OAK BASIN RESTORATION/RAC PROJECT
UPPER WILLAMETTE RESOURCE AREA
BLM EUGENE DISTRICT
ENVIRONMENTAL ASSESSMENT
DOI-BLM-OR-E060-2011-0005-EA

1.0 INTRODUCTION

Oak Basin is part of a large complex of upland prairie and oak woodlands on the west flank of the Coburg Hills, which stretch across BLM and various private landowners. Upland prairie and oak woodlands are now uncommon in the Southern Willamette Valley, where less than 1% of historic amounts remain.

At Oak Basin, fire suppression and forest management activities have allowed conifers to encroach on the prairies, decreasing their size and connectivity to one another. Past disturbances such as logging and grazing have disrupted the native plant communities and introduced non-native plants.

On BLM lands, there are about 40 acres of upland prairie plant communities, on private roughly 30 acres of prairie. While the prairies are now mainly introduced pasture grasses, they do support a diversity of native prairie species. Oak Basin is one of the few upland sites (above the Willamette Valley floor) of Kincaid's lupine, a federally threatened species, and Fender's blue butterfly (FBB) a federally endangered species. Both are obligates of prairie oak, savanna and oak woodland habitats. Also present are species with high fidelity to prairie, oak savanna and oak woodlands, including nectar species for FBB. As these habitats decline, species dependent on them also decline, increasing the potential need to list them under the Endangered Species Act. While not designated as critical habitat, Oak Basin is recognized regionally as a key site due to its elevation and its importance to recovery of Fender's blue butterfly and Kincaid's lupine within the designated Eugene East Recovery Zone.

The Secure Rural Schools and Community Self-Determination Act of 2000 (P.L. 106-393 [as amended by P.L. 110-343]) provides for federal funds to flow to counties that traditionally have been supported by timber payments. Resource Advisory Committees (RAC) makes annual recommendations on how a portion of this money is used on projects which benefit public land and resources, as specified in the authorizing legislation.

The Upper Willamette Resource Area, Eugene District BLM proposes to implement Oak Basin Prairie and Oak Habitat Restoration Title II RAC Project. The project is located in T. 14 S., R. 2 W., Sections 29, 30, and 33. This project is a joint effort between the BLM, Nature Conservancy (TNC) and adjacent private land owners. The proposed project area totals 224 acres of prairie, oak savanna and oak woodland habitats. The majority of the acres (184) are located on adjacent private property, and the remaining acres (40) are on BLM managed lands. The 40 acres located on BLM lands (referred to as "Oak Basin") are proposed as an Area of Critical Environmental Concern (ACEC). The private landowner has been working with the Fish and Wildlife Service (FWS), Natural Resources Conservation Service (NRCS), and TNC to improve prairie and oak habitats for over 10 years.

The overall goals of the proposed project are to: help maintain, enhance, augment or restore the existing and historical extents of prairie, savanna and oak woodland habitats in the project area; to provide beneficial management for BLM Sensitive species associated with these habitats; and to contribute to the recovery of Fender's blue butterfly and Kincaid's lupine (T&E species).

1.1 PURPOSE AND NEED

The Eugene District Record of Decision and Resource Management Plan states that the BLM shall, "maintain, protect, or restore relevant and important value(s) of ACEC and other Special Areas…" (pg. 67). Oak Basin contains federally listed Endangered Fender's Blue Butterfly and Threatened Kincaid's lupine, as well as other BLM Special Status Species. The site has degraded over time due to human influences such as fire suppression, invasion by weeds, soil disturbance and management to favor Douglas fir forest. The Proposed Action would address needed management intervention to maintain the Relevant and Important Values of the ACEC; including the two T&E species populations, their habitats and the greater prairie, oak savanna and oak woodland habitats. The Proposed Action would also help to restore, enhance and augment these resources, and provide initial steps for future restoration actions.

1.2 CONFORMANCE

The Eugene District initiated planning and design for this project to conform and be consistent with the Eugene District's 1995 RMP.

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in Conservation Northwest, et al. v. Sherman, et al., No. 08-1067-JCC (W.D. Wash.), granting Plaintiffs' motion for partial summary judgment and finding NEPA violations the *Final Supplemental to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (USDA and USDI, June 2007). In response, parties entered into settlement negotiations in April 2010, and the Court files approval of the resulting Settlement Agreement on July 6, 2011. Projects that are within the range of the northern spotted owl are subject to the survey and management standards and guidelines in the 2001 ROD, as modified by the 2011 Settlement Agreement.

