ENVIRONMENTAL ASSESSMENT NO. OR090-05-03

WEST EUGENE WETLANDS
SCHEDULE EA

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

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West Eugene Wetlands Schedule EA

1.0 INTRODUCTION

1.1 BACKGROUND

The West Eugene Wetlands (WEW) Project is a cooperative venture by the Bureau of Land Management (BLM), Eugene District, to protect and restore wetland ecosystems in the southern Willamette Valley of Oregon. This unique program involves a partnership of federal, state, and local agencies and organizations to manage lands and resources in an urban area for multiple public benefits. The eight partners in the WEW Project are the BLM, City of Eugene, The Nature Conservancy, Oregon Youth Conservation Corps, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, McKenzie River Trust, and Willamette Resources and Educational Network. The BLM became an active partner in 1993 when it adopted the WEW Plan (WEWP) (City of Eugene 1992, 2000). The BLM has been involved with its partners in land acquisition, restoration, enhancement, and maintenance of approximately 2,800 acres in the West Eugene area.

A variety of management activities for the WEW Project are recommended in the WEWP. In 1994, the BLM began limited management actions on various properties that included planning, research on special status species, prescribed burning, environmental education, trash removal, and noxious weed control. Public use of federal land within the WEW Project is currently allowed under the Code of Federal Regulations (43 CFR 8365.1-6).

This EA provides a schedule of on-the-ground actions that can accomplish restoration and maintain past restorative actions, and analyzes a range of alternatives that is consistent with the 1992 WEW Plan; the BLM, Eugene District Resource Management Plan (RMP), Record of Decision (ROD) (1995) as amended; and the WEW Recreation, Access, and Environmental Education Plan (2001).

The planning area for the purposes of the EA is defined as those lands within the WEW Project which are owned by the BLM; the North and South Taylor parcels; and the Long Tom Area of Critical Environmental Concern (ACEC). The majority of the planning area lies within the Urban Growth Boundary (UGB) of the City of Eugene; the Oak Hill, Fir Butte, Larsen, and North and South Taylor parcels and the Long Tom (ACEC) lie outside the Urban Growth. All land within the planning area lies in the Long Tom River Basin (see Map 1).

1.2 PURPOSE AND NEED

Management of BLM's parcels in the WEW has not always provided for a comprehensive and long-term strategy to meet the wetlands goals and values as expressed in the WEWP (1992). Several parcels have gone through the City of Eugene's mitigation bank process and need maintenance treatments to ensure the long-term success of the City's mitigation efforts.

Other parcels acquired by BLM, such as Hansen and Oak Hill, have not been part of the mitigation bank process.

This planning effort will provide a long-term (10 year) integrated treatment schedule for BLM lands within the WEW that will contribute to attainment of the following objectives embodied in the larger WEWP (1992):

- Protect and enhance water quality, wildlife habitat, flood storage, sediment and toxicant removal and other wetland functions and values.
- Protect high quality examples of each important type of wetland plant community currently existing in West Eugene: native Willamette prairie grassland, ash forest, cattail marsh, shrub/scrub, and open water.
- Protect and expand current populations and habitat of rare plants and animals that currently exist in West Eugene.
- Protect an interconnected system of wetlands within a sustainable, ecologically-sound system, with a high likelihood of long-term survival.
- Conserve and enhance wetland functions and values through operations, maintenance, and monitoring practices.

This schedule will also provide for the long-term management of the Long Tom ACEC consistent with the Eugene District RMP, ROD (1995).

This planning effort will determine whether prescribed fire should play a role in managing vegetation in remnant prairies, and will schedule hazardous fuels management treatments within the WEW/City wildland-urban interface (WUI).

1.3 CONFORMANCE WITH LAND USE PLAN

The BLM, Eugene District, adopted the WEWP as the land management plan for those BLM lands within the WEW Project on March 23, 1993. This plan was revised, and BLM adopted the revised WEWP (City of Eugene, 2000) on September 17, 2001. For actions within the WEW, the alternatives are consistent with the adopted plan. For actions within the Long Tom Area ACEC, the alternatives are in conformance with the BLM, Eugene District RMP, ROD (1995) as amended. This EA is in conformance with these planning documents.

Management actions proposed under this EA would be accomplished in a manner that is consistent with the WEW Recreation, Access, and Environmental Education Plan (2001) which provided an integrated, consistent management approach for both public and partnership land holdings to achieve wetland and prairie restoration goals, while providing an avenue for both increased outdoor education and recreation needs. This recreation, access, and environmental education planning effort included consultation with the City of Eugene and Lane Council of Governments.

Additional site-specific information is available in the WEW Schedule EA project analysis file. This file and the above referenced documents are available for review at the Eugene District Office.

1.4 RELATIONSHIP TO STATUTES, REGULATIONS, OR OTHER PLANS

For those BLM parcels with existing and in-progress Mitigation Improvement Plans (MIPs), the management actions within the alternatives addressed within this EA would not be implemented until the MIP projects have been completed, mitigation credits approved, and the City of Eugene has been released from financial liability by the U.S. Army Corps of Engineers and Oregon Department of State Lands. These parcels are listed in Table 1.

For parcels where MIP's have been developed, but NEPA analysis has not been completed, this document does not address the effects of MIP implementation. Existing MIP's without NEPA analysis and any new MIP's will need to undergo additional NEPA analysis before they proceed.

Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing, fire suppression) would continue to occur regardless of the alternative selected.

The outcome of the proposed West Eugene Parkway is unknown at this time. Projects stemming from this EA that are in the footprint of the proposed parkway would not be implemented until the future of the parkway is determined. However, in the interim, rare plant sites within the footprint of the proposed parkway would be maintained as described in Alternative C, Class 1 (see Section 4.3).

2.0 ISSUES SELECTED FOR ANALYSIS

The issues for analysis were developed based on interdisciplinary team discussion. The issues are summarized below and serve to focus the analysis and comparison of alternatives.

2.1 ISSUE 1: *How would management actions affect existing and potential habitat of prairie-dependent Federally Threatened or Endangered, Special Status, or State Threatened botanical species?*

Prairie-dependent rare plants depend on disturbance to maintain both their habitat and population levels. If existing or potential habitat is left undisturbed, natural succession would eventually cause this habitat to decline or disappear. Analyzing this issue allows comparison of the amount of habitat that would be available for prairie-dependent species under each alternative.

Measures:

(1) *Acres of habitat treated with rare plants present.*

(2) *Acres of habitat treated adjacent to rare plant populations.*

(3) *Acres of habitat treated to improve connectivity between populations.*

2.2 ISSUE 2: *What are the effects of management on plant communities?*

The dominant plant communities in West Eugene are wet prairie, upland prairie, and oak communities. With less than one percent of these communities remaining over their historic range, the pattern of management, or lack of management, will have an impact on their long-term survival. BLM has the opportunity to choose from a diverse array of implementation strategies. Each strategy will have potential positive and negative effects on the plant communities.

Measures:

(1) *Acres of low, medium, high, and excellent habitat quality as determined by two factors: native plant diversity and plant community structure.*

2.3 ISSUE 3: *What are the effects of management actions on existing and potential habitat for the Fender's blue butterfly?*

Fender's blue butterfly is Federally-listed as Endangered. Several populations of this butterfly occur within the WEW area. Design and timing of management treatments, such as prescribed fire and mowing, have the potential to either enhance or adversely affect populations of this butterfly and its host plant, Kincaid's lupine.

Measures:

(1) *Acres of Fender's blue butterfly habitat (i.e., host plant- Kincaid's lupine) treated.*

(2) *Acres of Fender's blue butterfly habitat (i.e., host plant- Kincaid's lupine) treated adjacent to current populations.*

(3) *Acres of Fender's blue butterfly habitat (i.e., host plant- Kincaid's lupine) treated to improve connectivity between populations.*

2.4 ISSUE 4: *What are the effects of each alternative on the western pond turtle and western meadowlark Special Status wildlife species?*

Design and timing of management actions have the potential to enhance or degrade habitat conditions for the western pond turtle and the western meadowlark, both of which are BLM

Special Status Species. Identifying how these species would be affected would help determine how well each alternative contributes to achieving goals of the WEW Plan.

Measures:

(1) *Western pond turtle - Number of parcels managed (maintained, enhanced, and expanded).*

(2) *Western meadowlark - Acres of upland prairie, wet prairie, and oak savanna habitat.*

2.5 ISSUE 5: *What is the estimated cost range of implementing actions by alternative?*

A relative measure of cost provides the basis for determining whether or not an alternative is economically feasible. Alternatives may vary in the cost of implementation, and may vary in environmental "benefits" as described by the other issues. Analyzing this issue will provide the information necessary for comparing the benefits and costs among alternatives.

Measure:

(1) *Estimated annual cost by alternative.*

3.0 ISSUES CONSIDERED BUT NOT ANALYZED

3.1 *How would restoration and maintenance activities be affected by a limited number of "air quality days"?*

The number of days when prescribed burning would be allowed due to air quality parameters is beyond BLM control. Other treatments such as mowing can be substituted for burning if burning is not feasible in a given year.

3.2 *What are the effects of prescribed burning on air quality?*

Because of existing air quality permitting procedures, all of the alternatives would meet air quality standards. Thus, there would be no differences between alternatives.

3.3 *How would management actions affect the Long Tom ACEC and its adjacent parcels (North and South Taylor)?*

Environmental effects to the values for which the Long Tom ACEC was designated are addressed throughout the other issues. Determining whether or not an area would qualify for ACEC designation is done at the Resource Management Plan level, and thus, is beyond the scope of this document.

3.4 *What are the effects of management actions on habitat for the great copper butterfly in the WEW?*

The great copper butterfly was recently discovered in the WEW, after years of being considered extirpated from the area. Little is known about the habitat needs of this species. The species' host and nectar plants are known; however, the habitat quality that the species needs in order to maintain a viable population is unknown. Thus, analysis of this issue would be highly speculative. However, to ensure that BLM's management actions in the WEW do not adversely affect the butterfly, a design feature has been included in each alternative that would require nectar plant seed to be contained in appropriate seed mixes used in restoration efforts.

3.5 *How would management actions affect soil productivity?*

Many actions analyzed in the EA, such as tilling/disking, prescribed burning, and mowing have the potential for affecting soil productivity. However, design features have been included in each alternative to ensure that BLM's management actions in the planning area mitigate adverse effects to soil productivity during restoration efforts.

3.6 *How would management actions affect water quality?*

Restoration treatments can release nitrogen and phosphorus from the soil, which may be capable of reaching stream systems. However, design features have been included in each alternative to ensure that BLM's management actions in the planning area mitigate adverse effects to water quality during restoration efforts.

4.0 ALTERNATIVES

Appendix A provides a detailed description of the objectives/classes and actions for each alternative. Design features common to all action alternatives are shown in Appendix C. A summary of each alternative is provided below.

4.1 ALTERNATIVE A – *No Action* (Map 2)

This alternative would take no management actions to maintain, enhance, or expand any of the habitats found in the planning area. No actions would be taken to contribute to the recovery of any Federally Threatened or Endangered species. Only those actions specifically required by City or County ordinance, or other law or policy would occur, such as weed mowing and fire suppression.

Mowing would occur under the No Action alternative in order to comply with the City of Eugene's nuisance vegetation abatement policy. Mowing would occur on approximately 120 acres, three times per year, between June 15 and September 30, and would include a 50-foot strip along the perimeter of all BLM parcels within the Urban Growth Boundary of the City of Eugene. No mowing would occur on any BLM parcel outside of the UGB.

Approximately 9% of the planning area would be treated under Alternative A.

4.1.1 Acres Summary, Alternative A:

Acres Managed, Alternative A

Managed to Meet City and County Ordinances	120	**9%**
Not Managed	1,120	
Total, Planning Area	**1,340**	

4.2 ALTERNATIVE B – *Minimal Maintenance* (Map 3)

This alternative would maintain existing and in-progress WEW Mitigation Bank projects on BLM lands. In addition, Alternative B would maintain the relevant and important values in the Long Tom ACEC as directed by the Eugene District Resource Management Plan (RMP). Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing and fire suppression) would continue to occur as in Alternative A. Approximately 19% of the planning area would be managed or treated.

Table 1
Existing or In-Progress Mitigation Bank Projects in the Planning Area

Current Site Name	Previous Site Name	MIP Status
Bertelson Nature	Stewart Pond	Completed
Meadowlark Prairie	Larson	In progress
Meadowlark Prairie	Nielson	In progress
Meadowlark Prairie	Turtle Swale	Completed
Oak Hill	North Greenhill	Completed
Willamette Daisy Meadow	Oxbow East	In progress
Willamette Daisy Meadow	Oxbow West	Completed
Swallow Pond	Eastern Gateway	Completed
Tsal Luk wah	Balboa	Completed
Tsal Luk wah	Beaver Run	Completed
Tsal Luk wah	Danebo	Completed
Tsal Luk wah	Isabelle	Completed
Tsal Luk wah	Willow Confluence	Completed

Alternative B would address the following objectives:

Objective 1: Maintain native vegetation cover, diversity, dominance, and structure on completed or in-progress Mitigation Bank project sites (250 acres) in the planning area over the life of this plan. Desired plant communities include emergent, open water, freshwater/riverine, ash swale/riparian, and wet prairie/ vernal pool.

Objective 2: Maintain the relevant and important values in the Long Tom ACEC (8 acres) tufted hairgrass (*Deschampsia caespitosa*) wet prairie community and its associated rare plant species; and Oregon white oak/Oregon ash (*Quercus garryana/Fraxinus latifolia*) woodlands as directed by the Eugene District RMP (1995).

4.2.1 Vegetation Treatments

Actions to control woody vegetation encroachment and invasive species, reduce litter/thatch, and maintain existing levels of native plant species cover would occur to achieve both objectives above. Project implementation would be ranked and scheduled across the acreage and habitats within the Mitigation Bank project and ACEC, based on site conditions identified through monitoring, available funding, and other management guidelines. Livestock grazing would not be used as a management tool to control woody vegetation encroachment and invasive species removal under this alternative.

There are 40 acres of introduced and remnant rare plant populations within the Mitigation Bank project sites on BLM lands. However, these rare plant populations would not be the primary focus of management under Alternative B.

No upland habitat would be treated under this alternative. Therefore, no habitat for Kincaid's lupine or meadow checkermallow would be maintained.

4.2.2 Fender's Blue Butterfly Treatments

No management actions to specifically improve Fender's blue butterfly habitat would occur under this alternative.

4.2.3 Acres Summary, Alternative B:

Acres of Habitat by Objective, Alternative B

Objective 1 – Existing Habitat Managed	250	
Objective 2 – ACEC Habitat Managed	8	
Total Managed	**258**	**19%**
Not Managed	1,082	
Total, Planning Area	1,340	

4.3 ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion (Map 4)*

Alternative C is designed to protect and enhance the habitats of selected Special Status Species. Alternative C manages or treats approximately 810 acres (60 percent) of the planning area.

Botanical Special Status Species managed under this alternative include vascular plant species with a Federal Threatened or Endangered (T & E) designation, a BLM status of Bureau Sensitive (BS), or a State designation of Threatened, and include the following:

- Willamette daisy (*Erigeron decumbens var. decumbens*) Federally Endangered
- Bradshaw's lomatium (*Lomatium bradshawii*) Federally Endangered
- Kincaid's lupine (*Lupinus sulphureus* ssp*. kincaidii*) Federally Threatened
- Shaggy horkelia (*Horkelia congesta* ssp*. congesta*) Bureau Sensitive
- Meadow checkermallow (*Sidalcea campestris*) Bureau Sensitive
- Thin-leaved peavine (*Lathyrus holochlorus*) Bureau Sensitive
- Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*) Bureau Sensitive
- White-topped aster (*Aster curtus*) State Threatened

Wildlife Special Status Species managed under Alternative C include the following:

- Fender's blue butterfly (*Icaricia icarioides fenderi*) Federally Endangered
- Western pond turtle (*Clemmys marmorata*) Bureau Sensitive

Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing and fire suppression) would continue to occur as in Alternative A.

Alternative C would include two Treatment Categories: Vegetation and Western Pond Turtle Habitat. Each category includes three classes of actions. Actions in Class 1 would generally be implemented first, proceeding to actions in Class 2, and then Class 3.

4.3.1 Vegetation Treatments

Vegetation treatments would occur on approximately 810 acres under Alternative C.

Plant communities treated under this alternative include freshwater/riverine, open water, emergent, wet prairie/vernal pool, upland prairie, ash swale/riparian, and oak community habitat in oak woodlands and oak savanna. This alternative would treat ~~a~~ 55 acres of oak community habitat.

Vegetation treatments would control woody vegetation encroachment and invasive species; reduce litter/thatch; and maintain, enhance, and increase native plant cover to achieve the three classes of actions described below:

Class 1: *Maintain* 165 acres habitat with remnant populations of rare plants, Fender's blue butterfly, and western pond turtle.

Class 2: *Enhance* 255 acres of habitat adjacent to remnant populations of rare plants and Fender's blue butterfly.

Class 3: *Connect, create, and expand* habitat for rare plants and Fender's blue butterfly on 390 acres by treating habitat where rare species may colonize.

Implementation of treatments within these classes would be ranked and scheduled across the acreage and habitats, based on site conditions identified through monitoring, available funding, and other management guidelines specified in Appendix A. Vegetation treatment techniques to be used are listed in Table C-1 of Appendix A.

4.3.2 Western Pond Turtle Habitat Treatments

Class 1: *Maintain* suitable habitat conditions for western pond turtles on up to 9 parcels by treating woody vegetation encroachment, invasive weeds, and

other vegetation in nesting and rearing habitats and travel corridors using vegetative treatment techniques listed in Table C-1 of Appendix A.

Class 2: *Create or improve* nesting and rearing habitats for western pond turtles on up to 8 of the 9 parcels using vegetative and western pond turtle treatments listed in Table C-1 of Appendix A.

Class 3: *Create or improve* nesting and rearing habitats for western pond turtle on up to 2 parcels not presently occupied by western pond turtles to expand habitat. Treatments could include vegetative treatments and western pond turtle treatments listed in Table C-1 of Appendix A.

Implementation of western pond turtle habitat treatments (including vegetation treatments) within these classes would be ranked and scheduled across the acreage and habitats, based on site conditions identified through monitoring, available funding, and other management guidelines specified in Appendix A.

4.3.3 Summary Tables Alternative C

Acres Habitat managed by Class, Alternative C

Class 1 – Existing Habitat	165	
Class 2 – Adjacent Habitat	255	
Class 3 – Connectivity Habitat	390	
Total Managed	**810**	**60%**
Not Managed	530	
Total, Planning Area	1,340	

Acres Fender's blue butterfly habitat by Class, Alternative C

Class 1	20
Class 2	15
Class 3	75
Total Managed	**110**

Number Western Pond Turtle Parcels managed, Alternative C

Class 1	≤ 9
Class 2	≤ 8 of 9
Class 3	≤2

4.4 ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion (Map 5)*

This alternative is designed to maintain, enhance, and expand the amount of high and medium quality habitat of each of the eight predominant habitat types delineated in the planning area. Within this alternative, sites would be ranked based on site quality characteristics including:

(1) the presence of rare plants, Fender's blue butterfly, and western pond turtles
(2) the diversity of native plants present on the site
(3) the size of the site and habitat block

(4) the site's importance in maintaining the habitat connectivity of the wetlands

Once ranked, each site would be designated as high, medium, or low quality. Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing and fire suppression) would continue to occur as in Alternative A.

Alternative D would manage or treat 1,340 acres (100%) of the planning area.

Similar to Alternative C, Alternative D would include two treatment categories: Vegetation and Western Pond Turtle Habitat. Each category includes three classes of actions. Actions in Class 1 would generally be implemented first, proceeding to actions in Class 2, and then Class 3.

4.4.1 Vegetation Treatments

Vegetation treatments would occur on approximately 1,340 acres.

Desired plant communities include freshwater/riverine, open water, emergent, wet prairie/vernal pool, upland prairie, ash swale/riparian, and oak community habitat in oak woodlands and oak savanna. This alternative would treat more oak woodland and oak savanna habitat (150 acres) than Alternative C.

Vegetation treatments would control woody vegetation encroachment and invasive species; reduce litter/thatch, and maintain, enhance, and increase native plant cover to achieve the three classes of actions described below:

Class 1: Treat 500 acres of the highest quality examples of each desired plant community type, such that there would be no net loss of the highest quality communities over the life of this plan.

Class 2: Treat 420 acres of high and medium quality habitat adjacent to the highest quality communities of each desired plant community type over the life of this plan.

Class 3: Treat 420 acres of low quality habitat to increase the amount of medium and high quality habitat.

Implementation of treatments within these classes would be ranked and scheduled across the acreage and habitats, based on site conditions identified through monitoring, available funding, and other management guidelines specified in Appendix A. Vegetation treatment techniques to be used are listed in Table C-1 of Appendix A.

4.4.2 Western Pond Turtle Habitat Treatments

Class 1: Maintain suitable habitat conditions for western pond turtles on up to 9 parcels by treating woody vegetation encroachment, invasive weeds, and other vegetation in nesting and rearing habitats and travel corridors using vegetative treatment techniques listed in Table C-1 of Appendix A.

Class 2: Create or improve nesting and rearing habitats for western pond turtles on up to 8 of the 9 parcels using vegetative and western pond turtle treatment techniques listed in Table C-1 of Appendix A.

Class 3: Create or improve nesting and rearing habitats for western pond turtle on up to 2 parcels not presently occupied by western pond turtles to expand habitat. Treatments could include vegetative treatments and western pond turtle habitat treatments listed in Table C-1 of Appendix A.

Implementation of western pond turtle habitat treatments (including vegetation treatments) within these classes would be ranked and scheduled across the acreage and habitats, based on site conditions identified through monitoring, available funding, and other management guidelines specified in Appendix A.

4.4.3 Summary Tables Alternative D

Acres Habitat Managed by Class, Alternative D

Class 1 – Existing Habitat	500	
Class 2 – Adjacent Habitat	420	
Class 3 – Connectivity Habitat	420	
Total Managed	**1,340**	**100%**
Not Managed	0	
Total, Planning Area	1,340	

Acres Fender's blue butterfly habitat (Occupied and Unocuppied) by Class, Alternative D

Class 1	20
Class 2	15
Class 3	85
Total Managed	**120**

Number Western Pond Turtle Parcels managed, Alternative D

Class 1	≤ 9
Class 2	≤ 8 of 9
Class 3	≤2

5.0 EXISTING CONDITIONS

This section describes the existing environment that may be influenced or affected by proposed management activities and the No Action alternative. This information forms the baseline for measuring changes and comparing the alternatives.

