, brush control, and prescribed fires. No changes to topography are expected.	Impacts are expected to be similar to the Proposed Action.
<b>Vegetation</b>		
Forage production	There will be some permanent adverse effects on lands that have not previously been tilled or heavily utilized and where remnant prairie vegetation persists because such vegetation may be reduced or lost due to clearing for vineyards. Impacts are not expected to be significant because most of the lands in the Plan Area have already been utilized for agricultural purposes.	Impacts are expected to be similar to the Proposed Action.

<b>HCP Alternative</b>		<b>No Action Alternative</b>
Pasture/ Livestock grazing	There will be some permanent adverse effects on lands that have not previously been tilled or heavily utilized and where remnant prairie vegetation persists because such vegetation may be reduced or lost due to clearing for vineyards. Impacts are not expected to be significant because most of the lands in the Plan Area have already been utilized for agricultural purposes.	Impacts are expected to be similar to the Proposed Action.
Vineyard establishment/ management	There will be some permanent adverse effects on lands that have not previously been tilled or heavily utilized and where remnant prairie vegetation persists because such vegetation may be reduced or lost due to clearing for vineyards. Impacts are not expected to be significant because most of the lands in the Plan Area have already been utilized for agricultural purposes.	Impacts are expected to be similar to the Proposed Action.
Timber establishment/ management	There will be some permanent adverse effects on lands that have not previously been tilled or heavily utilized and where remnant prairie vegetation persists because such vegetation may be reduced or lost due to clearing for vineyards. Impacts are not expected to be significant because most of the lands in the Plan Area have already been utilized for agricultural purposes.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	Some short-term adverse effects due to mowing, spraying, and burning. Potentially significant long-term benefits to upland prairie vegetation because there would be less competition from invasive non-native species and woody vegetation.	Impacts are expected to be similar to the Proposed Action.
HCP implementation	Some short-term adverse effects due to mowing, spraying, and burning. Potentially significant long-term benefits to upland prairie vegetation because there would be less competition from invasive non-native species and woody vegetation.	The HCP conservation measures would not be implemented. While short-term negative effects would be avoided, long-term beneficial effects would not occur.
<b>Wildlife and fish</b>		
Forage production	The effects of the covered activities would be negligible and would not result in long-term negative impacts to wildlife or fish populations.	Impacts are expected to be similar to the Proposed Action.
Pasture/ Livestock grazing	The effects of the covered activities would be negligible and would not result in long-term negative impacts to wildlife or fish populations.	Impacts are expected to be similar to the Proposed Action.

HCP Alternative		No Action Alternative
Vineyard establishment/management	The effects of the covered activities would be negligible and would not result in long-term negative impacts to wildlife or fish populations.	Impacts are expected to be similar to the Proposed Action.
Timber establishment/management	The effects of the covered activities would be negligible and would not result in long-term negative impacts to wildlife or fish populations.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	Some long-term indirect benefits to wildlife that depend on upland prairie habitat are expected due to minimization of impacts and implementation of long-term habitat conservation and enhancement measures.	Impacts are expected to be similar to the Proposed Action.
HCP implementation	Some long-term indirect benefits to wildlife that depend on upland prairie habitat are expected due to minimization of impacts and implementation of long-term habitat conservation and enhancement measures.	Impacts are expected to be similar to the Proposed Action.

Protected Species		
Forage production	FBB may be negatively affected by loss of nectar species where mowing or other crop management practices reduce the cover of nectar sources. Minimal future impacts to Fender's blue are expected because no growth in forage production areas is anticipated and past agricultural practices have likely eliminated KL from most forage production lands. Mowing may also benefit FBB by reducing competition with invasive and woody vegetation.	Impacts are expected to be similar to the Proposed Action except that BMPs and other Conservation Measures may not be implemented unless individual landowners seek incidental take coverage.
Pasture/Livestock grazing	Some indirect impacts to FBB are expected due to loss of prairie habitat where remnant prairie vegetation is converted to pasture. Direct impacts to the butterfly are possible if livestock are allowed to trample occupied lupine patches, but these impacts will be minimized through implementation of the BMPs. Grazing in compliance with certain timing restrictions identified in the HCP may also benefit FBB by reducing competition with invasive and woody vegetation.	Impacts are expected to be similar to the Proposed Action except that BMPs and other Conservation Measures may not be implemented unless individual landowners seek incidental take coverage.
Vineyard establishment/management	Some indirect and direct impacts to FBB are expected due to initial land clearing and continued herbicide application. KL and nectar species may be lost and direct impacts to the butterfly are possible	Impacts are expected to be similar to the Proposed Action except that BMPs and other Conservation Measures may not be