This project is consistent with the Eugene District Resource Management Plan as amended by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD), as modified by the 2011 Settlement Agreement.

The implementation of this project will not have significant environmental effects beyond those already identified in the 1995 Final EIS/Proposed RMP. Information compiled by the Interdisciplinary Team (ID Team) to analyze effects and is available for review at the Eugene District Office.

1.3 SCOPING

Scoping information about the Oak Basin Restoration/RAC Project was first provided in the October 2010 *Eye to the Future.* No scoping comments were received.

1.4 ISSUES

The ID Team brought forward additional concerns related to resources that had potential of being affected by the proposed actions. The resource concerns related to the issues are analyzed in Section 3.0: Affected Environment and Environmental Consequences.

Issues identified:

1. How would project actions affect T&E and BLM Special Status animals and plants?
2. How would project actions affect the relevant and important values of the Oak Basin and Relic Forest Island ACECs?
3. How would project actions affect the spread of noxious weeds?
4. How would project actions affect soils?

3.0 ALTERNATIVES

3.1 Alternative 1: No Action

Under this Alternative on BLM managed lands, much of the Proposed Action would not occur during the same time period (3-5 years). Overall, the BLM may conduct lesser amounts of similar actions described in the Action Alternative. However, unless other cooperative opportunities are proposed, management actions that would occur may be limited in type and amount and would likely focus on simply maintaining existing Kincaid's lupine and Fender's blue butterfly populations. This assumption is based on current BLM funding and staffing levels.

Management actions on private lands would continue. However, their rate and amount would be reduced due to fewer personnel and less funding because of lack of collaboration with the BLM. Cultivation of collaborative relationships with private landowners would be diminished or delayed under this Alternative, which could affect future actions in the area.

3.2 Alternative 2: Restoration Actions

Under this alternative, the actions described in Oak Basin Prairie and Oak Habitat Restoration Title II RAC project would be implemented. Restoration actions would include mowing, manual and mechanical treatment of invasive species, removal of conifers, thinning of native oaks, prescribed burning, seed collection, and native plant cultivation and planting. Activities occurring on BLM lands are primarily weeding, removing encroaching conifers in and between prairies, burning of prairie areas, and planting of native prairie and nectar species.

Work on BLM lands would be accomplished only by "hand methods" to minimize adverse effects to T&E species and existing prairie plants and soils. Existing prairie would be enlarged by cutting encroaching shrubs, and trees on their perimeter for a width of about one half of a site-potential tree (100 ft.) Scattered trees within existing prairie would also be removed. Slash would be disposed of by piling and burning, chipping or moving into the nearby forest. The prairies would be weeded, and mowed to reduce thatch and weed seed set as well as to kill tree seedlings. Prairies would be broadcast burned one to three times during the duration of the project. Propane torch flaming would be used to spot burn areas to control weeds and remove thatch. Desired plant species populations, including Kincaid's lupine and nectar species for Fender's blue butterfly, would be augmented by planting with seed or plugs. In some areas, new desired plant species would be added to the existing species composition. Seed would be collected for new plant starts, to increase seed inventories, and to create or augment populations.

On the privately managed land, project actions would be completed by both "hand methods" and "larger mechanical methods" would be used. Conifers, maple and ash would be removed to release oaks. Logging would be done using ground based methods. Existing oaks may be removed for operational safety or to reduce their densities to amounts appropriate for oak

savanna or oak woodland habitats (as low as 80-120 trees per acre). Shrubs, small deciduous trees, and conifer trees would be removed by hand or machinery such as a brush hog. Slash and brush byproducts of restoration actions would be removed from prairie, oak savanna, or oak woodland habitats by hand or large mechanical methods, piling brush for burning or grinding or masticating brush on site, chipping, or relocation off-site or into surrounding conifer forest to decay. Hand methods work would be used where larger mechanical methods work would not be practical due to terrain or access. With both hand and machine methods, piles could be burned on site.

Table 1 displays an overview of the location, timing, frequency and quantification of individual management actions. Polygon numbers refer to designated RAC proposal polygons depicted on the map found in Appendix A.