5.1 GEOLOGY

The WEW ranges from 330 to 580 feet above Mean Sea Level. Underlying the WEW is the Spencer Formation (Ts) and the Eugene/Fisher Formation (Tfe). The Spencer Formation is derived from an ancestral Coast Range sedimentary rock, while the Eugene/Fisher is derived from Cascade volcanism. These two Formations outcrop along Amazon Creek in West Eugene (Madin and Murray 2004).

The thick surficial clay soil unit of the West Eugene Wetlands has been tied to the eruption of Mount Mazama (James and Baitis, 2003), approximately 7,700 years ago. The grey clay is present at approximately 4 to 18 inches below the topsoil. It is this clay that creates the wetlands in the Willamette Valley. The clay, approximately two feet thick, becomes saturated in winter, and water pools at the interface of the clay and the topsoil, creating the hydrology needed for wetlands. Adjacent hillslope soil profiles contain the same Mazama mineralogy, but have developed into well-drained silty clays.

5.2 SOILS

5.2.1 Valley Soils

Obvious landforms on the valley floor have been leveled by a hundred years of farming; however, the typical prairie wetland predominates the area. Based on radiocarbon dating, the surficial soil developed over a thousand year period is very shallow in depth and is mollic (James and Baitis, 2003). The upper soil is at a depth of 4 to 18 inches; below is the massive grey clay that is typically found in the Willamette Valley.

Soils in the area have been impacted from logging, grazing, agriculture and urbanization. Some areas have microtopography that is uneven and humpy with polygonal blocky peds rising as much as four inches above the surrounding surface. These areas have extremely shallow topsoil, and the grey clay is close to the surface. This kind of microtopography has been studied in Western Oregon and other regions of the Western United States, where it is the result of ground disturbance from animals (Huddleston, pers. comm. 2003). Air photos corroborate grazing occurred on much of the WEW. Larger mounds are vegetated and populated with anthills as tall as 18 inches. The patterned ground appears symmetrical, similar to polygonal cracking. These areas are associated with the grey clay unit, which, when near the soil surface, is greatly influenced by cycles of seasonal wet and dry periods. As it dries, it shrinks and cracks, allowing upper siltier soil and organics to fall into the cracks. This is repeated at each successive rainfall, and the crevices fill with surface soil. As continuous rains saturate the clay, the crevices expand, and the cracks cannot close because of the surplus materials that have fallen into them, producing a slickenslide. The result is that the polygonal crack (soil ped) is compelled to bulge upwards, creating the humpy surface.

Soil series mapped by the Soil Conservation Service (SCS) on the valley floor include Dayton and Natroy. Wetland soils have high clay content, and these soils are easily compacted. The Dayton soil has a clay content of 15-30 percent in the upper 19 inches, and the Natroy has a clay content of 30-40 percent in the upper 5 inches (SCS, 1987).

The Dayton soil has a shallow A horizon. It is found throughout the Willamette Valley and is described similarly throughout Lane, Linn, Marion, Polk and Yamhill Counties (SCS, 1972; SCS, 1974; SCS, 1982; SCS, 1987; SCS, 1987). In Lane County, the Dayton series is associated with the Awbrig, Bashaw, Conser, Courtney, Holcomb, Linslaw, Natroy, Noti and Pengra soils. The SCS soil surveys state that the Dayton series is "deep, poorly drained" in drainageways on broad stream terraces; however, all the SCS surveys describe soil development as only 13 to 16 inches deep with grey clay subsoil.

The Natroy soil is mapped along the floodplains of tributaries flowing from Spencer Butte in areas prone to erosion and deposition. The Natroy soil has an A horizon typically 24 inches deep. It is described as "deep, poorly drained", located on terraces and fans; however, the SCS soil description indicates that the C horizon (a dark clay) immediately follows the A horizon at 24 inches, indicating that that soil development is not very deep.

Soil borings and trenches were dug across the West Eugene Wetlands to verify soils information. The sediments in the West Eugene area extend as deep as 144 inches, and variations in particle size occur across the wetland area. In some areas, substrates have high clay contents down to bedrock with the summertime water table at approximately 120 inches. In other areas, the relict Willamette River channels have deposited cobbles, gravels and sand, which are found in the substrates. Historic excavation of gravel from borrow pits below the water table has provided seasonally ponded areas and habitat for wetland plants and wildlife in these substrates with little effect to adjacent wetlands.

5.2.2 Hillslopes

Across the hillslopes of West Eugene, the upper two feet of soils contain the same mineralogy of that in the grey clay found in the valley floor. However, because of better drainage, the soils have weathered into something very different than those found on the valley floor. Soils that may be mapped include Bellpine, Hazelair, Nekia, Pengra, and Willakenzie, but are not limited to these. The soils tend toward being well drained, moderately deep, sometimes shallow, silty clays or clay loams formed on low slopes. At a depth of between two and three feet, an older paleosol containing weathered minerals from the substrate below is present.

5.3 HYDROLOGY

Hydrology in the WEW is complex. Many seeps and springs are in the headwaters of low-sloped streams. Because of the geologic bedding plains dipping eastward, some of the hillslopes have flats that receive water from water stored in the fractures of the rocks beneath the gently sloping hills. There are several hydrologic regimes present at different times of the year.

During summer, the regional water table is at approximately ten feet. Heavy clays maintain moisture throughout the season. Mapped groundwater contours show a trough, indicating recharge into Amazon Creek (Frank, 1973). During winter rains and high flows, groundwater intersects with the surfaces and occasionally flows over the banks of Amazon Creek. It is unknown how the regulation of the Fern Ridge Reservoir water table is reflected in the hydrologic regimes as the release and capture of water moderates upstream flows throughout the year.

The grey clay that is prevalent on the valley floor becomes an impervious layer once it has become saturated and swells. Water storage occurs along this saturation zone, and it is the captured water at the interface of the grey clay and the surface soil, which creates the wetlands. Precipitation maintains standing surface water levels throughout the winter as the

upper soil unit becomes saturated. Shallow layers of topsoil are barriers to evaporation and maintain longer water storage in the prairie wetlands.

In late summer, when the grey clay dries out, it shrinks and cracks. Some of the cracks have been observed to be two inches in width extending through the thickness of the grey clay. As first rains in the fall begin, the water runs through these underground cracks in a crisscrossing of piping. Where the cracks intersect with stream banks, sloughing of the bank may occur. With time, the water percolates into the ground, and is stored in cracks, fissures and pores, until the grey clay becomes saturated and swells, and evidence of all cracks disappears.

A relict Willamette River channel is present in the eastern and northern extents of the WEW. The channel is filled with gravels, cobbles and overbank deposits, leaving a barely visible change in surface elevation and relict channel landforms. Hydrology is different along the relict channel than in the western part of the Wetlands. This area is part of the Springfield fan, an alluvial fan created from the Willamette and McKenzie Rivers in prehistoric times. The movement of groundwater through coarser substrates is much faster than in the finer clay substrates that occur further south on the valley floor.

5.4 HISTORIC HYDROLOGY

Over the past century, there have been many alterations to hydrology in West Eugene. In 1852 the western part of the Valley was “inundated from 1 to 3 feet deep by the Willamette River” at high water (GLO, 1852). Urbanization and channelization of the Willamette River have removed the mechanism of overbank flooding and deposition of alluvium at the West Eugene Wetlands. Remnants of the old Willamette River channel are present as channel lag deposits along Bertlesen and Teal Sloughs, and gravel pits were common in this vicinity.

Air photos of West Eugene in 1936, 1952, 1968, and 1977 illustrate the succession of change during the twentieth century. By 1936, the area had experienced the construction of a railroad, agricultural plowing, and leveling of the fields; and Willow Creek passed through the Oxbow West parcel. By 1952, Dead Cow Creek had been straightened, and levees had been placed on each side. By 1968, Amazon Creek occupied the Willow Creek Channel through the Oxbow West parcel. Amazon Creek had been straightened, and levees had been placed on both banks.

The channelization of Amazon Creek has altered the timing and duration of inundation of the prairies in the WEW. Historic maps illustrate that Amazon Creek did not have a single channel and seasonally took advantage of topographic lows. The 1852 GLO Map and a 1911 City of Eugene Engineers Map display the multiple-channel drainage pattern that existed in the southwestern part of the valley during those times. In the 1850s, Amazon Creek was mapped along a three-mile reach between today’s Lane County Fairgrounds to the lower end of Bertelsen Slough. Across West Eugene, no creek channels were mapped; including Willow Creek. Photographs from the 1940s illustrate that Amazon Creek was a relatively shallow channel that flooded across the Western Valley into multiple braids. In the 1950s, Amazon Creek was excavated for flood control to bedrock at a depth of ten to twelve feet, and its channel course was forced to flow along the southern foothills. Tributary streams to Amazon Creek lost their connectivity to the land surface when they were routed into storm sewer drains and pipes which flowed into Amazon Creek.

Channeling of Amazon Creek included the construction of a diversion channel designed to divert floodwaters from the creek into Fern Ridge Dam. The construction of the dam altered the timing and duration of water table levels in Amazon Creek. Currently, the Army Corps of Engineers regulates the water level at Fern Ridge Reservoir, influencing the level of flows within the diversion channel. During the summer, when the Fern Ridge Reservoir is full, the diversion channel has flows that visibly back-up with the increased water level behind the

dam. In the winter, the dam is open, allowing all water to flow as quickly as possible through the urbanized areas.

5.5 ECOLOGY

Plant communities of the Willamette Valley have changed over time in response to changes in landscape and climate. In addition to climatic and geologic influences, plant communities in the Willamette Valley have changed in response to disturbance processes (Pendergrass et al. 1995). Plant communities in the Willamette Valley, including wet and upland prairies and oak savannas and woodlands, were maintained through frequent natural and anthropogenic fires.

Fire suppression has led to natural succession of these communities with, increased cover by shrubs and trees in prairie communities, and denser canopies, including an increased number of conifers in oak habitats. Succession changes the structure of the plant community by shading species that are dependent upon more open conditions.

5.5.1 Anthropogenic Disturbance of Plant Communities:

Kalapuya Indian Use of Fire and Its Exclusion

In the Willamette Valley, the Kalapuya Indians used fire to help maintain open prairie habitats. These habitats supported a variety of wild food plants they relied upon for their subsistence, such as the camas lily and tarweed. Fire was also used as a tool to facilitate food gathering of acorns, nuts, seeds, roots, and insects, and to facilitate hunting of game animals. Prairie fires were extensive throughout the Willamette Valley at the time of European settlement. Journal accounts indicate that the Kalapuyas ignited fires from late summer into early fall on a regular, almost yearly basis.

With increased pressure from settlers to control fire and the extirpation of Kalapuyans through disease and displacement, inadvertent fire exclusion in the Valley generally began in the late 1840's and has largely continued to the present. Fire exclusion has resulted in encroachment of woodlands and forests into former prairies. However, heavy grazing has stemmed woody growth in places (Pendergrass et al. 1995).

European Settlement and Farming

Large-scale European settlement of the Willamette Valley progressed swiftly in the 1840's and 1850's. With settlement, many prairie plant communities were replaced with agricultural crops. Prairies not farmed and cropped were often heavily grazed by various livestock. Prairies were maintained in some places by continued use of fire by settlers and by grazing. Hill lands not heavily grazed were often planted to fruit orchards (Pendergrass et al. 1995).

Species composition of Willamette Valley prairies has been altered by both accidental and deliberate introduction of exotic species. Some of these exotic species have become naturalized in the Willamette Valley and were introduced as orchard, food-crop, hedgerow and ornamental plants. Other exotics were introduced in association with livestock, imported seed mixes, and other means (Pendergrass et al. 1995).

5.5.2 Habitat Fragmentation

The most notable change in West Eugene has been fragmentation of the landscape over the past 150 years. Roads, houses, industry and other developments have resulted in a discontinuous landscape with patches of habitat separated by human developments. Fragmentation affects different ecological processes at different scales. For example, research indicates that Fender's blue butterflies travel up to ¼ mile between Kincaid lupine sites. Similarly, western pond turtles may move up to ½ mile upland in search of nesting sites. Roads, houses, and other structures serve as

barriers to these types of movement and may prevent different West Eugene sites from providing habitat at larger scales.

One of the largest contiguous landscapes is the Meadowlark Prairie-Oak Hill-Dragonfly Bend-Willamette Daisy Meadow complex. While there are several roads and a railway bisecting this area, there is still adequate connectivity among these areas for some ecological functions, such as plant and animal migration (although with considerable mortality). However, other functions, such as hydrology, have been segmented by the roads.

5.5.3 Biodiversity

Plant and animal communities in West Eugene are unique globally. There are records of over 425 plant species, 203 species of birds, 12 species of reptiles/amphibians, 17 mammal species, 49 butterfly species, and 24 dragonfly species.

Fungi, bryophytes, microflora and fauna, and most invertebrates are not well documented in West Eugene.

5.6 BOTANY

5.6.1 Rare Vascular Plants: Threatened or Endangered and Special Status Species

Appendix D, Table D-1 lists all rare and uncommon vascular plant species which have been documented in the planning area, including eight rare Federally-listed and BLM or State Special Status Species. Appendix D, Table D-2 describes the habitat of the eight rare species, their status in the planning area, and threats to their survival.

Federally Listed Species within the planning area include the Federally-listed Threatened Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), and the Federally-listed Endangered Willamette daisy (*Erigeron decumbens var. decumbens*) and Bradshaw's lomatium (*Lomatium bradshawii*). Portions of the planning area are considered "essential habitat" for the Kincaid's Lupine and Willamette daisy. Essential habitat is defined in BLM Manual 6840 as habitat that is essential for the survival and recovery of listed species.

Special Status Species include the State-listed Threatened white-top aster (*Aster curtus*), and BLM Bureau Sensitive species shaggy horkelia (*Horkelia congesta* ssp. *congesta*), thin-leaved peavine (*Lathyrus holochlorus*), meadow checkermallow (*Sidalcea campestris*), and Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*).

5.6.2 Invasive Plants and Noxious Weeds

There are dozens of invasive species in West Eugene that were not apart of the landscape 150 years ago. These species alter plant and wildlife communities, soil chemistry, water quality, and other ecosystem functions. For example, some invasive species seem to thrive when burned. Restoring historic fire frequencies and intensities may not lead to restoration of historic plant communities. Similarly, many invasive species seem well suited to existing and historic hydrologic conditions. Restoring hydrologic processes may not lead to restoration of historic plant communities.

For ease of discussion, invasive species are divided into three categories: 1) noxious weeds (Oregon Department of Agriculture (ODA) Weed List, with list rating), 2) native invasive plants, and 3) non-native invasive plants.

Noxious weeds present in the WEW include false brome (*Brachypodium sylvaticum*), meadow knapweed (*Centaurea pratensis*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulagre*), Scotch broom (*Cytisus scoparius*), common St. Johnswort (*Hypericum perforatum*), Himalayan blackberry (*Rubus discolor*), English ivy (*Hedera helix*), and tansy ragwort (*Senecio jacobaea)*.

Invasive non-native and native plants that represent special challenges in the planning area include Harding grass (*Phalaris aquatica*), reed canarygrass (*Phalaris arundinacaea*), pennyroyal (*Mentha pulegium*), smooth cat's ear (*Hypocharis radicata*), common teasel (*Dipsacus fullonum*), and hairy hawkbit (*Leontodon taraxacoides*). All can degrade prairie habitats by forming dense monocultures and reducing biological diversity.

Weeds that represent the greatest threat to native plant communities in the WEW are the non-native invasive plants of Harding grass, reed canarygrass, and pennyroyal. Harding grass invades wet and upland prairie communities and is spreading quickly along the upper slope of the Amazon channel. Sites with active invasions include Nolan, Beaver Run, and Eastern Gateway. Reed canarygrass occupies emergent areas. Sites with large monocultural patches include Bertelsen Nature Park (Stewart Pond, Teal Slough, Grimes Pond), Oxbow West, Spectra Physics, and Vinci. Pennyroyal invades mainly vernal pool habitats, but also colonizes emergent and wet prairie communities. This weed is present, in varying degrees of severity, on almost all lands.

A number of other invasive non-native and native plants are found on some sites within the planning area. Their presence varies from dense monocultures on some sites to scattered populations on others. Cut-leaf geranium (*Geranium dissectum*), common velvetgrass (*Holcus lanatus*), creeping bentgrass (*Agrostis stolonifera/capillaries*), brome fescue (*Vulpia bromoides*), tall meadow fescue (*Festuca arundinacea*), spatulaleaf loosestrife (*Lythrum portula*), and meadow foxtail (*Alopecurus pratensis*) dominate a small subset of properties.

Native tree and shrub species that invade prairie and savanna in the absence of fire include Nootka rose (*Rosa nutkana*), Oregon ash (*Fraxinus latifolia*), Douglas-fir (*Pseudotsuga menziesii*), Suksdorf's hawthorn (*Crataegus suksdorfii*), Oregon crabapple (*Malus fusca*), and cascara (*Rhamnus purshiana*).

Non-native species that establish in prairies in the absence of fire or other disturbance include paradise apple (*Malus x domestica*), one seed hawthorn (*Crataegus monogyna*), hybrid hawthorn (*Crataegus monogyna x suksdorfii*), and Himalayan blackberry (*Rubus discolor*).

5.6.3 Plant Communities, Rare or Unique Sites

The planning area contains three endangered plant communities: Willamette Valley wet prairie, upland prairie, and oak savanna. Less than 1% of the historic area remains of these plant communities (Alverson 1993). Typically, oak savanna is roughly equivalent in species composition to upland prairie, except there are one to two Oregon white oak (*Quercus garryana*) trees per acre. California black oak (*Quercus kelloggii*) is also present to some extent in oak savanna in the southern Willamette Valley. Due to the lack of fire, most oak savanna habitat in the WEW is now oak/conifer mixed woodland. These three community types cover the majority of the land area in West Eugene; however, other communities present include freshwater/riverine, open water, emergent, vernal pool, ash swale/riparian, and Douglas-fir forest.

5.6.4 Plant Community Descriptions (Map 6)

Sites listed below with an asterisk (*) are or have been Mitigation Bank enhancement or restoration projects.

Freshwater/Riverine (< 5 acres)

Freshwater/Riverine habitats include the channel and riparian areas of streams. In West Eugene, most of the stream channels are perennial (either naturally or artificially). The associated plant community consists of herbaceous species, including rushes and sedges; and trees and shrubs, including cottonwood, ash, and willow species. Streams that flow through the WEW include the Amazon (both the A and A-3 Channels), Willow Creek, Dead Cow Creek, and Coyote Creek.

Open water (20 acres)

Open water habitats are ponds that contain water year round. This community type does not include habitats with fluvial year-round water. In the WEW, the edges of the ponds support a variety of trees, shrubs, and snags. There are very few sites with open water habitats within the WEW that are not connected to streams and rivers; however, Grimes Pond* is an example of open water not connected to a stream.

Emergent Wetlands (145 acres)

The emergent wetlands present in the WEW are deep (approximately 8 to 36 inches deep at full pool), yet ephemeral, wetlands, which fill annually from precipitation or runoff and become completely dry by late summer. The inundation period for emergent areas lasts from approximately October through mid- to late July. These areas support plant communities dominated by perennial rushes, and sedges. Some annual forbs are also present. Emergent habitats are present on many sites in West Eugene. Some examples are Balboa Phase 2*, Stewart Pond*, and Danebo*.

Wet Prairie/Vernal Pool (720 acres)

For the purposes of discussion in this EA, the Vernal Pool plant community is included with the Wet Prairie plant community because the two intergrade. Vernal pools are shallow (approximately 1 to 8 inches deep at full pool) ephemeral wetlands, which fill annually from precipitation or runoff and become completely dry by early summer. Inundation stretches from mid October through late May or early June in the vernal pools of West Eugene. These areas contain perennial grasses, sedges, and rushes. Few perennial forbs are present in vernal pool areas. The majority of species within vernal pools are annual forbs. In Mitigation Bank Project areas, vernal pool habitats are often spatially separated and distinct from wet prairie areas; however, in remnant areas, vernal pool and wet prairie intergrade continuously, depending on the development of the microtopographic variation (hummocks).

The Wet Prairie community type is divided into subcategories which are distinguished by the degree of disturbance they have undergone, microtopographic variation, species composition and proportions, presence of rare species, and the typical invasive species present.

High Quality Remnant (HQR) Wet Prairie (270 acres, including some vernal pool)

Some wet prairies are “high quality remnants” (HQR). These communities are on land that has had relatively little high intensity disturbance. They may have had some level of hydrologic alteration, livestock grazing, or hay production, but the disturbance was not sufficient to remove plants that are typically more sensitive to habitat alteration. Hydrologic alteration may include ditching or stream modification that disturbs the flooding regime. Most wet prairies in West Eugene are now solely fed by rain water, rather than a combination of flooding and rainwater. HQR wet prairies differ in many ways from other wet prairies in that they have high species diversity;

however, they are still dominated by perennial grasses, including tufted hairgrass (*Deschampsia caespitosa*) and California oatgrass (*Danthonia californica)*. They also have a larger proportion of forbs to grasses than more disturbed sites. Additionally, they contain medium to large populations of lily family representatives.

HQRs often have some of the largest remaining populations of rare and endangered plant species, such as white-topped aster (*Aster curtus*), Willamette daisy (*Erigeron decumbens* var. *decumbens*), shaggy horkelia (*Horkelia congesta* ssp. *congesta*), Bradshaw's lomatium (*Lomatium bradshawii*), and Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*).

The highly variable microtopography of HQR sites is also notable; the sites are often very hummocky. The top of the hummocks usually harbor tufted hairgrass and other species that grow in dryer microsites, while the spaces between hummocks contain species that require wetter conditions, such as sedges and rushes, or vernal pool annual forbs.

While these communities are in relatively good condition compared to more disturbed sites, they are still vulnerable to exotic species invasions and woody species succession. Good examples of this habitat type include the eastern prairie of Oxbow West (Enhancement)*, Balboa Enhancement*, North Greenhill Ash Grove*, and portions of Vinci.

Low Quality Remnant (LQR) Wet Prairie (120 acres, including some vernal pool)

Like HQR wet prairies, lower quality remnant (LQR) wet prairies, have been subject to livestock grazing, hay production, hydrologic alteration, and the cessation of management with fire. However, these activities may have been applied more intensely or for longer periods of time. These prairies are still dominated by perennial grasses, including tufted hairgrass (*Deschampsia cespitosa*) and California oatgrass (*Danthonia californica*), but there is less California oatgrass. Also, the ratio of forbs to grasses is much lower. There may be a small component of lily family species, but they are not densely spread throughout the site. There may also be populations of other perennial grasses and forbs not often found in mitigation restorations, such as bog saxifrage (*Saxifraga oregana*) and Nevada rush (*Juncus nevadensis* var. *nevadensis*). These sites may have populations of rare species, but they are small and isolated.