	HCP Alternative	No Action Alternative
	from pesticide application. Pesticide impacts will be addressed on a case by case basis when new vineyards are established and BMPs will be developed and implemented as information becomes available on the chemical effects to Fender's blue and its habitat.	implemented unless individual landowners seek incidental take coverage.
Timber establishment/management	Some indirect and direct impacts to FBB are expected due to initial land clearing and continued herbicide application. KL and nectar species may be lost and direct impacts to the butterfly are possible from pesticide application. Pesticide impacts will be addressed on a case by case basis when new vineyards are established and BMPs will be developed and implemented as information becomes available on the chemical effects to Fender's blue and its habitat.	Impacts are expected to be similar to the Proposed Action except that BMPs and other Conservation Measures may not be implemented unless individual landowners seek incidental take coverage.
Voluntary habitat restoration	Short-term negative effects to FBB are possible, but there would be long-term benefits to the species due to improved habitat quality and habitat availability.	Impacts are expected to be similar to the Proposed Action except that BMPs and other Conservation Measures may not be implemented unless individual landowners seek incidental take coverage.
HCP implementation	Private landowners would receive take authorization for impacts to FBB through the HCP and would avoid, minimize, and mitigate for impacts based on the conservation measures provided in the HCP.	Mitigation for impacts to Fender's blue from forage production, pasture and livestock grazing, vineyard establishment and timber establishment would not be coordinated by the Yamhill SWCD and would instead be done on a case-by-case basis. The conservation measures, including BMPs for avoidance of impacts, would not be implemented.
<b>Water Resources</b>		
Forage production	Impacts to water quantity and quality are expected to be minor.	Impacts are expected to be similar to the Proposed Action.
Pasture/Livestock grazing	Impacts to water quantity and quality are expected to be minor.	Impacts are expected to be similar to the Proposed Action.
Vineyard establishment/management	There could be an increase in erosion and sedimentation, and need for irrigation could affect water quantity, but the impacts to water quantity and quality are expected to be minor.	Impacts are expected to be similar to the Proposed Action.

<b>HCP Alternative</b>		<b>No Action Alternative</b>
Timber establishment/management	There could be an increase in erosion and sedimentation, but the impacts to water quantity and quality are expected to be minor.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	No impacts to water quantity are anticipated and impacts to water quality are expected to be infrequent and minor.	Impacts are expected to be similar to the Proposed Action.
HCP implementation	No impacts to water quantity are anticipated and impacts to water quality are expected to be infrequent and minor.	Impacts are expected to be similar to the Proposed Action.
<b>Air quality and Noise</b>		
Forage production	Vehicle emissions from due to soil tillage, fertilization, and other crop management activities are not expected to measurably alter air quality in the Plan Area or surrounding environment.	Impacts are expected to be similar to the Proposed Action.
Pasture/Livestock grazing	Relatively minor vehicle usage for fertilization, feeding, irrigation and other pasture management activities are not expected to measurably alter air quality or the noise environment.	Impacts are expected to be similar to the Proposed Action.
Vineyard establishment/management	Vehicles used for soil preparation, planting, harvesting, and other vineyard management activities will release some fine particulates and create some noise. The impacts are consistent with other agricultural activities in the Plan Area and are not expected to measurably increase noise in the plan area or affect air quality.	Impacts are expected to be similar to the Proposed Action.
Timber establishment/management	Vehicles and equipment used for soil preparation, planting, harvesting, and other timber establishment and management activities will release some fine particulates and create some noise. The impacts are consistent with other agricultural activities in the Plan Area and are not expected to measurably increase noise in the plan area or affect air quality.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	Prescribed burning and mowing may release fine particulates that could affect air quality, however, these activities will not significantly affect the region's air quality or noise environment.	Impacts are expected to be similar to the Proposed Action.
HCP implementation	Prescribed burning and mowing may release fine particulates that could affect air quality, however, these activities will not significantly affect the region's air quality or noise environment.	Impacts are expected to be similar to the Proposed Action.
<b>Cultural and Historical Resources</b>		