The specific action numbers of the proposed management activities, with their descriptions, are as follows:

1. Mowing – Mowing cuts the tops of vegetation and coarsely chops the clippings. As a treatment, mowing would be used to reduce grass thatch, reduce seed set of weeds, and remove weeds shading out desired vegetation. Where appropriate, this action may intentionally mow T&E plants.

1A. Hand methods **-** Equipment use would include a weed trimmer, machete and weed whip.

1B. Larger mechanical methods **-** This action would use larger mechanical methods (e.g., tractor mower, brush hog, excavator, Bobcat or backhoe) to achieve the same objectives as action 1A.

2. Plant Population Augmentation - Plant population augmentation increases the population size of prairie plants species that already exist on the site. This includes important nectar sources and host plant species for the Fender's blue butterfly.

2A. Plant Population Augmentation of T&E Plants (hand methods) - This action would manually plant plugs or seed of Kincaid's Lupine in or near existing populations to increase their size and extent.

2B. Plant population augmentation of Non T&E native plants (hand methods) - This action would involve the same general actions and methods as described under 2A. In addition, planting would occur in areas disturbed by restoration actions (e.g., conifer removal).

2C. Plant populations augmentation of T&E plants (larger mechanical methods) - This action would not occur on BLM or adjacent private lands within the proposed project area.

2D. Plant population augmentation of Non T&E native plants (larger mechanical methods) - This action would use mechanical methods (e.g., a seed drill either self-propelled or pulled by a truck, tractor, or ATV) to plant native seed using

Ground preparation for this action would be by raking (machine or hand) or tilling (tractor or ATV pulled, or a garden tiller operated by a person on foot).

3. Plant population creation - Planting of species, not currently present at Oak Basin, would occur to create new populations. Only native species appropriate to prairies, savanna or oak woodland habitats would be used. This includes important nectar sources for the Fender's blue butterfly.

3A. Plant population creation of Non T&E native plants (hand methods) - Manual planting of native plugs, broadcasting seeds or planting seeds by hand.

3B. Plant population creation of Non T&E native plants (larger mechanical methods) - This action would not occur on BLM or adjacent private lands within the proposed project area.

4. Weeding -

4A. Weeding (hand methods) - This action would use tools such as a shovel, hoe, weed wench, propane flamer and/or hand pulling to kill or remove weeds. Digging or wrenching tools, including hand pulling, physically remove the plant roots from the soil to kill the plant, while a propane flamer bursts the cell walls of above-ground herbaceous plant's stems and leaves to kill an annual species or top-kill perennial species to prevent flowering. In areas of dense infestation, with little or no desired vegetation or T&E plants, shade cloth (placement of dark plastic cloth over areas invaded by weeds and fastened to the ground with wooden stakes to control monotypic weed species) or solarization (tilling and then covering weed patches with clear plastic sheets) may be used to kill weeds. Small areas of ground disturbance would occur. Removal of shrubs is covered under the shrub and deciduous tree removal action (Action 7).

4B. Weeding (larger mechanical methods) - This action would use mechanical equipment to kill, cut or remove weeds by tilling, plowing or using a tracked or wheeled vehicle with shearer, brush hog, chain, grapple or shovel attachment. This action would occur in areas with large infestations of weeds such as blackberries and blackthorn.

5. Prescribed Fire -

5A. Broadcast burning - This action would burn in prairie, savanna, oak woodland habitats. Mowing may be needed to create fire lines. Fire may involve the use of hand crews, fire engines, water tenders and propane or drip torches.

5B. Pile burning - This action would burn piles of slash and weeds. Piles would be placed in prairie, savanna or oak woodland (all habitats) and may be intentionally used to kill weed patches or prepare sites for planting before burning occurs. Piles may also be placed on individual trees to kill them and the surrounding duff layer.

6. Removal of encroaching conifers with a dbh of 4 inches or more -

6A. Removal of encroaching conifers with a dbh of 4” and larger (hand methods) - This action would remove conifers by means of cutting or girdling using tools such as a chainsaw, axe, hand saw or weed whacker with a blade.

6B. Removal of encroaching conifers with a dbh of 4” and larger (larger mechanical methods) - This action would remove conifers by means of ground-based logging methods such as a timber jack, forwarder or feller-buncher. Girdling may be used to kill encroaching trees when it is not feasible or safe to cut or remove trees.