LQR sites may or may not have intact pockets of hummocky microtopography, depending on the intensity of past disturbances.

As with HQR prairie, LQR sites are threatened by exotic species and woody species succession. Typical examples of this type of plant community include the central remnant of Turtle Swale, the central and western* prairie at Oxbow West, Isabelle*, and the southwestern portion of Balboa.

Wet Prairie Mitigation Bank Restoration (250 acres)

Wet prairie restorations done by the mitigation bank vary greatly in their quality. These sites were highly disturbed by tilling/farming or filling before restoration. Most had several feet of fill over the wetland or had been converted to grass crops such as annual rye. Mitigated wetlands usually have lower species diversity than HQR prairies but are often much more diverse than LQR prairies. They continue to be dominated by tufted hairgrass (*Deschampsia cespitosa*), but like LQR sites, there is less California oatgrass (*Danthonia californica*) than on HQR sites and, depending on the site, a lower proportion of forbs to grasses. There are also very few and often small populations of lily family representatives.

Some of the sites have introduced populations (planted or seeded) of rare species, such as white-topped aster (*Aster curtus*), Willamette daisy (*Erigeron decumbens* var. *decumbens*), shaggy horkelia (*Horkelia congesta* ssp. *congesta*), and Bradshaw's lomatium (*Lomatium bradshawii*).

The highly diverse microtopographic variation present in remnant prairies is almost entirely absent in mitigation restorations, but there is some evidence of this developing over time. The topographic variation that does occur is on a larger scale. Where it occurs over the space of square meters in remnant sites, it is on the scale of tens of square meters in restorations, with emergent areas grading from vernal pool to wet prairie.

All restorations, like the remnant prairie, are subject to woody and exotic species invasion. Examples of mitigation bank sites with rare species include North Greenhill Phase 1 Sod-removal* and Beaver Run Phase 2 (Rosy)*. Mitigation bank sites without rare species include Willow Corner* and Turtle Swale Phase 1*. Lower quality sites include Beaver Run Phase 1* and Isabelle*.

Upland Prairie

High Quality Remnant Upland Prairie (15 acres)

As with wet prairie, these plant communities have undergone a large amount of disturbance, largely from hay production and livestock grazing. Despite these pressures, some remnants harbor significant populations of native grasses and forbs, as well Kincaid's lupine. Many of the grass and forb species present in wet prairies are also major components of upland prairies. Upland prairies also have many species that are unique to the community type. Examples of this plant community type include sites such as Fir Butte and the southern section of Turtle Swale.

Low Quality Remnant Upland Prairie (100 acres)

Disturbances such as agriculture and grazing have been more intense in LQR uplands. These sites have very few populations of rare species and in some cases have been entirely converted to exotic grasses and forbs. Bertelsen Nature Park has an example of this community.

Oak Communities (145 acres)

As with all other community types, oak communities have been subject to varying amounts of livestock grazing and agricultural disturbance (hay production with or without tilling and fertilization). The vast majority of understory species in oak communities are the same as in upland prairies.

Oak Savanna: Some savanna-specific species such as California fescue (*Festuca californica*) and fawn lily (*Erythronium oreganum*). Some experts believe that pre-settlement oak savanna communities had one to two trees per acre, while other put the canopy cover between 5%-30%. The low tree density of oaks results in a stout, broad canopy on each oak tree. While the dominant tree is Oregon white oak (*Quercus garryana*), California black oak (*Quercus kelloggii*) and madrone (*Arbutus menziesii*) are sometimes present as well. Some sections of Taylor South and Hansen exhibit this character.

Oak Woodlands: Oak woodlands have a canopy cover that is greater than 30%. The large amount of variation in canopy cover is likely due to varying fire frequency and intensity. Much of the historic oak savanna community has transitioned to oak woodland due to the prevention of fire. In oak woodland communities, oaks form dense stands of young trees surrounding older trees. The high tree density of oak woodlands results in a thin, tall canopy on each oak tree. The dense stands largely shade out herbaceous plants. Additionally, the absence of fire has allowed for the

invasion of other trees, such as Douglas-fir, to colonize open areas. Whether the result of an altered fire regime or not, California black oak (*Quercus kelloggii*) and madrone (*Arbutus menziesii*) are also occasionally present. Additionally, the increased shade in woodlands results in a more shade-tolerant understory. Portions of Hansen, Taylor North and Taylor South exhibit this characteristic.

Ash Swale/Riparian (170 acres)

In wetter areas where fire has been suppressed, ash swales have developed. These often contain populations of rare species, but the understory is dominated by perennial grasses, sedges, and rushes. The eastern ash swale on Oxbow West* is an example of this habitat type.

Douglas-fir forest (3 acres)

In this upland community, Douglas-fir trees dominate the overstory. The canopy is very dense, but there is a sparse understory composed of a mixture of native and non-native shrubs, herbs, and grasses. In the planning area, this community exists on the Maliner site, a stand of Douglas-fir trees planted by a previous owner.

5.7 WILDLIFE

The eight recognized plant communities within the WEW are habitat for a wide variety of wildlife species, such as waterfowl, shorebirds, raptors, songbirds, reptiles, amphibians, bats, rodents, beaver, deer, raccoon, and fox.

Remnant prairie, oak woodland, and aquatic/riparian habitats within the WEW support native species that are rare or uncommon in the Willamette Valley, such as grasshopper sparrow, Oregon vesper sparrow, yellow-breasted chat, red-legged frog, long-toed salamander, and western gray squirrel. A large diversity of butterflies and dragonflies has been documented in portions of the WEW.

5.7.1 Special Status Wildlife Species

There are 17 Special Status Wildlife Species that occur or have potential to occur in the planning area, including two Federally-listed species, the Fender's blue butterfly (*Icaricia icaricoides fenderi*) and the bald eagle (*Haliaeetus leucocephalus*). Portions of the planning area are considered "essential habitat" for the Fender's blue butterfly and its host plant, Kincaid's lupine. Essential habitat is defined in BLM Manual 6840 as habitat that is essential for the survival and recovery of listed species. Appendix E lists Special Status Wildlife Species known or suspected to occur within the planning area, their current status, habitat associations, and threats.

5.7.2 Threatened and Endangered Species

Fender's Blue Butterfly

The Fender's blue butterfly (*Icaricia icarioides fenderi*) is listed as Endangered under the Federal Endangered Species Act. Its current range is confined to the Willamette Valley of Oregon. It is found exclusively in native prairie habitats containing its larval food plants, primarily Kincaid's lupine (*Lupinus sulphureus* spp. *kincaidii*), but also spur lupine (*L. arbustus*) and occasionally sickle-keeled lupine *(L. albicaulis*). There are currently 16 isolated populations or subpopulations of Fender's blue butterfly on native prairie remnants within the Willamette Valley totaling approximately 457 acres. Of these sites, half are less than five acres in size (Schultz et al. 2003). The long term survival of this species is threatened due to the loss and fragmentation of native prairie to urban development; habitat degradation by encroachment of woody vegetation and invasive weeds; and the vulnerability of small, isolated populations to extirpation from local events.

Two essential components of habitat for the Fender's blue butterfly are larval food plants and adult nectar plants. Within the WEW, Kincaid's lupine is the exclusive larval food plant. Adult Fender's blue butterflies use a variety of flowers as nectar sources, but they exhibit strong preference for a limited number of native nectar plants, such as rose checkermallow (Sidalcea virgata), narrow-leaf wild onion (*Allium amplectans*), and cat's ear (*Calochortus tolmiei*) (Schultz et al. 2003).

Several populations of the Fender's blue butterfly are known to occurwithin the WEW, three of which are in the planning area (Fir Butte, Isabelle, and Oxbow West). At one additional site where Kincaid's lupine was introduced (Turtle Swale), butterfly eggs have been found, but further surveys are needed to confirm the presence of this species. The largest population in the planning area is at Fir Butte (an estimated 446 butterflies in 2004). The largest population in the WEW area occurs on The Nature Conservancy's Willow Creek Preserve (an estimated 1,400 butterflies in 2004) adjacent to BLM-managed land (Luk Wah Prairie). Several other populations exist on private and Federally-owned lands, north of Fern Ridge Reservoir.

Remnant populations of Kincaid's lupine, the preferred host plant, occur on 13 acres in the planning area. Several populations of Kincaid's lupine have also been introduced to the WEW (Isabelle, North Greenhill, Turtle Swale, Hansen) and occupy 2 acres. Fender's blue butterfly populations associated with both remnant and introduced lupine currently occupy 12 acres in the WEW.

A number of sites within the WEW have been identified as potential areas for restoration and possible reintroduction of Kincaid's lupine in order to improve connectivity between existing populations of the lupine and Fender's blue butterfly. Two restoration projects are currently being implemented on land owned by the City of Eugene (Dragonfly Bend) and on adjacent private land that would restore up to 12 acres of Fender's blue butterfly habitat within the next three years. These two restoration projects are expected to increase the probability of long-term persistence of Fender's blue butterfly in the area by providing key stepping stones to improve connectivity between the existing populations at the Willow Creek Reserve to the south and populations at Fir Butte and the north end of Fern Ridge Reservoir.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a Federal-listed Endangered species. The bald eagle has been observed using the plainning area for occasional foraging, but there are no known nests and limited habitat within the planning area.

5.7.3 Other Special Status Wildlife Species

Western Pond Turtle

The western pond turtle (*Clemmys marmorata*) is one of two native turtle species in Oregon. It has been petitioned to be listed as threatened under the federal Endangered Species Act and is on the Sensitive Species List for the BLM and State of Oregon. The population of turtles inhabiting the Willamette Valley is estimated at 1% of the numbers that existed 150 years ago (Holland, 1993b). Holland (1993a.) estimates that less than 1,500 individuals inhabit the valley.

Western pond turtles need the following habitat features to be successful:

1) permanent water bodies with slow moving water for foraging
2) shallow, near-shore water with aquatic vegetation for hatchlings to hide from predators

3) nearby, accessible, undisturbed upland sites with sparse vegetation and south-facing slopes for nests
4) aquatic basking sites for temperature regulation
5) corridors such as streams, rivers, and riparian areas that allow movement between populations.

Habitat within the WEW includes permanent and seasonal ponds, ditches, and channels. Key travel corridors for turtles in the area include Amazon Creek, the Amazon Diversion Channel, A-3 Channel, Dead Cow Creek, Willow Creek, Coyote Creek, and the Long Tom River. Numerous small ditches are also used by turtles to move through the area. No recent surveys have been conducted, and the current number of turtles using the WEW is unknown at this time; however, in 1994, eighteen turtles were documented through surveys and trapping conducted on lands within and adjacent to BLM lands in the WEW (ODOT, 1994).

The WEW is considered a major part of a proposed reserve system (Willamette Ecosystem Reserve Matrix). This reserve system envisions "major and minor nodes" (of turtle populations) linked by corridors allowing for short-term dispersal and eventually long-term gene flow (Holland, 1993b). Fern Ridge Reservoir to the west of the WEW is another key part of this reserve with one of the largest aggregations of western pond turtles remaining in the Willamette drainage. The population at Fern Ridge was estimated to be approximately 200 individuals in 1993 (Beale, pers. comm. 2005). An estimated 100 turtles inhabit Kirk Pond which is connected to one of the WEW parcels (South Taylor) by Coyote Creek.

The western pond turtle population in the Willamette Valley is declining due to alteration and loss of nesting and rearing habitat, predation of hatchlings (primarily by introduced species), and fragmentation of habitat. Spread of non-native invasive plants, such as reed canarygrass (*Phalaris arundinacaea*) and Himalayan blackberry (*Rubus discolor*), have reduced the quantity and quality of pond turtle habitat in many areas. Upland breeding sites are often flooded, irrigated, or choked with vegetation, reducing nesting potential and success. Shallow water habitat, important for foraging and protecting juveniles, has in many areas become invaded with monocultures of reed canarygrass, limiting food resources and dispersal. Microhabitat features, such as basking sites and refugia, have also become limited (ODOT, 1994).

The current habitat conditions at many sites within the WEW are poor for most life stages of western pond turtle. There are few permanent ponds in the planning area. The banks of Amazon Creek, Willow Creek, the A Channel, (old Amazon Creek) and the A-3 Channel within the planning area are relatively steep and extensively vegetated with non-native plants (primarily Himalayan blackberry and agricultural grass species) and small patches of native grasses, forbs and roses. The channel beds are typically choked with reed canarygrass, a non-native, highly invasive plant species. There are limited basking sites, suitable nesting sites, and areas for hatchlings to hide from predators. These factors all limit the current suitability of habitats within the WEW for the western pond turtle.

Western Meadowlark

The western meadowlark (*Sturnella neglecta*) is one of many grassland bird species that has declined in numbers due to the loss of native grassland habitats. The meadowlark is a State Sensitive species and a Bureau Sensitive species within the Willamette Valley in Oregon. The western meadowlark was considered common to abundant in the Northwest at the time of European settlement when large expanses of grassland and savanna were still present. (Suckley and Cooper, 1860; Johnson, 1880; Anthony, 1902). Populations in the Willamette Valley have shown significant

declines since the 1960's. In 1990, breeding populations in the Willamette Valley were estimated at less than 300 pairs (Altman, 1999b).

The western meadowlark is considered a focal or "umbrella" species for management of grassland and savanna birds in Oregon by Partners in Flight (2000). It is representative of other declining grassland species due to the following characteristics:

1) historically occurred throughout grassland and savanna habitats
2) has declining population trends
3) encompasses a range of habitat conditions within native and non-native grassland habitat
4) overlaps in habitat use with most other priority grassland species
5) has relatively large area (home range) requirements (Altman, 1999a).

Because there is limited structural layering in grassland systems, there are many similarities among bird species-habitat relationships. Managing for one species, such as the meadowlark, with large area requirements, will meet some of the habitat requirements of most other grassland bird species.

Meadowlark habitat is characterized by large, open, grass-dominated fields (remnant prairie, fallow fields, light-moderately grazed pasture) with several kinds of grasses of varying heights (12-36 inches) and densities, patches of bare ground (3-6%), and natural or artificial singing perches (trees, shrubs, telephone poles, fenceposts). Singing perches are a critical component for meadowlarks because they are used as a stage to defend territories and attract mates. A variety of forbs is also desirable to attract a diversity of insects for food (ODFW, 2000).

Optimal habitat is defined as grassland with the following conditions (Altman, 1999a):

1) patches greater than 100 acres
2) variable grass heights less than 24 inches tall
3) less than 10% tree/shrub cover4) natural or artificial (fencelines, telephone poles) singing perches within the breeding territory.

Marginal habitat is defined as:

1) patches greater than 20 acres
2) grass heights less than 36 inches
3) shrub cover less than 25%, in a landscape that includes optimal habitat

Meadowlarks breed from April to July. A single meadowlark pair requires up to 20 acres of habitat for breeding territory and a healthy population of meadowlarks requires 100 acres or more. Meadowlark nests are built in a small hollow or scrape in the ground. Because nests are on the ground, the young are vulnerable to predation and inadvertent trampling or destruction by livestock, machinery, people, and pets (ODFW, 2000).

Meadowlarks occur year-round in the Southern Willamette Valley, including the WEW. Potential habitat in the planning area consists of upland and wet prairie (840 acres total) and oak savanna (25 acres total). Due to the meadowlark's need for large contiguous areas of grassland for breeding, smaller, fragmented blocks of grassland do not function as nesting habitat. The best habitat for meadowlarks in the WEW is provided by the large, contiguous block of grassland in Meadowlark Prairie and Willamette Daisy Meadow (approximately 200 acres). Smaller, fragmented patches

may still function as breeding areas for one or several pairs, and as foraging and wintering areas.

5.8 WATER QUALITY

Along much of Amazaon Creek, water quality conditions are moderately impaired to impaired, including water temperature, dissolved oxygen, E. Coli, nitrate, turbidity and phosphorus (Thieman, 2003). Amazon Creek drains an urban and industrial area. The creek has been noted to contain high concentrations of silver, copper, lead, zinc, nickel, cobalt, cadmium, chromium, mercury, arsenic, antimony, manganese, and titanium in bottom sediments. Additionally, five chlorophenoxy-acid herbicides, one organophosphorus insecticide and three semivolatile priority pollutants were found in whole-water samples (Rinella, 1993). The 303D Listing for Amazon Diversion Channel includes dissolved oxygen and Fecal Coliform. The 303d listing for Amazon Creek includes Arsenic, Lead, and E. Coli. The 303d listing for the A-3 Channel includes Dichloroethylenes, Tetrachloroethylene, Arsenic, Lead, Mercury and E. Coli (ODEQ, 2005).

5.9 CULTURAL RESOURCES

Because the planning area's terrain and habitat are similar to those of adjacent areas containing known cultural resource values, it can be reasonably assumed that cultural values are present within the planning area.

5.10 AIR QUALITY

The majority of the planning area is within the Urban Growth Boundary of the City of Eugene. Actions must comply with the conditions and equipment requirements set forth by the "Open Burning Letter Permit" issued by the Lane Regional Air Pollution Authority and the "Short Term Burn Permit" issued by the City of Eugene, Office of the Fire Marshal.

6.0 ENVIRONMENTAL EFFECTS

6.1 UNAFFECTED RESOURCES OR CRITICAL ELEMENTS

The following resources are either not present or would not be affected by any of the alternatives: prime or unique farmlands, Native American religious concerns, water quality (ground and surface water), solid or hazardous wastes, Wild and Scenic Rivers, wilderness, and environmental justice (minority or low income populations).

6.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable future actions within the planning area include:

- Actions specifically required by City or County ordinance, or other law or policy (e.g., weed mowing, fire suppression) would continue to occur regardless of the alternative selected.
- Maintenance, repair, and replacement of existing water control structures, flashboard risers, culverts, and headgates to achieve desired cross-site hydrologic flows would continue to occur as needed.
- Wetland restoration and enhancement projects contained within MIPs connected to operating the WEW Mitigation Bank Program would continue. For those BLM parcels with existing and in-progress MIP's, the management actions within the alternatives addressed within this EA would not be implemented until the MIP projects have been completed, mitigation credits have been approved, and the City of Eugene has been released from financial liability by the U.S. Army Corps of Engineers and Oregon Department of State Lands.
- Outdoor education and recreational facility development, such as an environmental education center, kiosks, multi-use paths, trails, overlooks, "watchable wildlife" sites, and parking structures to access the wetlands may occur in compliance with the "WEW Recreation, Access, and Environmental Education Plan" (2001).
- Research, native seed collection, restoration activities, and other activities associated with City of Eugene, The Nature Conservancy, and other private lands.
- The outcome of the proposed West Eugene Parkway is unknown at this time. Projects stemming from this EA that are in the footprint of the proposed parkway would not be implemented until the future of the parkway is determined. However, in the interim, rare plant sites within the footprint of the proposed parkway would be maintained as described in Alternative C, Class 1.
- The "Recovery Plan for Prairie Species of Western Oregon and Southwest Washington" is currently being written. This recovery plan may influence future management direction for federally-listed species within the WEW.

6.3 TABLE 2: SUMMARY OF EFFECTS

Issue	Alternative A *No Action*	Alternative B *Minimal Maintenance*	Alternative C *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*	Alternative D *Habitat Type Maintenance, Enhancement, and Expansion*
Issue 1: *How would mgt actions affect habitat of prairie dependent T&E, Special Status or State Threatened botanical species?*				
Measures: Acres treated:				
a) with rare plants	0	30	110	110
b) adjacent to rare plant populations	0	20	210	400
c) to improve connectivity between populations	0	0	350	520
TOTAL	**0**	**50**	**670**	**1,030**
Issue 2: *What are the effects of mgt on plant communities?*				
Measures: Acres native species diversity:				
Low	1,330	1,100	520	0
Moderate	0	140	290	665
High	0	90	520	670
Measures: Acres plant community structure:				
Present	120	170	690	1,150
Absent	1,030	980	460	0
Issue 3: *What are the effects of mgt actions on habitat for the FBB?*				
Measures: Acres treated:				
a) w/FBB populations	0	0	20	20
b) adjacent to FBB populations	0	0	15	15
c) to improve connectivity between FBB populations.	0	0	75	85
TOTAL	**0**	**0**	**110**	**120**
Issue 4: *What are the effects on Special Status wildlife species?*				
Measures: Parcels				
maintained	0	Portions of 6 incidental to veg. treatments.	≤9	≤ 9
enhanced	0	0	≤ 8	≤ 8
expanded	0	0	≤ 2	≤ 2
Measures: Acres western meadowlark habitat provided	0	190	595	865
Issue 5: *What is the estimated cost range of implementing actions by alternative?*				
Measures: Annual estimated cost range:				
Total Cost	$18,000 - $22,000	$244,000 - $293,000	$657,000- $788,000	$907,000 - $1,088,000
$/Acre Cost	$17	$219	$588	$812
$/Treated Acre	$181	$1136	$1030	$812

6.4 ENVIRONMENTAL EFFECTS – (Discussed by Issue and Alternative)

6.4.1 ISSUE 1 – *How would management actions affect existing and potential habitat of prairie-dependent Threatened or Endangered, Special Status, or State Threatened botanical species?*

Rare plant community type

Species	Status	Habitat
Willamette daisy	Fed. Endangered	Wet prairie
Bradshaw's lomatium	Fed. Endangered	Wet prairie
Kincaid's lupine	Fed. Endangered	Upland prairie
shaggy horkelia	Bureau Sensitive	Wet prairie
white-topped aster	State Threatened	Wet prairie
meadow checkermallow	Bureau Sensitive	Upland prairie
thin-leaved peavine	Bureau Sensitive	Wet prairie
Hitchcock's blue-eyed grass	Bureau Sensitive	Wet and Upland Prairie, Oak Savanna

As prairie dependent species, the major threats to rare plant populations in the planning area are woody vegetation encroachment (Habeck, 1961, Franklin and Dryness, 1973) and non-native species invasion (Wilson and Clark, 2001). Historically, the Kalapuya Indians maintained these communities with the regular use of fire (Johannessen et. al. 1971, Boyd, 1999). Without fire or other disturbance, these communities succeed to shrub or tree dominated plant communities. These rare plants are adapted to open conditions and do not survive in densely wooded areas. These plant communities and their associated rare species are dependent on relatively frequent, low intensity disturbance for their persistence.

Even with regular disturbance to remove encroaching woody vegetation, these communities and species are threatened by invasive non-native species. Without management to reduce or remove invasive non-natives, the prairie communities will eventually be out-competed.