<b>HCP Alternative</b>		<b>No Action Alternative</b>
Forage production	No impacts are expected where agricultural activities have been ongoing.	Impacts are expected to be similar to the Proposed Action.
Pasture/ Livestock grazing	No impacts are expected.	Impacts are expected to be similar to the Proposed Action.
Vineyard establishment/ management	Conversion of lands from grazed or fallow areas to vineyards may unearth or crush archaeological resources.	Impacts are expected to be similar to the Proposed Action.
Timber establishment/ management	Conversion of lands from grazed or fallow areas to timber may unearth or crush archaeological resources.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	Habitat restoration, enhancement, and management-related activities have the potential to impact archaeological resources. A cultural resource survey should be conducted prior to undertaking these activities.	Under the No Action alternative there could be less prescribed burning or use of two-stroke engines for vegetation control. However, the restoration-related impacts to air quality and noise are anticipated to minor compared to the other sources in the region.
HCP implementation	Habitat restoration, enhancement, and management-related activities have the potential to impact archaeological resources. A cultural resource survey should be conducted prior to undertaking these activities.	Under the No Action alternative there could be less prescribed burning or use of two-stroke engines for vegetation control. However, the restoration-related impacts to air quality and noise are anticipated to minor compared to the other sources in the region.

<b>Land Use and Socio-economic Factors</b>		
Forage production	Forage production activities will not alter the rural character of the lands and will not significantly affect land use or socioeconomics of the Plan Area or region. The adverse and beneficial socioeconomic effects of the Proposed Action will be shared by all landowners and residents of the Plan Area, regardless of ethnic background or economic status.	Impacts are expected to be similar to the Proposed Action.

HCP Alternative		No Action Alternative
Pasture/ Livestock grazing	Pasture management will not alter the rural character of the lands and will not significantly affect land use or socioeconomics of the Plan Area or region. The adverse and beneficial socioeconomic effects of the Proposed Action will be shared by all landowners and residents of the Plan Area, regardless of ethnic background or economic status.	Impacts are expected to be similar to the Proposed Action.
Vineyard establishment/ management	Landowners may shift from using lands for forage production to pasture or timber production, but only where such activities are authorized under the County's Comprehensive Land Use Plan and zoning designations. Shifts in management will not alter the rural character of the lands and will not significantly affect socioeconomics of the Plan Area or region. The adverse and beneficial socioeconomic effects of the Proposed Action will be shared by all landowners and residents of the Plan Area, regardless of ethnic background or economic status.	Impacts are expected to be similar to the Proposed Action.
Timber establishment/ management	Landowners may shift from using lands for forage production to pasture or timber production, but only where such activities are authorized under the County's Comprehensive Land Use Plan and zoning designations. Shifts in management will not alter the rural character of the lands and will not significantly affect socioeconomics of the Plan Area or region.	Impacts are expected to be similar to the Proposed Action.
Voluntary habitat restoration	No impacts are expected.	Impacts are expected to be similar to the Proposed Action.
HCP implementation	The Proposed Action may increase employment opportunities in agriculture, forestry, and habitat management and restoration (personnel to mow, spray, assist with prescribed burns, etc.). Private landowners will likely save money by obtaining incidental take coverage through the Yamhill SWCD HCP and Permit, rather than having to obtain their own Permit from the USFWS. The adverse and beneficial socioeconomic effects of the Proposed Action will be shared by all landowners and residents of the Plan Area, regardless of ethnic background or economic status.	The financial cost of the No Action alternative is not certain as it would be borne by each individual landowner that chooses to seek ESA compliance. These landowners, however, will bear costs associated with developing and implementing individual HCPs and may face substantial time delays.

**Transportation**

	HCP Alternative	No Action Alternative
Forage production	No impacts are expected.	No impacts are expected.
Pasture/ Livestock grazing	No impacts are expected.	No impacts are expected.
Vineyard establishment/ management	No impacts are expected.	No impacts are expected.
Timber establishment/ management	No impacts are expected.	No impacts are expected.
Voluntary habitat restoration	No impacts are expected.	No impacts are expected.
HCP implementation	No impacts are expected.	No impacts are expected.