7. Removal of shrubs, and deciduous and conifer trees with a dbh of less than 4 inches (hand methods) -

7A. Remove shrubs, and deciduous and conifer trees less than 4”dbh (hand methods) - Shrubs and small diameter deciduous and conifer trees would be cut, pulled out, or removed with tools such as a chainsaw, weed whacker, hand saw, weed wench or shovel.

7B. Remove shrubs, and deciduous and conifer trees less than 4”dbh (larger mechanical methods) - This action would remove shrubs and small diameter deciduous and conifer trees using equipment such as a brushhog, excavator with brush grinding head, or a tractor mounted mower.

8. Slash gathering, processing and disposal - Project actions that would process slash involve three steps. Step one would be the gathering or piling slash by hand or larger mechanical methods. Step two would be to treat slash in larger unprocessed pieces and/or after chipping, grinding or burning (burning itself is not discussed below because it is addressed under Action #5). Step three would be “disposal” of (i.e., relocation) to on-site or off-site locations. On-site slash disposal: Small ground or chipped slash could be left in prairies, savannas, or oak woodlands (if neutral or beneficial to project goals) or scattered into nearby conifer forest. Larger unprocessed slash would only be scattered into nearby conifer forests. The distinguishing differences in action type descriptions below are due to different combinations of steps one (hand or machine piling) and three (on-site or off-site disposal). Step two options of a combination of unprocessed and/or chipped, ground or burned slash are common to all actions below.

8A. Slash gathering by hand methods with on-site disposal - Under this action slash would be gathered by hand. Disposal would be by pile burning or scattering of ground or chipped pieces into prairies, savannas, or oak woodlands or into nearby conifer forest; or scattering larger pieces into nearby conifer forests.

8B. Slash gathering by hand methods with off-site disposal - Under this action slash would be gathered by hand. Disposal of all types of slash would be accomplished by hauling to an off-site location.

8C. Slash gathering by larger mechanical methods with on-site disposal - Under this action slash would be gathered by machine methods. Disposal would be by pile burning or scattering of ground or chipped pieces into prairies, savannas, or oak woodlands or into nearby conifer forest; or scattering larger pieces into nearby conifer forests.

8D. Slash gathering by larger mechanical methods with off-site disposal - Under this action slash would be gathered by machine methods. Disposal of all types of slash would be accomplished by hauling to an off-site location. Depending on site conditions, these areas would be seeded with native species.

9. Seed collection - Seed would be hand collected from T&E and native (Non-T&E) plants (including BLM Sensitive species) for use in other on-site restoration actions. Collection methods may include bagging flowers after seed set, hand collecting seeds, and/or use of a seed rake.

9A. Seed collection (T & E plants) - Seed would be collected for use in restoration actions in the project area and vicinity. Seed collection of T&E plants would involve walking through patches of lupine and placing bags over lupine seed heads.

9B. Seed collection (non-T&E native plants) - Seed would be collected for on-site restoration and for grow-outs to increase seed production both on and off-site.

10. Monitoring of restoration activities - Monitoring methods would be developed to measure the effectiveness of restoration actions and their effects on existing plants and animal populations.

10A. Monitoring (T&E Animals) - Ongoing monitoring of Fender's blue butterfly adults and eggs would continue to: assess and monitor project actions; to coordinate subsequent restoration actions; and to contribute to the recovery goals for these species. Egg count monitoring protocols presently involves walking through patches of lupine occupied by Fender's blue butterfly during its larval stage. Adult monitoring required catching some butterflies for positive identification.

10B. Monitoring (T&E Plants) - Ongoing monitoring of Kincaid's lupine would continue to: assess and monitor project actions; to coordinate subsequent restoration actions; and to contribute to the recovery goals for these species.

Exact methods include actions such as: laying measuring tapes on plant populations which could trample some plants; and touching plants for Fender's blue butterfly egg monitoring.

10C. Monitoring (plant community vegetation) - Monitoring methods would be developed to measure the response of plant communities and vegetation to restoration activities. Monitoring would assess the effectiveness of treatments such as weeding, burning, and planting of native species. Monitoring may include (but is not limited to) photo points, belt transects, point intersect and plots. The Oak Basin Management Plan provides guidance to find locations of OHV incursions. Monitoring would access effects of treatments on individual species, relative abundance of weeds and changes in plant community composition over time. Small amounts of tramping of plants, native and non-native would occur during monitoring.