The effects of grazing, mowing, and burning are influenced by the frequency, intensity, and timing of treatments (and for grazing, the breed/type of livestock), as well as a variety of environmental factors, including native and non-native seed banks, invasive weed species, site hydrology, and precipitation. Plant responses to these treatments may include an increase in seed scarification, plant re-growth, seedling establishment, mortality, and/or plant vigor (i.e., increase of flowering & seed abundance).

Grazing

In a study conducted by Rana Creek Restoration, native species and annual flowers regenerated vigorously after grazing. The seeds of these species were dormant for many years until thatch layers were removed and soil surface was disturbed (Kephart, 2001). Because of these plant responses, a treatment or a combination of treatments may be required to reach ecological goals. Based on annual monitoring results, prescription treatments may need to be refined annually.

The effects of improperly managed grazing on prairie habitat may include defoliation and/or loss of native vegetation, soil compaction, introduction and increased spread of invasive plant species, wildlife disturbance, and decreased water quality. These effects, however, can be avoided or mitigated through proper control of timing, duration, location, and intensity of grazing.

Some benefits of using grazing as a management tool include loosening of the soil surface during dry periods creating hummock-like topography that provides variable habitat for plant species diversity; removal of excess accumulation of standing dead vegetation (thatch build up); selective removal of invasive plant species; and trampling of seed which can promote germination and seedling establishment. Positive effects of grazing have been documented to control blackberries (Kephart, 2001. and pers. comm. Fitzpatrick, 2005).

Mowing and burning

Effects to rare plants from mowing and burning may be beneficial, neutral or detrimental. Indirect negative effects from mowing may include a change in micro-topography and subsequent change in hydrologic characteristics of a site from flattening or degrading hummocks. These effects are expected to be minimized by design features (six-inch minimum blade heights on mowers).

Data on the effects to specific species is limited; however, some research on rare plants within the planning area is discussed below.

The effects of mowing and burning on Willamette daisy are not well-studied, but preliminary research results suggest positive short-term effects. An increase in crown cover and inflorescences was observed after one year of mowing and burning (Finley and Kauffman,1992; Kaye, 2003). Research data on long term effects are not yet available.

Bradshaw's lomatium has a life history that is better known than most rare plants species (Alverson per. comm. 2005; Kaye, 1992). Results of ten years of research on lomatium suggest that burning increases the probability of survival (Bradshaw's lomatium Recovery Plan, USFWS, 1993). However, the benefits of mowing on this species are still not well studied or understood. The short term positive effects of mowing can include an increase of inflorescences and number of individuals (Perkins, 2000). Initial results from a study conducted by the City of Eugene showed large increases (over twice the number) in number of flowering plants over a five year period of mowing.

Mowing and burning treatments are expected to have short-term adverse affects to Kincaid's lupine through direct mortality of some individuals. However, this mortality is expected to be low. Mowing would occur on only a portion of the population at any site, after the majority of plants have senesced. Mowing in late spring has proven highly effective for reducing cover of invasive plants that suppress Kincaid's lupine (Wilson and Clark, 2001). Results of recent research and monitoring show overall positive effects of mowing and burning on Kincaid's lupine, including increases in leaf density, inflorescence and plant vigor. (Kaye, 2002, Wilson and Clark, 1997). Some direct, adverse effects have also been observed, such as reduced flowering and slower leaf production on mowed compared to un-mowed plants (Erhart, 2000). Little data on long term effects of mowing and burning are currently available.

ALTERNATIVE A – *No Action*

Direct and Indirect Effects

Under Alternative A, only the perimeter of sites within the City of Eugene's Urban Growth Boundary would be treated. Current rare plant habitat and habitat adjacent to rare plant populations would not be treated, and habitat between populations would not be treated to improve connectivity.

There would be no direct impact to rare plant habitat or populations under this alternative; however, within a few years, woody vegetation and non-native species

would begin to invade the prairie communities that presently support the rare plants. As a result, all populations of rare plants would decline.

Cumulative Effects

The loss of these populations would further isolate rare plant populations in the Willamette Valley and limit opportunities for genetic exchange, migrations and/or colonization of all species. This would contribute to overall decline in habitat throughout the valley and potentially affect the viability of other remnant populations where cross pollination and genetic exchange are needed for long-term population viability.

ALTERNATIVE B – *Minimal Maintenance*

Direct and Indirect Effects

Native vegetation cover, diversity, dominance, and structure would be maintained on a total of 258 acres of wetland habitat by treating invasive weeds, preventing or treating woody vegetation encroachment, treating litter/thatch buildup, and by treating native vegetation cover.

The 258 acres treated include 30 acres of current habitat for wet prairie rare plants (two federally listed species, the Willamette daisy and Bradshaw's lomatium) and 20 acres of adjacent habitat. Most of the rare plant populations within the treated wet prairie habitat are introduced and do not contain large numbers of plants. Remnant populations that are present are small and isolated. Due to these conditions, treatments are not likely to improve the viability and stability of these populations.

The remaining 208 acres would not be specifically treated to improve connectivity between populations of rare plants; however, some incidental improvement to connectivity could occur as a result of vegetation maintenance treatments.

Some of the largest populations of wet prairie rare plant habitat (80 acres) are not treated under this alternative and would eventually decline or be lost due to the invasion of non-native species and woody vegetation and litter/thatch buildup.

Treatments, primarily mowing and burning, are expected to have short-term adverse effects to rare species through direct mortality of individual plants as described above. However, these treatment techniques are expected to improve habitat condition over the long term by suppressing the spread of woody and non-native vegetation that poses a threat to prairie habitats. Direct mortality of individual rare plants would be minimized by implementation of design features described in Appendix C. No grazing by domestic livestock would occur with this alternative.

No upland habitat (including 20 acres of current Kincaid's lupine or meadow checkermallow habitat) would be maintained under this alternative. In the long-term, invasion of woody vegetation and non-native species would occur, leading to a decline of all rare upland plant populations in these areas.

Cumulative Effects

Remnant populations present would likely persist into the future. Introduced populations that are small and isolated are less likely to survive. The additional 210 treated acres are appropriate habitat for rare wet prairie plants; however, they are small, isolated areas that would not be able to contribute a great deal to the health of the species.

The degradation and eventual loss of 80 acres of high quality, remnant, wet prairie as well as upland rare plant habitat would further isolate these upland rare plant populations in the Willamette Valley and limit opportunities for genetic exchange, migrations and/or colonization. This would contribute to overall declines in habitat

throughout the valley and potentially negatively impact the viability of other remnant populations where cross pollination and genetic exchange are essential for long-term population viability.

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Alternative C would manage 810 acres of wetland habitat; a total of 670 acres of current or potential rare plant habitat would be treated for selected special status botanical species.

Native vegetation cover, diversity, dominance, and structure would be maintained on 110 acres of current habitat where rare plants (Willamette daisy, Bradshaw's lomatium, and Kincaid's lupine) are present. This includes all natural and introduced populations present in the planning area. This alternative would also enhance native vegetation cover, diversity, dominance, and structure on 210 acres of habitat adjacent to rare plant populations and would improve habitat connectivity between populations on an additional 350 acres of habitat. This alternative could improve the viability and stability of all populations by potentially increasing gene flow if natural plant colonization occurs as a result of habitat improvement.

Treatments, including mowing and burning, are expected to have short-term adverse effects to rare species through direct mortality of individual plants as described above. However, these treatment techniques are expected to improve habitat condition over the long term by suppressing the spread of woody and non-native vegetation that poses a threat to prairie habitats. Direct mortality of individual rare plants would be minimized by implementation of design features described in Appendix C. Grazing would be limited to areas outside of T&E occupied habitat; therefore, there would be no direct mortality to T&E species due to grazing.

All newly constructed nesting areas for the western pond turtle would be located outside of known rare plant populations; therefore, there would be no effect to rare plants from proposed habitat improvements for turtles.

Cumulative Effects

The planning area contains some of the largest protected populations of rare species that remain in the Willamette Valley. Maintaining and improving habitat for the rare plants in the planning area has the potential to increase the size and viability of existing WEW populations and improve the connectivity between populations, as well as aid in the recovery and conservation of listed rare plant species.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Alternative D would manage 1,340 acres of wetland habitat; a total of 1,030 acres of current or potential rare plant habitat would be treated to maintain, enhance, and expand the amount of high and medium quality habitat.

Native vegetation cover, diversity, dominance, and structure would be maintained on approximately 110 acres of current habitat where rare plants (Willamette daisy, Bradshaw's lomatium, and Kincaid's lupine) are present. This includes all natural and introduced populations present in the planning area, similar to Alternative C. Alternative D would enhance 400 acres of habitat adjacent to rare plant populations and would improve habitat connectivity between populations on an additional 520 acres of habitat. This could improve the viability and stability of all populations by potentially increasing gene flow if natural plant colonization occurs as a result of habitat improvement.

Alternative D is similar to Alternative C in that treatments, primarily mowing and burning, are expected to have short-term adverse effects to rare species through direct mortality of individual plants. However, these techniques are expected to be beneficial over the long term by suppressing the spread of woody and non-native vegetation that poses a threat to prairie habitats. Direct mortality of individual rare plants would be minimized by implementation of design features described in Appendix C. Grazing would be limited to areas outside of T&E occupied habitat; therefore, there would be no direct mortality to T&E species due to grazing.

All newly constructed nesting areas would be located outside of known rare plant populations; therefore, there would be no effect to rare plants from proposed habitat improvements for turtles.

Cumulative Effects would be Similar to Alternative C.

6.4.2 ISSUE 2 – *What are the effects of management on plant communities?*

Plant Community Effects

The major threats to the most prevalent plant communities in the planning area are woody vegetation encroachment (Habeck, 1961, Franklin and Dryness, 1973) and non-native species invasion (Wilson and Clark, 2001). Historically, Kalapuya Indians maintained these communities with the regular use of fire (Johannessen et. al. 1971, Boyd 1999). Without fire, grazing, or other disturbance, these communities succeed to shrub or tree dominated plant communities. Rare plants are adapted to open conditions and do not survive in densely wooded areas. Plant species that make up these communities are dependent on disturbance for persistence.

Even with regular disturbance to remove encroaching woody vegetation, these communities are threatened by invasive non-native species. Management to control invasive non-natives is needed to avoid displacement and decline of prairie communities.

ALTERNATIVE A – *No Action*

Direct and Indirect Effects

Alternative A would result in 1,330 acres of low diversity habitat and would provide habitat structure on 120 acres. Habitat structure would be absent on 1030 acres.

The current amount of high diversity habitat would decrease from 330 acres to 0 acres (a decline/eventual loss of 330 acres of high diversity habitat). The current moderate diversity habitat would decrease from 630 acres to zero acres (a decline/eventual loss of 630 acres of moderate diversity habitat). These declines and losses of habitat could occur in 5-15 years, dependent upon site conditions and timing of weed and woody vegetation invasion.

All low diversity plant communities (370 acres) would remain at low levels of native plant diversity and would likely continue to decline in quality without treatment. The current level of low diversity habitat would increase from 370 acres to approximately 1,330 acres (an increase of 960 acres) as high and moderate diversity habitat decline in diversity.

Perimeter mowing of BLM sites within the City of Eugene's Urban Growth Boundary would maintain the structure appropriate for prairie communities; however, it would lead to the eventual loss of most native plant diversity on these perimeters since no other weed treatments would take place. Woody vegetation encroachment and non-native species invasion would lead to the decline of all communities' native plant

diversity and structure in areas inside and adjacent to the mowed perimeters and on sites outside the UGB (approximately 1,200 acres).

Cumulative Effects

Alterative A would likely result in the loss of most of the existing native plant diversity and plant community structure currently present in the 1,340 acre planning area With less than one percent of these habitats remaining, the decline and eventual loss of 1,340 acres of habitat would represent a considerable reduction in the remaining acres of ash swale, wet prairie, upland prairie, and oak communities within the Willamette Valley.

ALTERNATIVE B – *Minimal Maintenance*

Direct and Indirect Effects

Alternative B would provide 1,100 acres of low diversity habitat, 140 acres of moderate diversity habitat and 90 acres of high diversity habitat. Alternative B would provide habitat structure on 170 acres. Habitat structure would be absent on 980 acres.

The current amount of high diversity habitat would decrease from 330 acres to 90 acres (a decline/eventual loss of 240 acres of high diversity habitat). The current moderate diversity habitat would decrease from 630 acres to 140 acres (a net decline/eventual loss of 490 acres of moderate diversity habitat). These declines and loss of habitat could occur in 5-15 years dependent upon site conditions and timing of weed and woody vegetation invasion.

All low diversity plant communities (370 acres) would remain at low levels of native plant diversity and would likely continue to decline in quality without treatment. The current level of low diversity habitat would increase from 370 acres to approximately 1,028 acres (an increase of 730 acres), as high and moderate diversity habitat decline in diversity.

Alternative B would maintain the native plant diversity and structure of the communities present within only the Mitigation Bank Project sites and the ACEC (258 acres). Woody vegetation encroachment and non-native species invasion would reduce native plant diversity and structure of plant communities on the remaining approximate 1,028 untreated acres. Approximately 240 acres of high native plant diversity habitat and 490 acres of land with intermediate levels of diversity would decline in habitat quality. The quality of habitat provided by upland or oak communities would also decline.

Cumulative Effects

Most of the 258 acres of wet prairie/vernal pool communities maintained under this alternative are not ecologically functional on their own, since the majority of the mitigation areas are small, isolated patches within the planning area. Defending these areas against exotic species invasion would be difficult and costly since most treatment areas have a large perimeter to area ratio.

Alternative B would result in the loss of most of the existing native plant diversity and plant community structure currently present due to woody vegetation encroachment and non-native species invasion of the unmanaged 1,100 acres. With less than one percent of these habitats remaining, the decline and eventual loss of 1,100 acres of wet prairie/vernal pool communities would represent a considerable reduction in the remaining acres of ash swale, wet prairie, upland prairie, and oak communities within the Willamette Valley.

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Alternative C would provide 520 acres of low diversity habitat, 290 acres of moderate diversity habitat and 520 acres of high diversity habitat. Alternative C would provide habitat structure on 690 acres. Habitat structure would be absent on 460 acres.

The current amount of high diversity habitat would increase from 330 acres to 520 acres with treatment (an increase of 190 acres).

Of 630 acres currently with intermediate levels of native plant diversity, 290 acres would be maintained as moderate diversity habitat, and 190 acres would be improved to high diversity habitat. The majority of the native plant diversity on the remaining 150 untreated acres would eventually decline to low diversity habitat due to woody vegetation encroachment and non-native species invasion.

All low diversity plant communities (370 acres) would remain at low levels of native plant diversity and would likely continue to decline in quality without treatment. The current level of low diversity habitat would increase from 370 acres to 520 acres (an increase of 150 acres), as high and moderate diversity habitat decline in diversity.

There are two important gaps in the treatment of land in this alternative:

- Alternative C treats only 55 acres of 150 acres of oak communities with moderate native plant diversity, leaving 95 acres of this community type unmanaged. These unmanaged oak communities would decline in habitat diversity due to woody vegetation encroachment and non-native species invasion.
- The second gap includes approximately 125 acres of land that has undergone mitigation but would not be maintained in this alternative. These acres would also decline in habitat diversity due to woody vegetation encroachment and non-native species invasion.

Cumulative Effects

Under this alternative, 530 acres would not be treated. This includes 150 acres of land where oaks are present and about 16% of medium diversity habitat. This alternative maintains about 84% (810 acres) of medium and high diversity habitats, which represents a large contribution to the protection of rare plant communities in the Willamette Valley; however, of the total land available for habitat improvement, 39% is not treated.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Alternative D would provide 670 acres of high diversity habitat and 665 acres of moderate diversity habitat. No habitat would remain at a low level of diversity. Alternative D would provide habitat structure on 1,150 acres.

The current level of high diversity habitat would increase from 330 acres to 670 acres with treatment (an increase of 340 acres of high diversity habitat).

The current level of moderate diversity habitat would increase from 630 acres to 665 acres with treatment. 290 acres would be maintained as moderate diversity habitat, and 340 acres would be improved to high diversity habitat.

All 370 acres of low diversity habitat currently present would improve to moderate diversity habitat with treatment, and 5 acres with no habitat diversity would be restored to moderate diversity habitat.

All 1,150 acres would eventually have the appropriate structure for their plant community type, as well as a medium or high level of native plant diversity. Under this alternative, all land in the planning would be treated. All habitats would be treated including wet prairie, upland prairie, and ash and oak communities.

Cumulative Effects

In a landscape analysis of the Willamette Valley, Puget Trough, Georgia Basin Ecoregion, The Nature Conservancy identified the WEW as the highest conservation priority in the Southern Willamette Valley, because it contains the largest blocks of high quality habitat with the potential of improving the quality of hundreds of additional acres. Continuing to manage and improve all acres in the system would make a large contribution to the conservation of these rare plant communities.

6.4.3 ISSUE 3 – *What are the effects of management actions on existing and potential habitat for the Fender's blue butterfly?*

ALTERNATIVE A – *No Action*

Direct and Indirect Effects

Under Alternative A, habitat for the Fender's blue butterfly's host and nectar plants, found primarily in upland prairie, would not be maintained, enhanced, or expanded. In the short term (1-3 years), invasive woody vegetation and non-native species would out-compete native host plant species and nectar plants, leading to decline in Fender's Blue butterfly populations. Over the long-term (5-10 years), in the absence of active management or natural disturbance, succession would proceed at prairie sites occupied by the butterfly's host and nectar plants and would result in the eventual loss of butterfly populations as plant communities at these sites transition to shrubland and/or forest.

Cumulative Effects

The loss of Fender's blue butterfly at remnant prairie sites within the WEW would further isolate populations in the Willamette Valley and limit opportunities for genetic exchange, migrations and re-colonization of this species. This would contribute to the overall trend of declining habitat and could negatively impact the viability of remnant populations of the butterfly in the WEW and the Willamette Valley.

ALTERNATIVE B – *Minimal Maintenance*

Direct and Indirect Effects

Under Alternative B, there would be no treatments specifically designed to protect and enhance habitat for the Fender's blue butterfly; however, there would be some incidental benefit from control of weeds and woody vegetation on less than 5 acres of upland habitat where butterfly populations exist (Isabelle and Oxbow West). Two other populations, including the largest population on BLM managed lands (Fir Butte) would not be managed and would eventually disappear due to encroachment of woody vegetation and weeds at these sites. In addition, over 100 acres of potential habitat within the WEW would be degraded, and opportunities for future recolonization to expand existing populations would be lost.

Cumulative Effects

Cumulative effects would be similar to those described under Alternative A

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Under Alternative C, 20 acres of habitat for the Fender's blue butterfly's host plant and nectar sources would be maintained, 15 acres would be enhanced, and 75 acres would be added as habitat. This represents 110 out of a total of 120 upland prairie and savanna acres in the WEW. The ten remaining untreated acres were determined to be lower quality sites that would likely require more intensive management to restore the native plant diversity and are a lower priority for expanding Fender's blue butterfly populations.

Three existing Fender's blue butterfly populations and one site with a high likelihood of being occupied (eggs were found, but adult butterflies not confirmed) would continue to be protected and enhanced through use of a suite of treatments indicated in Table C-1 of Appendix A. Some proposed treatments, such as mowing and burning, are expected to adversely affect the butterfly in the short term, through direct morality of larvae. However, all prescribed burning and mechanical treatments that occur within Fender's blue butterfly habitat would be timed and designed to minimize harm to all life stages of the butterfly (see design features, Appendix C). These techniques are expected to be beneficial over the long term, by suppressing the spread of woody and non-native vegetation that poses a threat to habitat for the butterfly, and by increasing vigor of its host and nectar plants. The effects of mowing and burning on the butterfly's host plant, Kincaid's lupine, were discussed in Issue 1.

Limited research data on the effects of mowing and burning to Fender's blue butterfly indicate overall positive effects from these treatments, including an increased number of eggs and adult butterflies (Kaye 2002, Wilson and Clark 2000, Fitzpatrick 2005). Numbers of adult butterflies on lands managed by The Nature Conservancy within the WEW have shown an upward trend since mowing began 5 years ago. Although burning is expected to result in 100 percent mortality of butterfly larvae in treated areas, females in adjacent un-burned areas appear to be able to re-colonize burned areas (Wilson and Clark, 2000). A ten-fold increase in the number of eggs on lupine plants was observed in burned areas compared to unburned areas. (Schultz and Crone, 1998).

There would be no effect to Fender's blue butterfly from proposed habitat improvement for the western pond turtle. No construction of nesting areas would be located within Fender's habitat.

Cumulative Effects

Loss of habitat for the Fender's blue butterfly in West Eugene and the Willamette Valley would continue to occur as housing developments and other urban growth projects increase. Increased use of the West Eugene area for recreation and other activities is expected to result in future loss and fragmentation of habitat for the Kincaid's lupine and Fender's blue butterfly. Maintaining, improving, and expanding habitat for the butterfly within the WEW would contribute to increased viability of populations by linking populations at Fern Ridge and Willow Creek Preserve, and would contribute to the long-term survival of the butterfly in West Eugene and the Willamette Valley.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

Direct, Indirect, and Cumulative Effects

The effects of Alternative D would be similar to Alternative C, except that under Alternative D, 10 more acres of upland prairie habitat would be treated to expand

Fender's blue butterfly habitat than under Alternative C. The ten additional acres treated under this alternative are low quality upland prairie sites. These sites are a lower priority for expanding Fender's blue butterfly populations due to the intensive management that would be required to restore native plant diversity and structure.

6.4.4 ISSUE 4 – *What are the effects of each alternative on the western pond turtle and western meadowlark Special Status wildlife species?*

Western Pond Turtle

ALTERNATIVE A - *No Action*

Direct and Indirect Effects

Under Alternative A, there would be no improvement or expansion of western pond turtle habitat within the planning area. In the absence of vegetation treatments, there would be short-term (1-3 years) degradation of nesting and rearing habitats (prairie, vernal pool, emergent, and riverine) due to an increase in vegetation growth and density that hinder movement of turtles. In the long-term (5-10 years), all nesting and rearing habitat would be lost, due to encroachment of woody vegetation and weeds as these habitats transition to forest and shrubland communities.

Under Alternative A, there is a potential for short-term disturbance and loss of individual turtles due to vehicles, equipment, and human activity associated with mowing on 120 acres of BLM parcel perimeters in western pond turtle habitat.

Cumulative Effects

In the absence of treatments designed to maintain and restore functioning of key habitats for the western pond turtle, continued degradation, loss, and fragmentation of habitat in the WEW would occur. This loss of habitat in an area that is considered a key part of the Willamette Ecosystem Reserve Matrix would further limit opportunities for dispersal and long term gene flow needed to ensure survival of the western pond turtle in the Willamette Valley.