Table 1: Action Descriptions and Locations

Action # and Description		Action Timing [1]	Action Frequency Annually [2]	Max. Acres Yearly [3]	Polygon Number and Size (acres)																									
					BLM Lands						Private Lands																			
					Poly #	1	2	3	4	5	271	301	303	304	307	311	312	313	315	316	343	362	363	367	368	369	371	382	384	385
					Poly Ac.	2	20	12	2	17	16	2	9	7	4	4	9	7	15	11	53	13	5	19	1	3	4	1	3	9
1	**Mowing**																													
1 A	Mowing-hand methods, with T&E	Late Summer, Fall	Maximum of 25% of area	5		X	X	X	X	X		X							X			X								
1 A	Mowing-hand methods, without T&E	Late Summer, Fall	Maximum of 5% of non-T&E area	12							X		X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	x
1 B	Mowing-large mechanical methods	Late Summer, Fall	Maximum of 25% of area, 1-3 times	112							X		X	X	X	X	X	X			X		X	X			X	X		X
2	**Plant Population Augmentation**																													
2 A	Plant Population Augmentation of T&E Plants - hand methods	Early Spring, Fall, Winter	Maximum of 5% of the area, up to 2 times	2		X	X	X	X	X		X							X			X								
2 B	Plant population augmentation of Non T&E (native) plants - hand methods	Early Spring, Fall, Winter	Maximum of 15% of the area, up to 2 times	75		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 C	Plant populations augmentation of T&E plants - mechanical methods	Not part of proposed action & would not occur.				~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~
2 D	Plant population augmentation of Non T&E (native) plants – mechanical methods	Not part of proposed action & would not occur.									~~X~~				~~X~~	~~X~~	~~X~~				~~X~~			~~X~~			~~X~~	~~X~~		~~X~~
3	**Plant population creation**																													
3 A	Plant population creation of Non T&E (native) plants - hand methods	Early Spring, Fall, Winter	Maximum of 15% of the area, up to 2 times annually (once plants available)	75		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 B	Plant population creation of Non T&E (native) plants– mechanical methods*	Not part of proposed action & would not occur.									X				X	X	X				X			X			X	X		X

4	**Weeding**																												
4 A	Weeding - hand methods	Year-round	Maximum of 15% of the area annually	38	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 B	Weeding – mechanical methods*	Spring, Summer, Fall	Maximum of 50% of the area annually	60						X				X	X	X				X			X			X	X		X
5	**Prescribed Fire**																												
5 A	Broadcast burning	Summer, Fall	Maximum of 20% of the area, every 1-3 years	80	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5 B	Pile burning	Fall, Winter	Once	250	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	**Removal of encroaching conifers**																												
6 A	Removal of encroaching conifers with a dbh of 4" and larger– hand methods	Summer, Fall	Once	250	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6 B	Removal of encroaching conifers with a dbh of 4" and larger – mechanical methods*	Summer, Fall	Once	150						X		X	X	X	X	X	X			X		X	X			X	X		X
7	**Removal of shrubs, deciduous trees, and conifers with a dbh of less than 4 inches – hand methods.**																												
7 A	Remove deciduous trees, shrubs and conifers less than 4"dbh- hand methods	Summer, Fall	Once	250	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7 B	Remove hardwoods, shrubs and conifers less than 4"dbh – mechanical methods*	Summer, Fall	Once	150						X		X	X	X	X	X	X			X		X	X			X	X		X
8	**Slash gathering, processing and disposal**																												
8 A	Slash gathering by hand methods with on-site disposal	Summer, Fall	Once	250	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8 B	Slash gathering by hand methods with off-site disposal*	Summer, Fall	Once	250	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