ALTERNATIVE B – *Minimal Maintenance*

Direct and Indirect Effects

No treatments specifically designed to benefit western pond turtles would occur; however, there would be some incidental benefit from control of weeds and woody vegetation on existing upland portions of six sites (Turtle Swale, Beaver Run, Oxbow East, Willow Confluence, Stewart Pond, and Swallow Pond). Continued degradation and loss of habitat to invasive weeds and encroachment of woody vegetation would occur on an unknown number of acres at the same six sites and on an additional five sites within the planning area. Little improvement or expansion of western pond turtle habitat would occur under this alternative.

Under Alternative B, there is the potential for short-term disturbance and loss (direct mortality) of individual turtles due to vehicles, equipment, and human activity associated with vegetation treatments in western pond turtle habitat. However, these effects would be minimized by implementation of design features to protect turtles (see Appendix C).

Cumulative Effects

In the absence of treatments designed to restore functioning of key habitats for the western pond turtle, continued degradation, loss, and fragmentation of habitat in the WEW would occur. This would result in the loss of habitat and turtle populations in an area that is considered a key part of the Willamette Ecosystem Reserve Matrix, which

would further limit opportunities for dispersal and long term gene flow needed to ensure survival of the western pond turtle in the Willamette Valley.

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Vegetation treatments would be implemented specifically to maintain and enhance key habitat components for western pond turtle on up to 9 parcels. In addition to vegetation management, other projects designed to improve nesting and rearing habitats would be implemented on up to 8 of the 9 parcels. Projects to create, and improve key habitat components would be implemented on up to 2 additional unoccupied parcels where potential habitat is present (e.g., creation of nesting mounds).

This alternative would improve habitat conditions at existing parcels and enhance connectivity and expansion of turtle populations within the WEW. Alternative C has a greater overall benefit to the western pond turtle than Alternative A or B, due to implementation of treatments designed to enhance, create, and connect key habitat components for pond turtles, compared to incidental benefit that may or may not occur from vegetation treatments under Alternatives A and B.

Under Alternative C, there is the potential for short-term disturbance and loss of individual turtles due to vehicles, equipment, and human activity associated with treatments in western pond turtle habitat. However, these effects would be minimized by implementation of design features to protect turtles (see Appendix C).

Cumulative Effects

Alternative C would slow or reverse the decline of western pond turtle habitat and population declines in the WEW. Improvement and expansion of habitat within the WEW would help conserve an area that is considered a key part of the Willamette Ecosystem Reserve Matrix. Maintaining habitat function within this key area would provide opportunities for dispersal and long-term gene flow needed to ensure survival of the western pond turtle in the Willamette Valley.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

The effects of Alternative D are similar to those described for Alternative C.

Cumulative Effects

The cumulative effects of Alternative D are similar to those described for Alternative C.

Western Meadowlark

ALTERNATIVE A – *No Action*

Direct and Indirect Effects

In the absence of vegetation treatments or natural disturbance, there would be short-term degradation (1-3 years) and long-term (5-10 years) loss of prairie habitat on 840 acres and oak savanna habitat on 25 acres of in the planning area due to loss of structure (grasses 12 -36 inches) and encroachment of woody vegetation and weeds.

Under Alternative A, there is the potential for short-term disturbance and loss of individuals or nests due to vehicles, equipment and human activity associated with mowing on 120 acres of BLM parcel perimeters.

Cumulative Effects

Western meadowlark populations have been significantly declining in the Willamette Valley as native grasslands and grass-dominated fields are being converted to other uses. The extent of effects from current and future development and human activities throughout the Willamette Valley are unknown. However, grasslands are expected to become more fragmented as they are converted to other uses. Under Alternative A, the loss of 865 acres of grasslands in the planning area would compound the fragmentation and loss of habitat that is occurring on other lands within the valley. The loss of habitat would result in a decline of meadowlark populations in the WEW and would contribute to further declines in the Willamette Valley.

ALTERNATIVE B – *Minimal Maintenance*

Direct and Indirect Effects

Under Alternative B, 190 acres of upland and wetland prairie would be maintained as meadowlark habitat through treatments to control invasive weeds and encroaching woody vegetation. Of these 190 acres, approximately 150 acres within Meadowlark Prairie provide contiguous habitat that is likely to support breeding meadowlarks. The largest numbers of meadowlarks within the planning area are found within this area of Meadowlark Prairie (Larson and Nielson parcels). The remaining 40 acres are small, scattered patches (less than 20 acres) that are not large enough by themselves to support a breeding pair.

There is the potential for short-term disturbance and loss of individual meadowlarks or nests due to vehicles, equipment, and human activity associated with treatments conducted in grassland areas. However, design features that limit the timing of mowing and other treatments using machinery to outside of the breeding season would minimize risk to meadowlarks and other breeding grassland birds (see Appendix C).

In the absence of vegetation treatments or natural disturbance, there would be short-term degradation (1-3 years) and long-term (5-10 years) loss of prairie habitat on 650 acres and oak savanna habitat on 25 acres of BLM lands in the WEW due to loss of structure (grasses 12 -36 inches) and encroachment of woody vegetation and weeds.

Cumulative Effects

The extent of effects from current and future development and human activities in West Eugene and throughout the Willamette Valley is unknown. However, grasslands are expected to become more fragmented as land is converted to other uses. Although 190 acres of prairie would be maintained as meadowlark habitat, the loss of 675 acres of grasslands (prairie and savanna) in the planning area would compound fragmentation and loss of habitat that is occurring on other lands within the Willamette Valley. This loss of habitat, combined with the effects of urban growth and potential disturbance from increased human activities, could contribute to further declines in populations of this bird in the WEW and Willamette Valley.

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Under Alternative C, 570 acres of upland and wetland prairie and 25 acres of oak savanna would be maintained as meadowlark habitat through a variety of treatments designed to maintain or improve native plant diversity and structure, including burning and mowing to control invasive weeds and encroaching woody vegetation.

Under this alternative, approximately 270 acres of prairie would not be treated and would no longer function as habitat when it transitions to shrubland and forest in 5-10 years. Under this alternative, a key block of grassland habitat (100 acres) for meadowlarks in Meadowlark prairie (Larson and Nielson parcels) would not be maintained. This large, contiguous block of wet prairie currently supports the largest numbers of meadowlarks within the planning area. The loss of this large block of relatively undisturbed habitat would result in a decline in meadowlark numbers in the WEW from present numbers.

There is the potential for some short-term disturbance and loss of meadowlark nests due to vehicles, equipment, and human activity associated with treatments conducted in grassland areas. However, design features that limit the timing of mowing and other treatments using machinery to outside of the breeding season, would minimize risk to meadowlarks and other breeding grassland birds (see Appendix C). Some additional disturbance from increased management activities and recreational use within the WEW could limit nesting success in some areas.

Cumulative Effects

There would be some benefit to meadowlarks from the treatment of 595 acres of grassland habitat (prairie and savanna) within the WEW, but only a portion of these acres would provide functional habitat for nesting meadowlarks (primarily those within Meadowlark Prairie and Willamette Daisy Meadow). The extent of effects from current and future development and human activities in West Eugene and throughout the Willamette Valley are unknown. However, grasslands are expected to become more fragmented as land is converted to other uses. The loss of approximately 100 acres of key habitat for the meadowlark, combined with the effects of urban growth and human disturbance to nesting birds, are likely to result in a decline in meadowlark populations over the long term. The overall effect of this decline on meadowlark populations in the Willamette Valley as a whole is unknown.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

Direct and Indirect Effects

Under Alternative D, 840 acres of upland and wetland prairie and 25 acres of oak savanna would be maintained as meadowlark habitat through treatments designed to maintain or improve native plant diversity and structure, including burning and mowing to control invasive weeds and encroaching woody vegetation.

Alternative D would have the greatest benefit to meadowlark of all alternatives. This is due in part to the larger number of acres treated. It is also due to the maintenance and enhancement of over 200 contiguous acres, including 100 acres that currently support the largest numbers of meadowlark within the WEW. Under Alternative A and C, these acres would not be maintained and would not provide habitat for meadowlarks or other grassland birds in the long-term (5-10 years).

There is a potential for some short-term disturbance and loss of meadowlark nests due to vehicles, equipment, and human activity associated with treatments conducted in grassland areas. However, design features that limit the timing of mowing and other treatments using machinery to outside of the breeding season, would minimize risk to meadowlarks and other breeding grassland birds (see Appendix C). Some disturbance from increased management activities and recreational use within the WEW could limit nesting success in some areas.

Cumulative Effects

Under Alternative D, the maintenance and enhancement of 865 acres of grassland habitat (840 acres of prairie plus 25 acres of savanna) within the WEW would

contribute to the long-term survival of western meadowlark populations in the Willamette Valley. The extent of effects from current and future development and human activities in West Eugene and throughout the Willamette Valley are unknown. However, grasslands are expected to become more fragmented as land is converted to other uses. As a result of human activities within the WEW, some areas of treated grasslands may cease to function as habitat. Managing habitat in Meadowlark Prairie and Willamette Daisy meadow (over 200 contiguous acres) would help to ensure current meadowlark populations are maintained within the WEW and would contribute to overall numbers of this bird in the valley.

6.4.5 ISSUE 5 – *What is the estimated cost range of implementing actions by alternative?*

ALTERNATIVE A –*No Action*

The annual estimated cost of full implementation of Alternative A is $18,000 to $22,000. The annual cost of implementing Alternative A would be $17 per acre, and the annual cost per treated acre would be $181.

ALTERNATIVE B – *Minimal Maintenance*

The annual estimated cost of full implementation of Alternative B is $244,000 to $293,000. The annual cost of implementing Alternative B would be $219 per acre, and the annual cost per treated acre would be $1,136.

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

The annual estimated cost of full implementation of Alternative C is $657,000 to $788,000. The annual cost of implementing Alternative C would be $588 per acre, and the annual cost per treated acre would be $1,030.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

The annual estimated cost of full implementation of Alternative D is $907,000 to $1,088,000. The annual cost of implementing Alternative D would be $812 per acre, and the annual cost per treated acre would be $812.

7.0 CONSULTATION AND COORDINATION

7.1 U.S. FISH AND WILDLIFE SERVICE (USFWS)

7.1.1 ESA Consultation

A Biological Assessment regarding the proximity of Federally-listed Willamette daisy (*Erigeron decumbens* var. *decumbens*), Bradshaw's lomatium (*Lomatium bradshawii*), Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), and Fender's blue butterfly *(Icaricia icaricoides fenderi*) populations to projects proposed within the alternatives will be submitted to the U.S. Fish and Wildlife Service (USFWS) in September for concurrence. The projects would not take place prior to the issuance of a Letter of Concurrence or Biological Opinion from the USFWS. All required terms and conditions in the response from USFWS would be implemented to ensure compliance with the Endangered Species Act.

7.2 CONFEDERATED TRIBES OF THE COOS, LOWER UMPQUA, AND SIUSLAW INDIANS

The Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians were notified of this project during the scoping process, requesting information regarding tribal issues or concerns relative to the project. No response was received.

8.0 LIST OF PREPARERS

Name	Title	Responsibility
Jean Jancaitis	Botanist/ Wetland Ecologist	City of Eugene, Botany
Nancy Sawlelle	Botany (Sr. Staff Specialist)	T&E Species Botany Advisor
Carla Alford	Wildlife Biologist	Wildlife
Karin Baitis	Soil Scientist	Soils and Hydrology
Sally Villegas	Wetlands Natural Resource Specialist	Wetlands Mgt. Specialist
Trevor Taylor	Natural Resource Coordinator	City of Eugene, Ecology
Rick Colvin	Landscape Planner	Team Lead
Mark Stephen	Forest Ecologist	EA writer/editor and Silviculture
Gary Wilkinson	GIS	Maps
Nancy Ashlock	Asst. Fire Mgt. Officer (USFS)	Fire Specialist
Mark Conley	Recreation Planner	Recreation
Mike Southard	Archaeologist	Cultural Resources
Chuck Fairchild	Natural Resource Specialist	Noxious Weed Specialist
Eric Wold	Wetlands Program Supervisor (City of Eugene)	City of Eugene, Wetlands Program Technical Specialist, Cost Estimates
Pat Johnston	Wetlands Program Manager (BLM)	Wetlands Program Manager

9.0 PUBLIC PARTICIPATION

A public notice advertising the availability of this EA and preliminary FONSI will be published in the Eugene Register Guard on October 5, 2005. The EA will be sent to local landowners, interest groups, tribes, state and government agencies, and other members of the public who have expressed interest in management of the WEW.

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11.0 APPENDIX A – DETAILED DESCRIPTION OF THE ALTERNATIVES

ALTERNATIVE A – *No Action*

This alternative would take no management actions to maintain, enhance, or expand any of the habitats found in the WEW. No actions would be taken to contribute to the recovery of any Threatened or Endangered species. Only those actions specifically required by City or County ordinance, or other law or policy would occur, such as weed mowing and fire suppression.

Mowing would occur under the No Action Alternative in order to comply with the City's nuisance vegetation abatement policy. Mowing would occur on approximately 120 acres, three times per year, between June 15 and September 30, and would include a 50-foot strip along the perimeter of all BLM parcels within the urban growth boundary of the City of Eugene. No mowing would occur on any BLM parcel outside of the urban growth boundary.

Alternative A manages or treats approximately 9 percent of the planning area.

ALTERNATIVE B – *Minimal Maintenance*

This alternative maintains WEW Mitigation Bank projects existing and in progress on BLM lands. In addition, this alternative would maintain the relevant and important values in the Long Tom ACEC as directed by the Eugene District RMP. Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing and fire suppression) would continue to occur as in Alternative A.

Project implementation would be ranked and scheduled across the acreage and habitats within the MIP's and ACEC based on site conditions identified through monitoring, available funding, and other management guidelines. Actions described below would be accomplished through the use of a suite of treatment techniques listed in Table B-1.

Alternative B manages or treats approximately 258 acres (19 percent) of the planning area.

Objectives

Objective 1. Maintain native vegetation cover, diversity, dominance, and structure on completed or in-progress Mitigation Bank project sites (250 acres) over the life of this plan.

BLM-managed parcels in the planning area with existing or in-progress Mitigation Bank Projects

Current Site Name	Previous Site Name*	MIP Status
Bertelson Nature	Stewart Pond	Completed
Meadowlark Prairie	Larson	In progress
Meadowlark Prairie	Nielson	In progress
Meadowlark Prairie	Turtle Swale	Completed
Oak Hill	North Greenhill	Completed
Willamette Daisy Meadow	Oxbow East	In progress
Willamette Daisy Meadow	Oxbow West	Completed
Swallow Pond	Eastern Gateway	Completed
Tsal Luk wah	Balboa	Completed
Tsal Luk wah	Beaver Run	Completed
Tsal Luk wah	Danebo	Completed
Tsal Luk wah	Isabelle	Completed
Tsal Luk wah	Willow Confluence	Completed

Action 1: Monitor yearly woody vegetation encroachment on 250 acres. Control woody vegetation encroachment on this acreage by using the following management guidelines:

Management Guidelines:

a) Treat all invasive native and non-native trees and shrubs when present.

b) Recommend acreage for control of woody vegetation when encroachment reaches the percent cover threshold corresponding to the habitat type listed in below table, except where a more shrub dominant community is desired.

Percent Cover Thresholds – Alternative B, Objective 1

Desired Plant Community	Small Diameter		Large Diameter		
	DBH (cm)	**Canopy Cover (%)**	**DBH (cm)**	**Canopy Cover (%)**	**Equivalent # of trees/acre**
Emergent	N/A	N/A	N/A	N/A	N/A
Open water	N/A	N/A	N/A	N/A	N/A
Freshwater/Riverine	N/A	N/A	N/A	N/A	N/A
Ash Swale/Riparian	< 15-30	5-10	> 15-30	50-100	5-15
Wet-prairie/vernal pool	All	5-10	N/A	N/A	N/A

Action 2: Monitor yearly the occurrence and spread of invasive plant species on 250 acres. Control invasive species on these acres using the following management guidelines:

Management Guidelines:

a) Recommend areas for control of non-native species when combined encroachment reaches 10% to 35% or greater of the habitat block and/or a weed population covers >50% of a 1m2 area, depending on site conditions and species present.

b) Control populations of highly aggressive weeds species including, but not limited to:

reed canarygrass (*Phalaris arundinacea*)	invasive grass
Harding grass (*Phalaris aquatica*)	invasive grass
meadow knapweed (*Centaurea pratensis*)	ODA, B-listed weed
false brome (*Brachypodium sylvaticum*)	ODA, B-listed weed
teasel (*Dipsacus fullonum*)	invasive forb
scotch broom (*Cytisus scoparius)*	ODA, B-listed weed

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on 250 acres. Treat areas according to the following management guidelines:

Management Guidelines:

a) Reduce the buildup of litter when the litter layer exceeds 10-20% cover and litter layer is detrimentally impacting native forb plant diversity or rare plant habitat.

b) Do not treat areas within five years of soil-disturbing activities.

c) Treat no more than 1/3 of the total acres in any year.

Action 4: Monitor yearly the existing levels of native plant species cover on 250 acres. Maintain the existing levels of native plant species by using the following management guidelines:

Management Guidelines:

a) Recommend vegetation treatments to maintain existing levels of native plant species cover when monitoring shows a loss of 5-10 percent of a site's existing number of native plant species.

b) Schedule treatments to allow needed time to acquire seed, equipment, and resources to accomplish the project.

Objective 2. Maintain the relevant and important values in the Long Tom ACEC tufted hairgrass (*Deschampsia caespitosa*) wet prairie community and its associated rare plant species and Oregon white oak/Oregon ash (*Quercus garryana/Fraxinus latifolia*) woodlands as directed by the Eugene District RMP, ROD (1995) over the life of this plan.

Action 1: Monitor yearly woody vegetation encroachment on the eight-acre ACEC. Control woody vegetation encroachment within the ACEC using the following management guidelines:

Management Guidelines:

a) Treat all invasive native and non-native trees and shrubs when present.

b) Recommend acreage for control of woody vegetation when encroachment reaches the percent cover threshold corresponding to the habitat type listed in below table, except where a more shrub dominant community is desired.

Percent Cover Thresholds - Alternative B, Objective 2

Desired Plant Community	Small Diameter		Large Diameter		
	DBH (cm)	Canopy Cover (%)	DBH (cm)	Canopy Cover (%)	Equivalent # of trees/acre
Emergent	N/A	N/A	N/A	N/A	N/A
Open water	N/A	N/A	N/A	N/A	N/A
Freshwater/Riverine	N/A	N/A	N/A	N/A	N/A
Ash Swale/Riparian	< 15-30	5-10	> 15-30	50-100	5-15
Wet-prairie/vernal pool	All	5-10	N/A	N/A	N/A
Upland prairie	All	5-10	N/A	N/A	N/A
Oak woodland	< 15-30	10-15	> 15-30	50-80	7-15
Oak savanna	< 20-30	5-10	> 20-30	40-60	3-7

Action 2: Monitor yearly the occurrence and spread of invasive plant species on the eight-acre ACEC. Control invasive plant species within the ACEC using the following management guidelines:

Management Guidelines:

a) Recommend areas for control of non-native species when combined encroachment reaches 10% to 35% or greater of the habitat block and/or a weed population covers >50% of a 1m2 area, depending on site conditions and species present.

b) Control populations of highly aggressive weeds species including, but not limited to:

Reed canarygrass (*Phalaris arundinacea*)	invasive grass
Harding grass (*Phalaris aquatica*)	invasive grass
meadow knapweed (*Centaurea pratensis*)	ODA, B-listed weed
false brome (*Brachypodium sylvaticum*)	ODA, B-listed weed
teasel (*Dipsacus fullonum*)	invasive forb
scotch broom (*Cytisus scoparius*)	ODA, B-listed weed

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on the eight-acre ACEC. Treat areas according to the following management guidelines:

Management Guidelines:

a) Reduce the buildup of litter when the litter layer exceeds 10-20% cover and litter layer is detrimentally impacting native forb plant diversity or rare plant habitat.

b) Do not treat areas within five years of soil-disturbing activities.

c) Treat no more than 1/3 of the total acres in any year.

Action 4: Monitor yearly the existing levels of native plant species cover on the eight-acre ACEC. Maintain the existing levels of native plant species by using the following management guidelines:

Management Guidelines:

a) Recommend vegetation treatments to maintain existing levels of native plant species cover when monitoring shows a loss of 5-10% of a site's existing number of native plant species.

b) Schedule treatments to allow needed time to acquire seed, equipment, and resources to accomplish the project.

Alternative B Summary Tables

Acres Habitat Managed by Objective – Alternative B		
Objective 1 – Existing Habitat	250	
Objective 2 – Adjacent Habitat	8	
Total Managed	**258**	**19%**
Not Managed	1,082	
Total, Planning Area	1,340	

Acres Fender's blue butterfly habitat by Class – Alternative B	
Objective 1	0
Objective 2	0
Total Managed	**0**

Number Western Pond Turtle Parcels Managed – Alternative B	
Objective 1	0
Objective 2	0

Table B-1: Alternative B Objectives 1 and 2 - Actions and Treatment Techniques

Treatment Techniques	Mitigation Bank Project Sites and ACEC Actions (Alt. B Objectives 1and 2)			
	Action 1	Action 2	Action 3	Action 4
	Control woody vegetation encroachment	Invasive species removal	Reduce Thatch Buildup	Maintain native plant cover
Carbon addition *				X
Chainsaws/Thinning	X			
Biosolid Treatments *		X		X
Fill removal *				
Girdling trees	X			
Grind tree stumps	X	X		
Grubbing	X	X		
Hand pulling tools (Hoeing and Clipping)	X	X		
Mowing	X	X	X	X
Mycorrhizae addition *		X		X
Planting propagules/Seeding		X		X
Prescribed burning	X	X	X	X
Raking			X	
Seeding		X		X
Shade cloth		X		
Sod rolling *		X		
Solarization *		X		
Spot tilling *		X		
Thermal (flame weeder, hot foam, propane)*		X		
Tilling *		X		X
Weed whacking	X	X		

* These treatment techniques will not be applied within Federally-listed T&E plant populations when the treatment could result in adverse affects to populations of T&E species.

ALTERNATIVE C – *Selected Rare Species Habitat Maintenance, Enhancement, and Expansion*

This alternative is designed to protect and enhance the habitats of selected rare species. Rare species of vascular plants under this alternative are defined as those species with a Federal Threatened or Endangered (T & E) designation, a BLM status of Bureau Sensitive (BS), or a State Designation of Threatened.

Special Status botanical species considered under this alternative are:

Willamette daisy (*Erigeron decumbens* var*. decumbens*)	Federally Endangered
Bradshaw's lomatium (*Lomatium bradshawii*)	Federally Endangered
Kincaid's lupine (*Lupinus sulphureus* ssp*. kincaidii*)	Federally Threatened
Shaggy horkelia (*Horkelia congesta* ssp*. congesta*)	Bureau Sensitive
Meadow checkermallow (*Sidalcea campestris*)	Bureau Sensitive
Thin-leaved peavine (*Lathyrus holochlorus*)	Bureau Sensitive
Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*)	Bureau Sensitive
White-topped aster (*Aster curtus*)	State Threatened

Wildlife Special Status species emphasized under Alternative C include the following:

Fender's blue butterfly (*Icaricia icarioides fenderi*)	Federally Endangered
Western pond turtle (*Clemmys marmorata*)	Bureau Sensitive

Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing and fire suppression) would continue to occur as in Alternative A.

Alternative C manages or treats approximately 810 acres (60 percent) of the planning area.

Alternative C would address the following classes of actions described below. Actions in Class 1 would generally be implemented first, proceeding to actions in Class 2, and then Class 3. Project implementation within classes would be ranked and scheduled across acreage and habitats based on site conditions identified through monitoring, available funding, and other management guidelines. Actions described below would be accomplished through the use of a suite of treatment techniques listed in Table C-1.

Class of Actions

Class 1. Maintain habitat (165 acres) where remnant populations of rare plants, Fender's blue butterfly, and western pond turtle are currently present.

Action 1: Monitor yearly woody vegetation encroachment on 165 acres. Control woody vegetation encroachment on this acreage by using the following management guidelines:

Management Guidelines:

a) Treat all invasive native and non-native trees and shrubs when present.

b) Recommend acreage for control of woody vegetation when encroachment reaches the percent cover threshold corresponding to the habitat type listed in below table, except where a more shrub dominant community is desired.

Percent Cover Thresholds – Alternative C, Class 1

Desired Plant Community	Small Diameter		Large Diameter		
	DBH (cm)	**Canopy Cover (%)**	**DBH (cm)**	**Canopy Cover (%)**	**Equivalent # of trees/acre**
Emergent	N/A	N/A	N/A	N/A	N/A
Open water	N/A	N/A	N/A	N/A	N/A
Freshwater/Riverine	N/A	N/A	N/A	N/A	N/A
Ash Swale/Riparian	< 15-30	5-10	> 15-30	50-100	5-15
Wet-prairie/vernal pool	All	5-10	N/A	N/A	N/A
Upland prairie	All	5-10	N/A	N/A	N/A
Oak woodland	< 15-30	10-15	> 15-30	50-80	7-15
Oak savanna	< 20-30	5-10	> 20-30	40-60	3-7

Action 2: Monitor yearly the occurrence and spread of invasive species on 165 acres. Control invasive plant species on the acres using the following management guidelines:

Management Guidelines:

a) Recommend areas for control of non-native plant species when combined encroachment reaches 10% to 35% or greater of the habitat block and/or a weed population covers >50% of a 1m2 area, depending on site conditions and species present.

b) Remove all populations of highly aggressive weeds species including, but not limited to:

reed canarygrass (*Phalaris arundinacea*)	invasive grass
Harding grass (*Phalaris aquatica*)	invasive grass
meadow knapweed (*Centaurea pratensis*)	ODA, B-listed weed
false brome (*Brachypodium sylvaticum*)	ODA, B-listed weed
teasel (*Dipsacus fullonum*)	invasive forb
scotch broom (*Cytisus scoparius*)	ODA, B-listed weed

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on 165 acres. Treat areas according to the following management guidelines:

Management Guidelines:

a) Reduce the buildup of litter when the litter layer exceeds 10-20% cover and litter layer is detrimentally impacting native forb plant diversity or rare plant habitat.

b) Do not treat areas within five years of soil-disturbing activities.

c) Treat no more than 1/3 of the total acres in any year.

Action 4: Monitor yearly the existing levels of native plant species cover on 165 acres. Maintain the existing levels of native plant species cover by using the following management guidelines:

Management Guidelines:

a) Recommend vegetation treatments to maintain existing levels of native plant species cover when monitoring shows a loss of 5-10 percent of a site's existing number of native plant species.

b) Schedule treatments to allow needed time to acquire seed, equipment and resources to accomplish the project.

Action 5: Monitor conditions of western pond turtle habitat on up to 9 parcels annually. Maintain suitable habitat conditions for western pond turtles on up to 9 parcels by treating woody vegetation encroachment, invasive weeds, and other vegetation in nesting and rearing habitats and travel corridors using vegetative treatment techniques listed in Table C-1 of Appendix A.

Class 2. Enhance 255 acres of habitat adjacent to current populations of remnant rare plants, and Fender's blue butterfly.

Action 1: Monitor yearly woody vegetation encroachment on 255 acres. Control woody vegetation encroachment on this acreage by using management guidelines listed under Class 1.

Action 2: Monitor yearly for occurrence and spread of invasive plant species on 255 acres. Control invasive species on the acres using management guidelines listed under Class 1.

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on 255 acres. Treat areas according to management guidelines listed under Class 1.

Action 4: Monitor yearly the existing levels of native plant species cover on 255 acres. Increase levels of native plant species to levels observed in high quality remnant sites, by using management guidelines listed under Class 1.

Action 5: Monitor habitat conditions of western pond turtle on up to 8 of 9 parcels annually. Create or improve nesting and rearing habitats for western pond turtles on up to 8 of the 9 parcels using vegetative and western pond turtle treatment techniques listed in Table C-1 of Appendix A.

Management Guidelines

See Restoration Treatment Definitions (Appendix B) and Design Features (Appendix C).

Class 3. Connect, create, and expand habitat for rare plants and Fender's blue butterfly on 390 acres by treating habitat where rare species may colonize.

Action 1: Monitor yearly woody vegetation encroachment on 391 acres. Control woody vegetation encroachment on this acreage by using management guidelines listed under Class 1.

Action 2: Monitor yearly for occurrence and spread of invasive plant species 390 acres. Control invasive species on the acres using management guidelines listed under Class 1.

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on 390 acres. Treat areas according to management guidelines listed under Class 1.

Action 4: Monitor yearly the existing levels of native plant species cover on 390 acres. Increase levels of native plant species cover to levels observed in high quality remnant sites, by using management guidelines listed under Class 1.

Action 5: Create or improve nesting and rearing habitats for western pond turtle on up to two parcels not presently occupied by western pond turtles to expand habitat. Treatments could include vegetative treatments and western pond turtle treatments listed in Table C-1 of Appendix A.

Management Guidelines

See Restoration Treatment Definitions (Appendix B) and Design Features (Appendix C).

Alternative C Summary Tables

Acres Habitat Managed by Class – Alternative C		
Class 1 – Existing Habitat	165	
Class 2 – Adjacent Habitat	255	
Class 3 – Connectivity Habitat	390	
Total Managed	**810**	**60%**
Not Managed	530	
Total, Planning Area	1,340	

Acres Fender's blue butterfly habitat by Class – Alternative C	
Class 1	20
Class 2	15
Class 3	75
Total Managed	**110**

Number Western Pond Turtle Parcels managed – Alternative C	
Class 1	≤ 9
Class 2	≤ 8 of 9
Class 3	≤2

Table C-1: Alternative C – Actions and Treatment Techniques

	Selected Rare Species Habitat Maintenance, Enhancement, and Expansion Actions – Alternative C				
	Action 1	Action 2	Action 3	Action 4	Action 5
Treatment Techniques	Control woody vegetation encroachment	Invasive species removal	Reduce Thatch Buildup	Enhance native plant cover	Improve/ maintain nesting/rearing habitat for WPT
Carbon addition *				X	
Chainsaws/Thinning	X				X
Biosolids treatments *		X		X	
Fill removal *				X	X
Girdling trees	X				X
Grind tree stumps	X	X			
Grubbing	X	X			X
Hand pulling tools (Hoeing and Clipping)	X	X			X
Livestock grazing (particularly sheep or goats)*	X	X			
Mowing	X	X	X	X	
Mycorrhizae addition *		X		X	
Planting propagules		X		X	X
Prescribed burning	X	X	X	X	X
Raking			X		
Shade cloth		X			X
Sod rolling *		X			X
Solarization*		X			X
Spot tilling *		X			X
Thermal (flame weeder, hot foam, propane) *	X	X			X
Tilling *		X		X	
Weed whacking	X	X			X
Western Pond Turtle					
Planting of aquatic vegetation					X
Create/improve upland soil mounds for nesting					X
Remove vegetative barriers to movement					X
Create permanent ponds					X
Coarse wood and boulder placement in ponds					X

* These treatment techniques will not be applied within Federally-listed T&E plant populations when the treatment could result in adverse affects to populations of T&E species.

ALTERNATIVE D – *Habitat Type Maintenance, Enhancement, and Expansion*

This alternative is designed to maintain, enhance, and expand the amount of high and medium quality habitat of each of the eight habitat types delineated in the planning area. Within this alternative, sites are ranked based on site quality characteristics including the presence of rare plants, Fender's blue butterfly, and the western pond turtle; the diversity of native plants present on the site; the size of the site and habitat block; and the site's importance in maintaining the habitat connectivity of the wetlands. Once ranked, each site is designated as high, medium, or low quality. With this breakdown, funding could be allocated as available. Actions specifically required by City or County ordinances, or other law or policy (e.g., weed mowing and fire suppression) would continue to occur as in Alternative A.

Alternative D manages or treats 1,340 acres (100%) of the planning area.

Alternative D would address the following classes of actions described below. Actions in Class 1 would generally be implemented first, proceeding through to actions in Class 2, and then Class 3. Project implementation within classes would be ranked and scheduled across acreage and habitats based on site conditions identified through monitoring, available funding, and other management guidelines. Actions described below would be accomplished through the use of a suite of treatment techniques listed in Table C-1.

Class of Actions

Class 1. Treat 500 acres of the highest quality examples of each plant community type, such that there would be no net loss of the highest quality communities over the life of this plan.

Action 1: Monitor yearly woody vegetation encroachment on 500 acres. Control woody vegetation encroachment on this acreage by using the following management guidelines:

Management Guidelines:

a) Treat all invasive native and non-native trees and shrubs when present.

b) Recommend acreage for control of woody vegetation when encroachment reaches the percent cover threshold corresponding to the habitat type listed in below table, except where a more shrub dominant community is desired.

Percent Cover Thresholds – Alternative D, Class 1

Desired Plant Community	Small Diameter		Large Diameter		
	DBH (cm)	**Canopy Cover (%)**	**DBH (cm)**	**Canopy Cover (%)**	**Equivalent # of trees/acre**
Emergent	N/A	N/A	N/A	N/A	N/A
Open water	N/A	N/A	N/A	N/A	N/A
Freshwater/Riverine	N/A	N/A	N/A	N/A	N/A
Ash Swale/Riparian	< 15-30	5-10	> 15-30	50-100	5-15
Wet-prairie/vernal pool	All	5-10	N/A	N/A	N/A
Upland prairie	All	5-10	N/A	N/A	N/A
Oak woodland	< 15-30	10-15	> 15-30	50-80	7-15
Oak savanna	< 20-30	5-10	> 20-30	40-60	3-7

Action 2: Monitor yearly the occurrence and spread of invasive plant species on 500 acres. Control invasive species on the acres using the following management guidelines:

Management Guidelines:

a) Recommend areas for control of non-native species when combined encroachment reaches 10% to 35% or greater of the habitat block and/or a weed population covers >50% of a 1m2 area, depending on site conditions and species present.

b) Remove all populations of highly aggressive weeds species including, but not limited to:

reed canarygrass (*Phalaris arundinacea*)	invasive grass
Harding grass (*Phalaris aquatica*)	invasive grass
meadow knapweed (*Centaurea pratensis*)	ODA, B-listed weed
false brome (*Brachypodium sylvaticum*)	ODA, B-listed weed
teasel (*Dipsacus fullonum*)	invasive forb
scotch broom (*Cytisus scoparius*)	ODA, B-listed weed

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on 500 acres. Treat areas according to the following management guidelines:

Management Guidelines:

a) Reduce the buildup of litter when the litter layer exceeds 10-20% cover and litter layer is detrimentally impacting native forb plant diversity or rare plant habitat.

b) Do not treat areas within five years of soil-disturbing activities.

c) Treat no more than 1/3 of the total acres in any year.

Action 4: Monitor yearly the existing levels of native plant species cover on 500 acres. Maintain the existing levels of native plant species diversity.

Management Guidelines:

a) Recommend vegetation treatments to maintain existing levels of native plant species cover when monitoring shows a loss of 5-10 percent of a site's existing number of native plant species.

b) Schedule treatments to allow needed time to acquire seed, equipment and resources to accomplish the project.

Action 5: Maintain suitable habitat conditions for western pond turtles on up to 9 parcels by treating woody vegetation encroachment, invasive weeds, and other vegetation in nesting and rearing habitats and travel corridors using vegetative treatment techniques listed in Table C-1 of Appendix A.

Class 2. Treat 420 acres of high and medium quality habitat adjacent to the highest quality communities of the eight community types over the life of this plan.

Action 1: Monitor yearly woody vegetation encroachment on 420 acres. Control woody vegetation encroachment on this acreage by using management guidelines described under Class 1.

Action 2: Monitor yearly the occurrence and spread of invasive plant species within 420 acres. Control invasive species on the acres using management guidelines described under Class 1.

Action 3: Monitor the yearly existing levels of litter/thatch in grasslands and oak communities on 420 acres. Treat areas according to management guidelines described under Class 1.

Action 4: Monitor yearly the existing levels of native plant species cover on 420 acres. Increase existing levels of native plant species to levels observed in high quality remnant sites, by using management guidelines described under Class 1.

Action 5: Create or improve nesting and rearing habitats for western pond turtles on up to 8 of the 9 parcels using vegetative and western pond turtle treatment techniques listed in Table C-1 of Appendix A.

Class 3. Treat 420 acres of low quality habitat to increase the amount of medium and high quality habitat.

Action 1: Monitor yearly woody vegetation encroachment on 420 acres. Control woody vegetation encroachment on this acreage by using management guidelines described under

Action 2: Monitor yearly the Class 1.occurrence and spread of invasive species within 420 acres. Control invasive species on the acres using management guidelines described under Class 1.

Action 3: Monitor yearly the existing levels of litter/thatch in grasslands and oak communities on 420 acres. Treat areas according to management guidelines described under Class 1.

Action 4: Monitor yearly the existing levels of native plant species cover on 420 acres. Increase levels of native plant species cover to levels observed in high quality remnant sites by using management guidelines described under Class 1.

Action 5: Create or improve nesting and rearing habitats for western pond turtle on up to two parcels not presently occupied by western pond turtles to expand habitat. Treatments could include vegetative treatments and western pond turtle treatments listed in Table C-1 of Appendix A.

Alternative D Summary Tables

Acres Habitat managed by Class – Alternative D		
Class 1 – Existing Habitat	500	
Class 2 – Adjacent Habitat	420	
Class 3 – Connectivity Habitat	420	
Total Managed	**1,340**	**100%**
Not Managed	0	
Total, Planning Area	1,340	

Acres Fender's blue butterfly habitat (Occupied and Unocuppied) by Class – Alternative D	
Class 1	20
Class 2	15
Class 3	85
Total Managed	**120**

Number Western Pond Turtle Parcels managed – Alternative D	
Class 1	≤ 9
Class 2	≤ 8 of 9
Class 3	≤2

Actions and Treatment Techniques under Alternative D are the same as listed in Table C-1 of this appendix.

12.0 APPENDIX B – TREATMENT DESCRIPTIONS

VEGETATION TREATMENTS

Bio-solid addition – The application of nutrient-rich organic materials resulting from the treatment of sewage sludge (solid, semisolid or liquid untreated residue generated during the treatment of domestic sewage in a treatment facility). When treated and processed, sewage sludge becomes bio-solids which can be safely recycled and applied as fertilizer.

Carbon addition – Carbon application (often in the form of sawdust or wood chips) to immobilize nitrogen in the soil. Carbon addition creates a nitrogen poor soil, which is favored by some native species.

Chainsaws – Handheld power tools that are utilized to cut down woody vegetation, control and remove invasive woody plants, and/or thin tree density.

Fill removal – Utilizing earth moving equipment to remove excess soil that was previously placed onsite to fill wetlands for development and/or agricultural uses. The amount of fill removed is determined by site objectives and goals; review of historic site records, particularly aerial photographs; grading plans using 1 foot contour intervals or less; and by digging test pits.

Girdling trees – The physical removal of the cambium layer around the circumference of the tree trunk near the base of a tree with an axe or chainsaw. Girdling eventually kills the tree.

Grinding tree stumps – Removing tree stumps and their associated root system manually or mechanically. This action prevents tree species from re-sprouting.

Grubbing/Hoeing – The manual digging and removal of roots and rootwads of invasive species with a shovel or other hand-held tool. It is done to control and remove invasive woody and herbaceous plants.

Livestock grazing – Allowing livestock, particularly goats and sheep, to lightly graze areas of woody and invasive vegetation. This technique is effective in controlling current shrubby vegetation and new sprouts. Grazing would be controlled by location, intensity, frequency, and timing of treatment.

Manual Weed Removal – The physical removal of invasive, herbaceous and woody plants, or parts using hand tools. This includes hoeing, grubbing, clipping, and weed pulling. Tools that may be used include shovel, weed wrench, lopping shears, trowel, and hoe.

Mowing – The mechanical cutting of herbaceous and woody vegetation with the use of a tractor-pulled rotary deck mower. Properly timed mowing can prevent flowering and seed formation of plants, exhaust food supplies thereby weakening plants, and can reduce woody shrub and tree cover while maintaining grass and forb species.

Mycorrhizae addition – Inoculation of soils with native mycorrhizal fungi to improve plant establishment, vigor, and growth.

No-till drill – A form of mechanized seeding. The no-till drill is a piece of equipment pulled behind a tractor that drills native seed mix into the undisturbed soil. No-till is beneficial because it does not disturb established vegetation or the organic topsoil and minimizes soil water loss.

Planting/Seeding – Establishment of native vegetation onsite through seeding or planting of other vegetative material. Plugs, cuttings, and bare root stock are transplanted at the restoration site following grow-out in the nursery. Seeds are dispersed by broadcast seeders or no-till seed drills. Seeds, plugs, cuttings, and bare roots for restoration projects are obtained from local native sources within and near the WEW.

Prescribed burning – The hand application of fire (via drip torches) to remove and control invasive woody plants, remove thatch, and invigorate native plant populations. Burns will be low-intensity and short duration, and will cover between 1-50 acres. Burns will be continued on a 2-3 year rotation, contingent upon the results of on-site monitoring, funding, and air quality limitations.

Raking – Use of a tractor mounted rake device or a long-handled garden tool in order to gather, and loosen vegetation and to reduce standing dead material (thatch).

Shade cloth – Dark cloth placed over areas invaded by weeds and fastened to the ground with wooden stakes to control monotypic weed species. Sunlight does not penetrate the cloth, causing weed dieback from a lack of photosynthetic capability. After 2 years, the cloth is removed, and the area is seeded to native vegetation. It is primarily used to control reed canary grass and harding grass, but also to control blackberry in some areas.

Sod rolling – A technique used to control reed canarygrass (RCG) and other invasive species. When roots have accumulated to a depth of 4 to 6 inches, the blade of a bulldozer pushes the vegetative mat into windrows at the edge of the site. A skilled equipment operator can adjust the depth of the blade and remove most of the RCG while leaving the soil layer beneath relatively intact. The material is composted in place, which kills the seeds and root material in the soil. Afterward, soil can be re-used on site.

Solarization – Used to kill monotypic weed patches. It includes tilling and then covering areas less than 5,000 square feet with clear plastic during the subsequent growing season. The plastic remains onsite for at least three months so that elevated temperatures within the plastic kill the majority of the target species. Once the plastic is removed, follow-up hand weeding may be necessary. Finally, treated areas will be seeded with native species.

Spot tilling – Used to control monotypic weed patches. A tractor with a tiller attachment will be used to turn up the soil no more than 6" deep on the specified site. This action disturbs the root system of the weeds and exposes them to sunlight, leading to the eradication of weed species. Secondary tilling applications may be needed throughout the season to suppress any new growth of the weeds. However, tilling will not occur during the wet season, so that hydrology is not disturbed. Once tilling is complete, the area will be seeded to native vegetation.

Thermal – Use of tractor or truck mounted equipment, such as the Sunburst™ or Waipuna™, walk behind, and handheld thermal devices, to expose unwanted vegetation to high temperatures with radiant heat, hot foam, or open flame. Some equipment types apply water prior to the thermal treatment to intensify the heating effect. Weed species are either killed or suppressed. Several treatments per year may be necessary to provide adequate control, depending on the establishment level of the weed species. These devices will only be used in compliance with fire season regulations.

Thinning –Utilizing chainsaws to remove trees and other woody vegetation, native or invasive, to recreate historic open areas (e.g., removing small diameter oaks and conifers to restore an open oak savanna). Removal of the woody material on site would be conducted by chipping, slash burning, sale of firewood, trucking, and utilizing a self loader.

Tilling/disking – Used to kill or suppress invasive plant species and/or prepare a site for native vegetation establishment. This action requires operation of a tractor and tiller. The tiller will likely disrupt the structure of several inches of soil.

Weed whacking – The physical cutting of herbaceous and woody vegetation with a hand-held, motorized "weed whacker". The whacker is a sharpened blade or plastic string on a pole that is swung by the operator.

WESTERN POND TURTLE TREATMENTS

Maintaining and improving existing nesting areas – Protection and enhancement of areas with suitable characteristics for nesting: sunny sites at least 20 x 20 feet on hard, compacted clay soils with south to southwest facing slopes; short, sparse vegetation; and within 500 feet of water bodies. Includes mowing, hoeing, and/or hand pulling vegetation to maintain short vegetation and create bare soil areas for nest excavation. Also includes controlling woody species, including invasive weeds such as blackberry, and scotch broom, to prevent encroachment on nesting areas; and thinning/removing native trees and shrubs to reduce shading of nest sites. Re-contouring of areas or augmentation with other soils could occur at some sites to enhance suitability for turtles.

Creating Nesting areas – Creation of nesting areas would consist of building upland mounds at least 10 feet wide and 2-3 feet high that have a south or southwest- facing slope. These mounds could cover an area of up to 50 x 50 feet. Mounds would be created from soils excavated on site or from other sites within the WEW and would be composted or sterilized to remove any viable weed seeds. Soil used would be primarily silt or clay.

Removing barriers to movement – Maintain clear visual and travel paths between water bodies and occupied or potential nesting sites and remove obstructions to movement in aquatic corridors/stream channels. This involves removal of invasive weeds, and other native/non-native species that could obstruct turtle movement, such as dense shrubs (willow, spiraea) in and adjacent to aquatic corridors, and areas of dense or tall grasses and forbs. Vegetation removal would include a variety of methods, but not restricted to: hand-pulling, mowing, grubbing, chainsaws, and solarization.

Coarse wood and boulder placement in ponds – Logs, large rootwads, and/or boulders would be placed in ponds to create basking sites for turtles. Log or root wad structures could be up to 4-5 foot d.b.h. with roots extending up to 10 or more feet. Movement of these large structures would require heavy equipment such as a backhoe or excavator.

13.0 APPENDIX C – DESIGN FEATURES BY RESOURCE

Additional design features may be developed by appropriate resource specialists on a site-specific basis, in response to on-site conditions and most current research and basin wide plans (e.g., Willamette Valley Recovery Plan).

AIR QUALITY/PRESCRIPTION BURNING

- All burning will be done in compliance with Lane Regional Air Pollution Authority and the unit-specific Prescribed Fire Burn Plan.
- Prescribed burns would generally occur at an interval of every 2-3 years, but intervals would be based on results of monitoring and/or research.
- Prescribed burning is generally restricted to late summer and fall months, when soils have low moisture values, and can support fire-fighting vehicles without damage to the soils.
- Burns would be of short duration and would be implemented on only a portion of any listed species population.
- Prescribed burns would be ignited by hand using propane, fusees, or drip torches.
- Fire control/suppression would be accomplished with the use of pre-burn hose lays, wet-lining, and/or fire retardant foam.
- An area approximately 10-20 feet wide would be mowed around the outside boundary of the prairie area to assure fire control.
- Access routes for vehicles (including fire vehicles) would be planned ahead of time to minimize potential effects to T&E species, Special Status species, and other sensitive wetland resources.
- Trampling by burn staff in areas of T&E species would be discouraged to avoid/minimize potential effects.

BIOLOGICAL RESOURCES (BOTANY and WILDLIFE)

- Ground-nesting and other key bird breeding areas would be identified prior to mowing. Mowing within these areas would not occur between April 15 – July 15, generally the nesting season.
- Removal of trees and shrubs would be timed to minimize adverse effects to occupied bird nests.
- Temporary protective fencing and restrictive signage would be placed along the boundary of project areas as needed to protect plant and wildlife habitat during construction activities.
- Use of native seed and other plant materials will be consistent with the Wetland Plant Supply Strategy (1996). Seed mixes would include nectar plant seed for the great copper butterfly.
- Livestock, particularly goats and sheep, would be used on areas that have a high percent cover of exotic species.

T&E and OTHER SPECIAL STATUS SPECIES

- Pre-project surveys for T&E and other Special Status Species would occur as needed, in accordance with the BLM policy at the time of project implementation. Areas of listed T&E species and Special Status species within or near project areas would be identified with flagging.
- Human activities, including walking, in areas occupied by T&E species would be limited to avoid/minimize potential effects.
- When burning in areas with Fender's blue butterfly, the size of the burn units for sites supporting 100 or more adult Fender's would be a maximum of 1/3 of the occupied habitat. The size of the burn units for sites with less than 100 adult Fender's would be a maximum of 1/4 of the occupied habitat. Un-burned occupied habitat would be maintained within 100 meters of the burn area to provide a re-colonization source for the butterfly. Where patch size allows, butterfly refugia within

burn units would be protected with a fire break and/or watering down prior to a burn. Intervals for burning would be determined based on monitoring of butterfly populations.

- Treatments applied to areas of listed T&E species, and other Special Status species, would generally occur after plant populations have senesced for the season. If any treatments occur during periods when T&E plants and other Special Status species are actively growing (February-September), plants would be well-marked on the ground so that plants would not be damaged by crews and equipment. When possible, work would be supervised by a trained specialist and would be implemented with as few workers as possible to limit trampling.
- Planting of native vegetation in areas occupied by Fender's blue butterfly would be conducted in late spring or winter and only between patches of extant Kincaid's lupine plants, where inactive larvae may be present.
- When mowing areas with T&E species and other Special Status species, work would occur after plants have senesced. Mower decks would be a minimum of six inches above ground to prevent soil disturbance on sites with irregular soil-surface topography and to reduce potential for disturbance to Fender's blue larvae in the thatch layer
- No more than 2/3 of a population of T&E plant species, with the exception of Kincaid's lupine, would be treated by mowing or burning in a given year.
- Use of shade cloth in areas occupied by any of the three T&E plant species would be placed a minimum of 5 feet away from known populations of these plants
- Girdling trees, grinding tree stumps or use of chainsaws would not occur within populations of the T&E species.
- Raking or weed whacking in areas of T&E plant species would occur only after plants have senesced.
- Any western pond turtle nest sites found during project implementation would be protected in coordination with ODFW.
- Silt/drift fences would be installed where appropriate to direct turtles away from construction/project activities and would be removed after project completion.

NON-NATIVE and NOXIOUS WEEDS

- Native plants would be seeded or planted post-treatment when needed to encourage establishment of native vegetation and to discourage potential spread and establishment of exotic and invasive woody and herbaceous species.
- To prevent the spread of noxious weeds and nonnative plants, all vehicles and heavy construction equipment would be cleaned to remove mud, debris, and vegetation material prior to arriving at the project site.
- Grazing would be monitored and restricted to the dry season in wetland habitat.
- Livestock would be quarantined and fed weed-free food before and after release on each project area. Quarantine should be sufficient to prevent seeds from one site contaminating the next. If the livestock are being used for treatment of the same species of invasive plants and noxious weeds on different sites within the WEW, no quarantine is needed.

HYDROLOGY/WATER QUALITY AND SOILS

- Grazing animals would not be allowed within 50 feet of any stream or river channel.
- Soil disturbing restoration techniques (where disruption of nitrogen removal, sediment stabilization, and phosphorus retention might occur) would be designed to protect functionality of wetland and riparian sites.
- Ground disturbing activities would be designed to retain organic materials (primary production of soil animals and microbes).
- Excavation of native soils would be designed to minimize disturbance to the historic native soil profile.

- Protective barriers would be placed around specified staging areas, drainages, ditches, and stream edges as needed to minimize sedimentation. Protective barriers would be removed after project completion.
- Sediment Traps/Retention Ponds will be constructed, as needed, during project implementation to intercept runoff from disturbed areas and will be located away from natural stream channels. The traps/ponds should be adequate in size and number to provide for storm events and predicted sediment accumulation. Sediment traps/retention ponds would be removed or left in place, based on site-specific circumstances.
- Weed free native straw mulch or geo-textiles will be used to minimize erosion from bare soils adjacent to streams, ditches or drainage ways.
- Soil disturbing work would occur during the dry season to minimize compaction. Use of low ground pressure equipment would be required to minimize compaction. Tilling would be used for decompaction where appropriate during low moisture soil conditions (summer/fall).
- Topsoil would be retained on site, if possible. Where feasible, disturbed soil would be salvaged, segregated during storage, composted, and reused in a similar location and depth. Where feasible, wetland soils would be salvaged and reused as fill in wetland areas.
- Monitoring of soils during sod rolling or fill removal would be required to minimize the disturbance and loss of the shallow native surface.

CULTURAL RESOURCES

- Cultural resource surveys would be conducted in advance of surface disturbing activities in areas with intact historic soil profile where cultural resource surveys have not been previously conducted. No excavation would occur in areas where the historic soil profile is intact.
- In the event paleontological remains or archaeological specimens are uncovered or found within the project area, the area would be secured by the BLM until the site can be evaluated to determine its eligibility for inclusion on the National Register of Historic Places.

14.0 APPENDIX D – BOTANY

Table D-1: All rare and uncommon plants that have been documented in the planning area

Vascular Plant Species	Federal/State Designation	BLM Designation	NPSO** R&E
*Aster curtus**	State Threatened	N/A	X
Apocynum cannabinum	None	None	X
Asclepias fascicularis	None	None	X
Asclepias speciosa	None	None	X
Calochortus uniflorus	None	None	X
Cicendia quadrangularis	None	Bureau Assessment	X
Erigeron decumbens var. *decumbens**	Federal Endangered	N/A	X
Geranium oreganum	None	None	X
Horkelia congesta ssp. *congesta**	Species of Concern	Bureau Sensitive	X
Lasthenia glaberrima	None	None	X
Lathyrus holochlorus	None	Bureau Sensitive	X
*Lomatium bradshawii**	Federal Endangered	N/A	X
Lupinus sulphureus ssp. *kincaidii**	Federal Threatened	N/A	X
Montia howellii	None	Bureau Tracking	X
Orobanche californica ssp. *californica*	None	Bureau Tracking	X
Pyrrocoma racemosa var. *racemosa*	None	Bureau Assessment	X
Prunus subcordata	None	None	X
Sidalcea campestris	None	Bureau Sensitive	X
Sidalcea cusickii	None	Bureau Tracking	X
Sisyrinchium hitchcockii	None	Bureau Sensitive	X

* State Listed Threatened (Managed as Bureau Sensitive)
** Native Plant Society of Oregon

Table D-2: All federally listed plants and plant species with a BLM classification of BS are listed with habitat information, their status on BLM land, and threats to the populations.

Information presented below is largely taken from the 'Interagency Conservation Strategy for Rare Native Prairie Species in West Eugene.'

Plant Species	Habitat	Status on BLM land in WEW	Threats within WEW
Aster curtus	Aster curtus is a species of native prairie remnants. In Oregon, populations are found in both wet prairie and upland prairie communities, as well as in open situations in oak savannas. Prior to alteration of native prairies by settlers, A. curtus may have been a widespread, if not common, species of native prairie habitats in the Willamette Valley. However, most extant sites in west Eugene are in wet prairies. Soils of the wet prairie sites are mapped as the Dayton and Natroy series. Soils of upland prairie sites are mapped as Nekia, Pengra, Philomath, Stayton, and Witzel series.	Most monitored populations are currently stable or increasing, but several are unmonitored.	**General** ▪ Tree and shrub encroachment ▪ Invasive species **Specific to WEW** ▪ One site may be impacted by a proposed highway ▪ Equestrian use
Erigeron decumbens var. decumbens	This species is restricted to native prairies but is found in a variety of prairie communities. Most of the west Eugene populations are in wet prairie. These populations are in sites that are relatively undisturbed, high quality prairie remnants, with a diversity of native forb and grass species present. Soils of the wet prairie sites are mapped as Dayton and Natroy series.	Three populations have been quantitatively monitored. These appear to be stable to decreasing. Quantitative monitoring has just begun at other sites.	**General** ▪ Tree and shrub encroachment ▪ Invasive species
Horkelia congesta ssp. congesta	Restricted to native upland prairie and wet prairie communities, on a variety of soils. In west Eugene, it is found mostly in wet prairie.	The regularly monitoring populations are stable or decreasing. Other populations are on recently acquired land and baseline data have been collected.	**General** ▪ Tree and shrub encroachment ▪ Invasive species **Specific** to WEW ▪ Road construction
Lathyrus holochlorus	Margins of woods, roadsides, fence rows and near farmland	Two populations were documented in 1997, but have not been seen since. Sites are overgrown with trees and shrubs.	**General** ▪ Tree and shrub encroachment ▪ Invasive species (Himalayan blackberry)
Lomatium bradshawii	In west Eugene, *Lomatium bradshawii* is restricted to wet prairies dominated by *Deschampsia cespitosa*. These areas are on soils mapped as the Bashaw, Dayton, or Natroy series. Most sites are in fairly high quality native prairie, although a few large populations are found in areas with substantial grazing history.	Status varies from population to population. A couple of populations have increased significantly while others have decreased significantly. Monitoring has just started on some populations.	**General** ▪ Tree and shrub encroachment Invasive species ▪ Lack of fire/disturbance **Specific to WEW** ▪ Rodent herbivory ▪ Road construction
Lunpinus sulphureus* ssp*. kincaidii	In west Eugene, this species occupies relatively mesic upland prairie habitats. Most of the extant populations are in native prairie remnants of moderate to high quality. *Lupinus sulphureus* spp. *kincaidii* is apparently able to survive limited disturbance because new shoots arise from the deep, well established root system. Populations occur on a variety of upland soils. This sub-species is never found on hydric soils, even when populations are immediately adjacent to wet prairies.	Artificially established populations are declining. Of the remnant populations, the number of plants is increasing at Oxbow West , but decreasing in all other locations; however, there are at most three consecutive years of data collection.	**General** ▪ Tree and shrub encroachment ▪ Invasive species **Specific to WEW** ▪ Trespass grazing ▪ Unauthorized recreational use ▪ Off-road vehicles
Sidalcea campestris	2-3 Plants at Taylor North; Historic site at Oak Hill	Unknown	**General** ▪ Tree and shrub encroachment ▪ Invasive species
Sisyrinchium hitchcockii	Wet prairie, upland prairie, and oak savanna. May be more common in west Eugene than previously thought.	Taxonomy still uncertain. No populations monitored.	**General** ▪ Tree and shrub encroachment ▪ Invasive species

Table E-1: Special Status Wildlife Species listed here include those with federal status as Threatened, Endangered, Bureau Sensitive, and Bureau Assessment, and Federal Candidate.
Also included here is information on associated habitats, current status on BLM land, and known threats to the populations.

Wildlife Species	Status	Habitat Types/Habitat Components	Status on BLM land in WEW	Threats
Fender's blue butterfly	Federal Endangered	Upland and wetland prairie habitats in association with Kincaid's lupine, its primary host plant	3 pops currently being managed/monitored. Eggs found at 1 additional site, but FBB not confirmed	Loss and fragmentation of habitat due to conversion of native prairie, invasion of non-native plants, and succession due to lack of fire
Bald Eagle	Federal Threatened	Ponds, rivers, streams [trees/snags that provide suitable perches for foraging]	Occasional use of WEW for foraging	Pesticides, habitat loss
Common nighthawk	Bureau Sensitive	Upland prairie, oak woodland/savanna [short herbaceous layer with bare, rocky areas for nests]	Documented in WEW. Rare in Willamette Valley	Loss and fragmentation of habitat/ground nests vulnerable to disturbance and predation
Lewis' woodpecker	"	Oak woodland/savanna [large trees and avail. cavities]	Documented during migration only. No documented nesting in Lane Co since 1960's	Loss of habitat- limited by number of large open grown trees/snags
Oregon vesper sparrow	"	Upland and wet prairie (summer only), Oak savanna [scattered shrubs, may use cultivated fields, roadsides]	Documented Spring/Summer	Loss and fragmentation of habitat/ground nests vulnerable to disturbance and predation
Purple martin	"	Upland and wet prairie, oak savanna [snags, nest boxes]	Documented in Summer	Loss and fragmentation of habitat, primarily limited by nest trees/snags.
Western Meadowlark	"	Upland and wet prairie, oak savanna [large patches of grassland with fencerows, scattered shrubs/trees for perching, may use cultivated fields]	Year-round resident	Loss and fragmentation of habitat/ground nests vulnerable to disturbance and predation.
Northwestern pond turtle	"	Open water, emergent, upland and wet prairie [ponds rivers, stream channels]	Year-round resident	Loss, degradation and fragmentation of habitat. Predation of hatchlings by non-natives.

Table E-1: (*continued)*

Wildlife Species	Status	Habitat Types/Habitat Components	Status on BLM land in WEW	Threats
Fringed myotis	Bureau Sensitive	Anywhere roost sites available [caves, bridges, buildings, crevices, snags]	Suspected use of WEW. No known roost sites	Disturbance, vandalism at roosts. Habitat loss
Townsend's big-eared bat	"	Anywhere roost sites available [caves, bridges, buildings, crevices, snags]	Suspected use of WEW. No known roost sites	Disturbance, vandalism at roosts. Habitat loss
Yellow-breasted chat	"	Riparian and ash swale [shrub thickets in or near riparian areas]	Summer residentSpotty occurrence in WV	Loss and fragmentation of habitat.
American acetropis bug	"	Wet prairie [*Deschampsia*]	Suspected- no records for Willamette Valley	Loss and fragmentation of habitat suspected.
Grasshopper sparrow	Bureau Assessment	Upland and wet prairie (summer only), oak savanna [moderately tall grass with low shrub/tree cover, may use cultivated fields]	Rare Summer visitor/breeder. Very rare in Western Oregon.	Loss and fragmentation of habitat/ground nests vulnerable to disturbance and predation.
White-tailed kite	"	Oak savanna, upland prairie, Riparian/ash swale [open with scattered deciduous trees for nesting]	Winter resident	Habitat Loss Note: Recent immigrant to Oregon, not confirmed as breeding resident.
Pallid bat	"	Anywhere roost sites available [caves, bridges, buildings, crevices]	Suspected use of WEW. No known roost sites	Disturbance, vandalism at roosts. Habitat loss.
Bald Hesperian snail	"	Wet prairie	Documented only in the WEW	Unknown-habitat loss suspected.
Streaked Horn lark	Federal Candidate	Upland and wet prairie, oak savanna [requires short vegetation with bare areas, will use cultivated or fallow fields]	Not documented. Nearest sighting Fern Ridge Reservoir.	Loss and fragmentation of habitat/ground nests vulnerable to disturbance and predation.

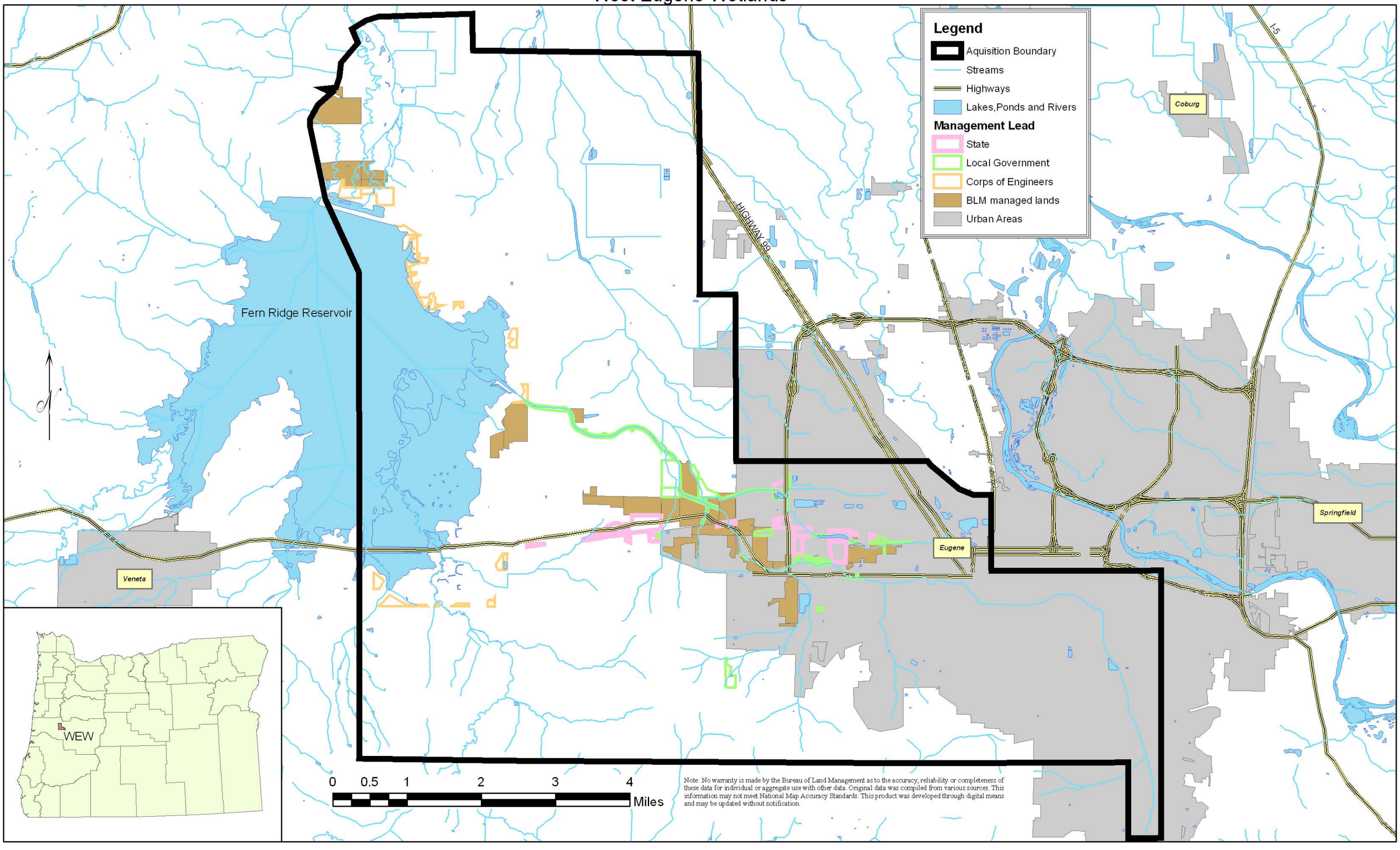
Table E-2 – BLM parcels to receive treatments for western pond turtles: Alternatives C and D

Class	Turtle Swale	Summer Oaks	Oxbow East	Beaver Run	Stewart Pond	South Taylor East	South Taylor West	Spectra Physics/ Oxbow West	North Taylor	Larson	Willow Ck Confluence
Class 1	X	X	X	X	X	X		X		X	X
Class 2	X	X	X	X	X	X		X		X	
Class 3							X		X		

Map 1

General Location Map

West Eugene Wetlands



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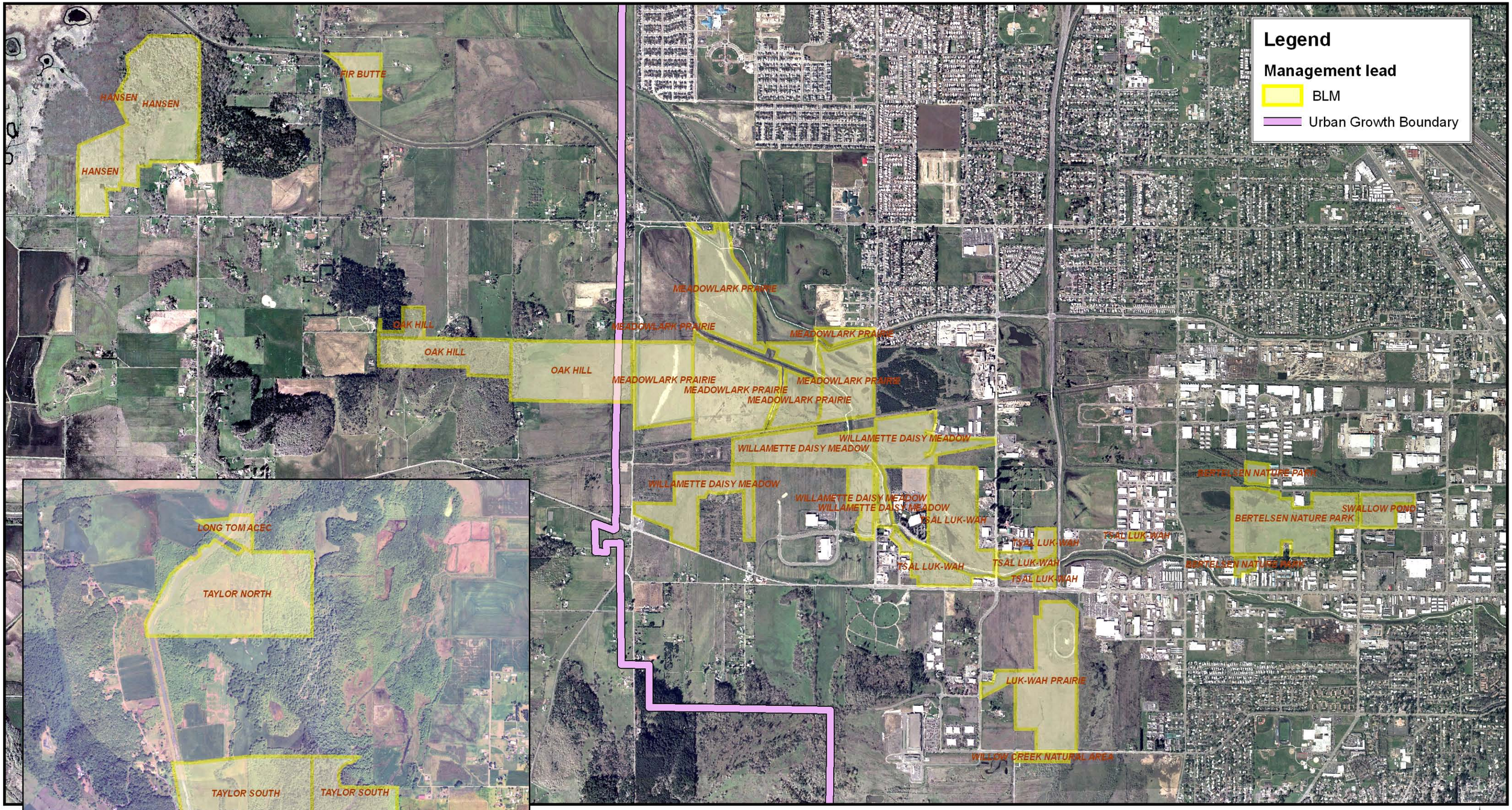
Map 2

ALTERNATIVE A

West Eugene Wetlands



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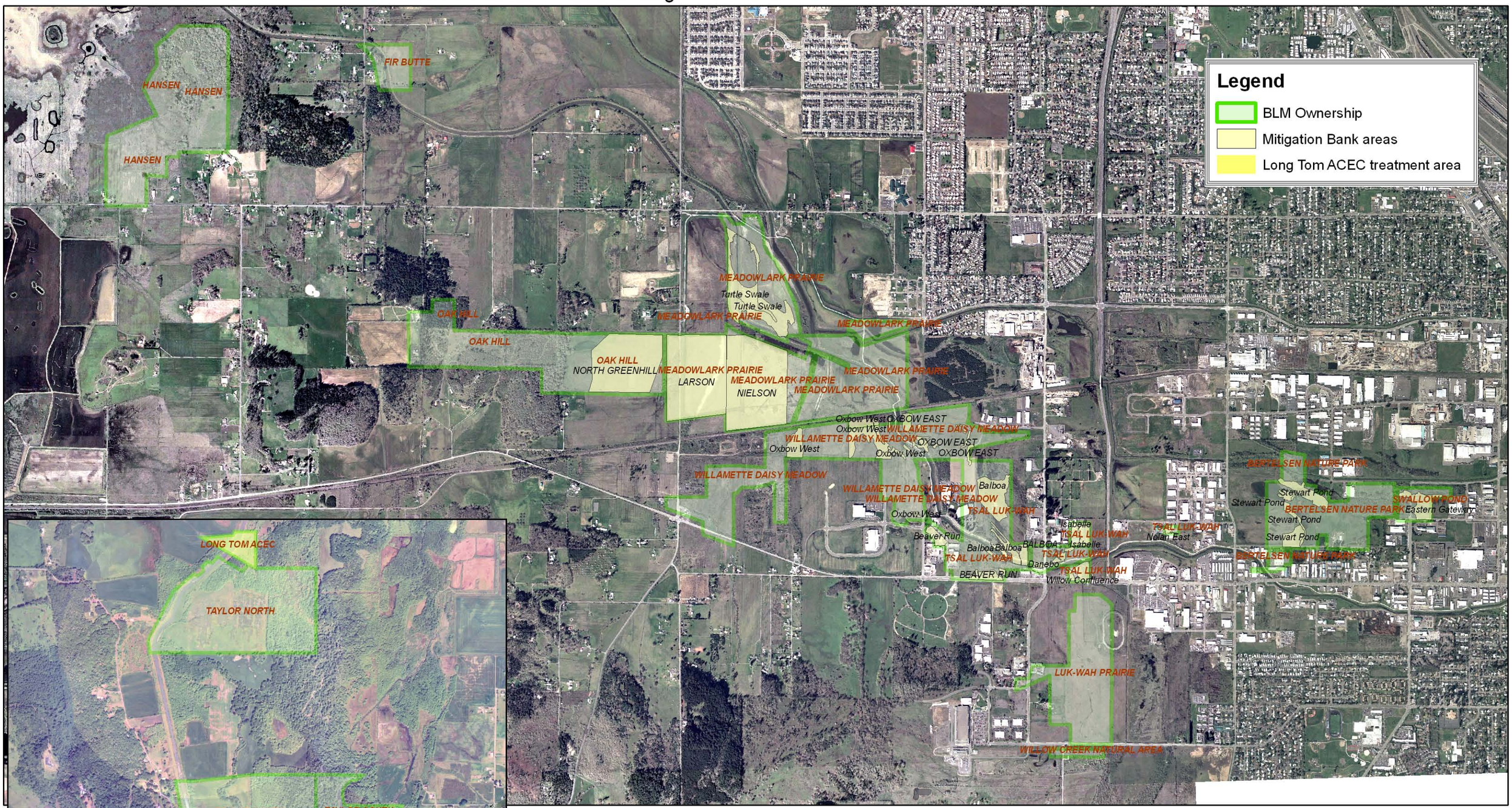
Map 3

ALTERNATIVE B

West Eugene Wetlands



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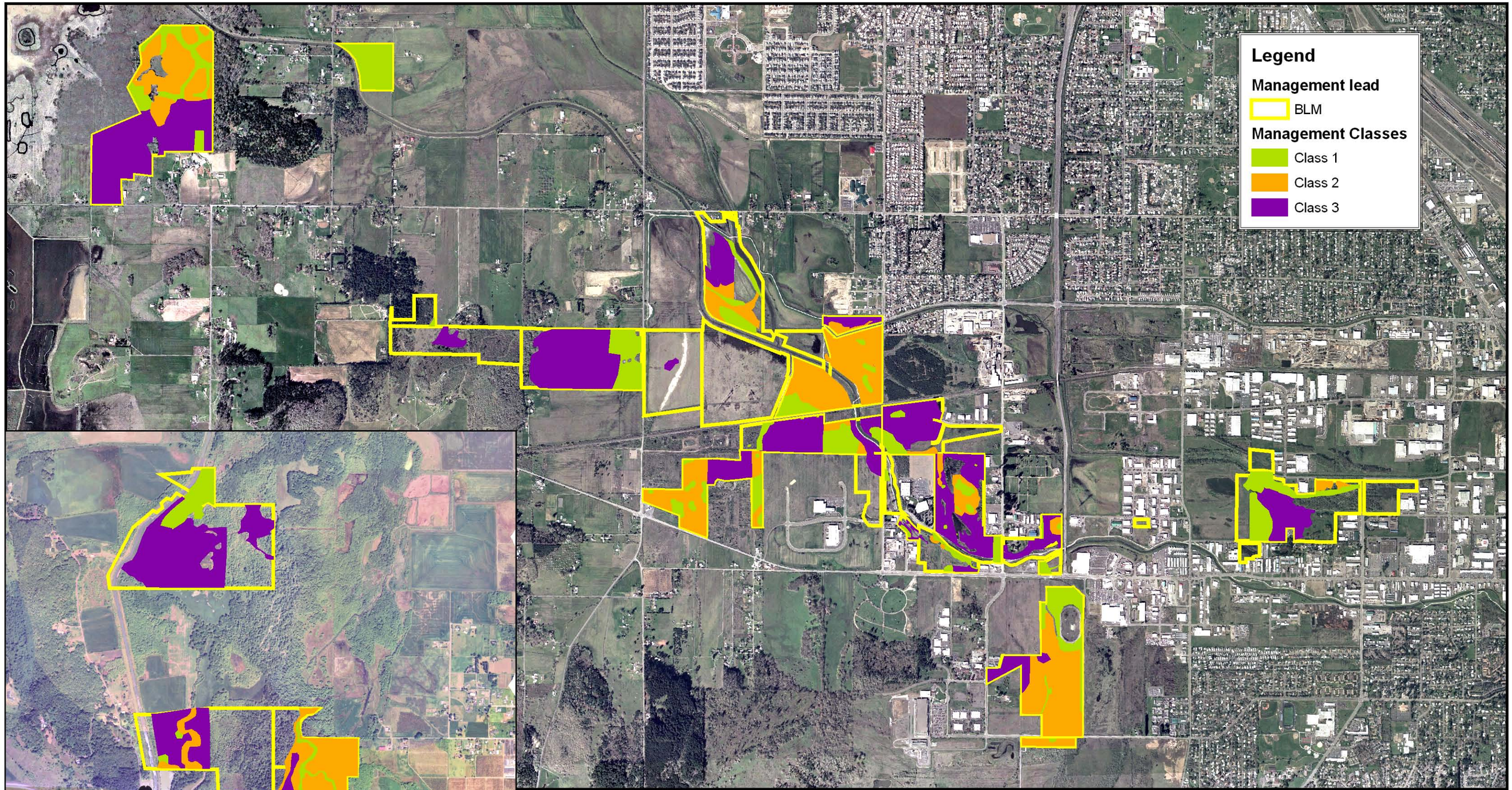
Map 4

ALTERNATIVE C

West Eugene Wetlands



Prepared by: Laurie Boldt and Jean Jancaitis
April 4, 2005

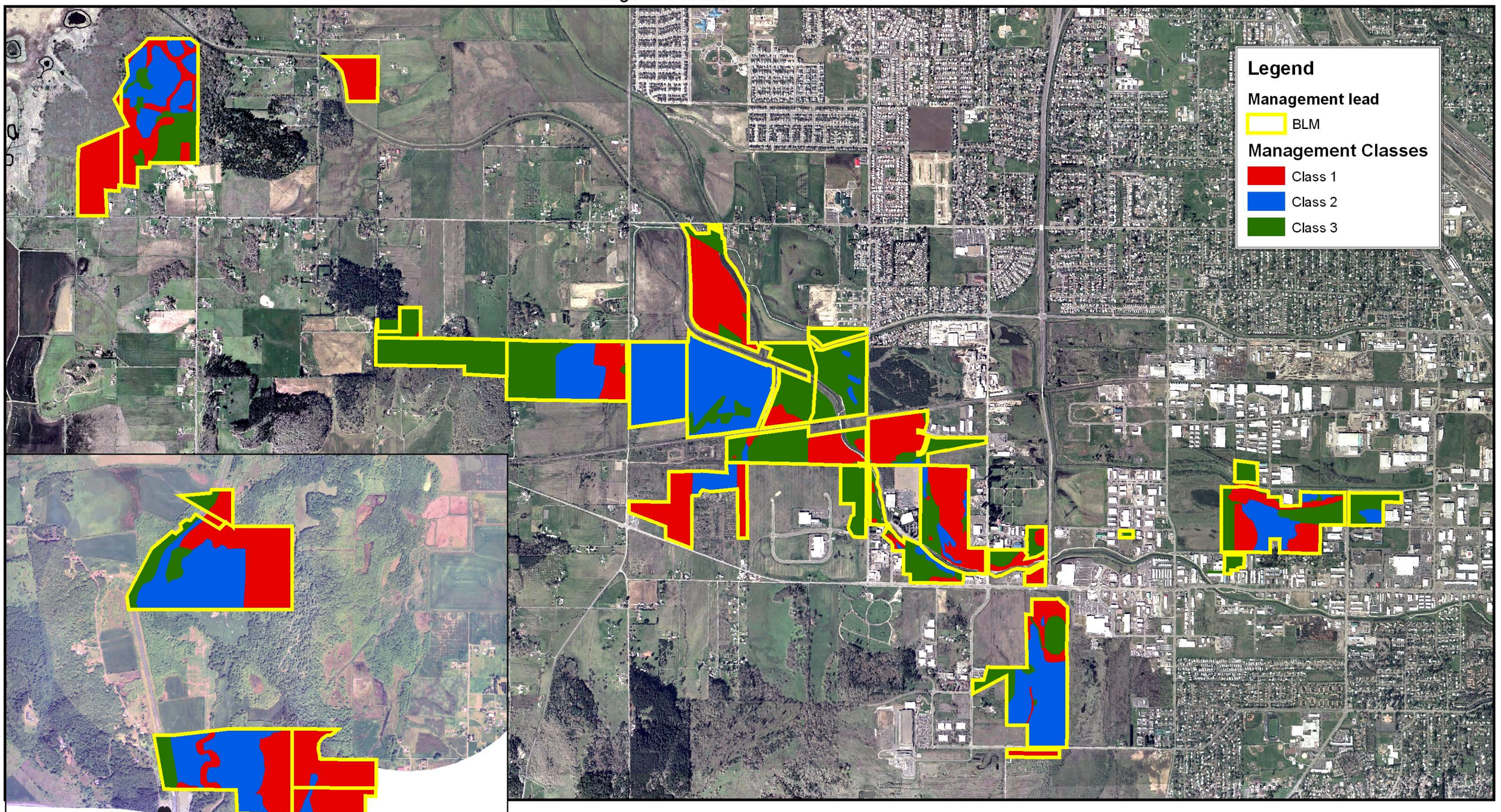
West Eugene Wetlands Data

Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Map 5

ALTERNATIVE D

West Eugene Wetlands



0 0.375 0.75 1.5 Miles

Prepared by: Laurie Boldt and Jean Jancaitis
April 4, 2005

West Eugene Wetlands Data

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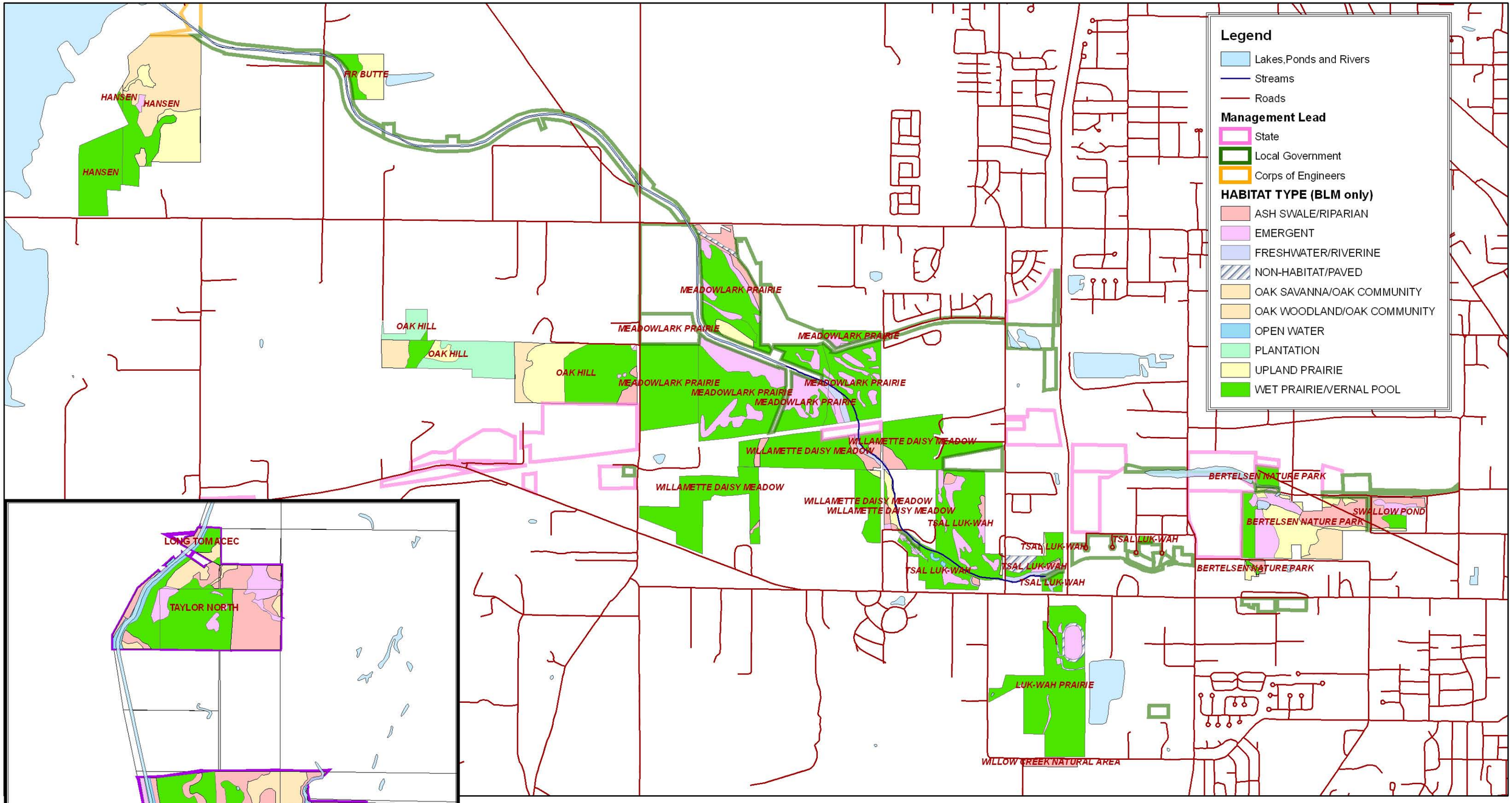
Map 6

Plant Communities

West Eugene Wetlands



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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE
DECISION RECORD and FINDING OF NO SIGNIFICANT IMPACT

West Eugene Wetlands Schedule
Environmental Assessment No. OR090-EA-05-03

PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT

On the basis of the information contained in the EA (OR090-EA-05-03), and all other information available to me, it is my determination that: (1) the implementation of the Proposed Action or alternatives will not have significant environmental impacts beyond those already addressed in the "Eugene District Record of Decision and Resource Management Plan," (June 1995); (2) the Proposed Action and alternatives are in conformance with the Eugene District Record of Decision and Resource Management Plan and the West Eugene Wetlands Management Plan (2000); and (3) the Proposed Action and alternatives do not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA.

Context

The Proposed Action would occur on BLM-managed lands within the West Eugene Wetlands (WEW) Study Area, in the Long Tom and Amazon Creek drainages. The WEW Study Area comprises approximately 8,000 acres. The Proposed Action prescribes treatments on that portion of the WEW Study Area managed by BLM, approximately 1,340 acres. The lands proposed for treatment are managed in cooperation with the City of Eugene and other partners to further the goals of the West Eugene Wetlands Management Plan. The treatments described in the Proposed Action are intended to enhance the values for which the West Eugene Wetlands are managed.

Intensity

I have considered the potential intensity/severity of the impacts anticipated from the WEW Schedule EA relative to each of the ten areas suggested for consideration by the CEQ.

1. Impacts that may be both beneficial and adverse. The EA considered both potential beneficial and adverse effects (see EA Table 2, p. 16).

2. The degree to which the proposed action affects public health and safety. The Proposed Action would use prescribed burning to control noxious weeds and invigorate native plants. Prescribed fire could affect public health and safety due to smoke and escaped fire. However, the Proposed Action contains design features to minimize risks of escaped fire (fire breaks, pre-burn hose lays, and wet-lining, for example). In addition, burning would be take place in consultation with the Lane Regional Air Pollution Authority to minimize smoke drift toward populated areas. Thus, public health and safety would be largely unaffected.

3. Unique characteristics of the geographic area such as proximity of historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. Pre-project cultural resource surveys would be conducted prior to surface-disturbing actions. Any sites found during the surveys would be evaluated to determine their eligibility for inclusion on the

National Register of Historic Places. There are no prime farmlands, or wild and scenic rivers in the area covered by the Proposed Action. The Long Tom Area of Critical Environmental Concern (ACEC) is within the project area. Actions that would occur in the ACEC are designed to enhance the values for which the area was designated. Actions would occur adjacent to and within wetlands. However, all actions are designed to enhance wetland values in the long term, and all actions are designed to minimize adverse effects of treatments in the short term.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial. The effects of actions planned under the Proposed Action are similar to actions that have been implemented in the West Eugene Wetlands over the past decade. No unique or high degree of controversy has been identified regarding the effects of the Proposed Action.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks. The analysis has not shown that there would be any unique or unknown risks to the human environment. Vegetation manipulation through prescribed fire, mowing, and handwork has been done in the Wetlands for several years, so the effects of such treatments are known. Grazing treatments would be small scale and in areas not occupied by sensitive resources, so there would be little risk to the human environment.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration. This project neither establishes a precedent nor represents a decision in principle about future actions. The Proposed Action is consistent with actions appropriate for accomplishing the goals of the West Eugene Wetlands Management Plan (2000).

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. The environmental analysis did not reveal any effects of the Proposed Action that, when combined with reasonably foreseeable future actions, would be cumulatively significant.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources. There are no known features within the project area that are listed, or eligible for listing, on the National Register of Historic Places. As noted above, cultural resource surveys would be conducted prior to surface-disturbing activities, and any cultural resources found would be evaluated to determine eligibility for inclusion on the National Register.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973. Several threatened or endangered species are known to inhabit the project area, including Fender's Blue Butterfly, Kincaid's lupine, Willamette Daisy, and Bradshaw's Lomatium. The Proposed Action may result in direct mortality of individuals of these species; however, the overall effect would result in invigorated growth and population health. Thus, the degree of adverse impact is small and short term, and the overall impact is beneficial.

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment. There is no indication that the Proposed Action threatens to violate any law. The Proposed Action is in compliance with the Eugene RMP which provides direction for the protection of the environment on public lands. The Proposed Action complies with City of Eugene ordinances regarding nuisance vegetation.

_____ _____

Field Manager Date
Siuslaw Resource Area