8 C	Slash gathering by machine methods with on-site disposal*	Summer, Fall	Once	150						X		X	X	X	X	X	X			X		X	X			X	X		X
8 D	Slash gathering by machine methods with off-site disposal*	Summer, Fall	Once	150						X		X	X	X	X	X	X			X		X	X			X	X		X
9	**Seed collection**																													
9 A	Seed collection- T & E plants	Summer, Fall	Once	20	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9 B	Seed collection- non-T & E plants	Summer, Fall	Up to 10 visits per year.	10	X	X	X	X	X		X							X	X		X		X	X	X			X	X
10	**Monitoring of restoration activities**																													
1 0 A	Monitoring – T&E animals	Spring, Summer	Up to 6 visits per year are required for an accurate adult butterfly count	20[(A)]	X	X	X	X	X		X							X			X								
1 0 B	Monitoring– T&E plants	Spring, Summer	Once	20[(A)]	X	X	X	X	X		X							X			X								
1 0 C	Monitoring – Plant Community Vegetation	Spring, Summer	Variable, as needed	Varia ble	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	Footnotes:
	Relict Forest Island (RFI) ACEC is located within polygons 3, 4 and 5.
(A)	Locations could include other polygons based on potential new habitat located or created by project actions.
1	Action Timing: Spring (Feb.15-April 30) [Early Spring (Feb.15 - March 15) Late Spring (March 15- April 30)], Summer (May 1- Sept 15) [Early Summer (May 1- June 30), Late Summer (July 1 – Sept. 15)], Fall (Sept 15- Nov 15), Winter (Nov. 16- Feb 14)
2	Frequency of Action: Estimates the maximum number of times action would occur each year over the 3-5 year life of the project.
3	Amount of Action: Estimated maximum amount of acres that would receive treatment each year during the 3-5 year life of the project. Acreages for non-T&E actions were calculated by adding the polygon acreages together and multiplying by the frequency. Acreage for T & E actions were calculated based on the approximate area of the polygon occupied by T&E species plus a buffer and then multiplied by the frequency.

3.3 PROJECT DESIGN FEATURES

The individual project design features and their associated management actions are described in the following table:

Table 2: Master List of Project Design Features & Corresponding Actions

Project Design Feature # and Description		Action # and Description	
1	Work would occur only during the dry season (Approximately June 21 to September 21 annually. Period may be reduced or extended by the Authorized Officer based on actual soil moisture in treatment areas).	1A	Mowing-hand methods
		4B	Weeding - larger mechanical methods.
2	The Authorized Officer must approve mechanical equipment use and timing in Polygons 2 and 362 due to wetter soil types (i.e., shorter dry season).	ALL	All actions, if applicable.
		1B	Mowing-larger mechanical methods
3	Human activities, including walking in areas occupied by listed species, would be limited to minimize or avoid potential negative effects to listed species.	ALL	All actions, if applicable.
4	Vehicle access routes and parking locations (including fire vehicles) would be planned ahead of time to minimize potential negative effects to T&E plants and Fender's blue butterfly.	ALL	All actions, if applicable.
5	Work would be supervised by a biologist, botanist, or person skilled in T&E plant identification when required for specific actions and their design features (e.g., certain treatments in the vicinity of T&E plants).	ALL	All actions, if applicable.
6	All hand mowing would be done in and around Kincaid's lupine only during the dormant season	1A	Mowing-hand methods
7	Hand mowing would occur 1 meter (3.3 ft.) or more from Kincaid's lupine when they are being reserved from this action (e.g., the maximum annual amount of mowing in a population has occurred)	1A	Mowing-hand methods -
8	For areas containing both Kincaid's lupine and Fender's blue butterfly, no more than 25% of an area would be treated by mowing each year.	1A	Mowing-hand methods -
9	The cutting mechanism for hand mowing (e.g., weed whacker blade) would be a minimum of six inches above ground to prevent soil disturbance and to reduce potential negative effects to Fender's blue butterfly larvae in the thatch layer.	1A	Mowing-hand methods
10	All weeding actions would occur 1 meter (3.3 ft.) or more from the nearest known T&E plant; or, weeding less than 1 meter from T&E plants would only occur during their dormant season and while supervised by an individual skilled in T&E plant identification.	4A	Weeding - hand methods.
11	Larger mechanical mowing would not occur in polygons occupied by Kincaid's lupine.	1B	Mowing-larger mechanical methods
12	Larger mechanical equipment use would be limited to slopes 35% or less.	1B	Mowing-larger mechanical methods

Table 2: Master List of Project Design Features & Corresponding Actions			
Project Design Feature # and Description		**Action # and Description**	
13	All equipment must be washed prior to arrival in the project area to remove mud, debris and weed seeds. The Authorized Officer would inspect equipment to ensure compliance.	ALL	All actions, if applicable.
14	Tilling would occur in areas three meters square or smaller to a maximum depth of six inches and 1.0 meter from T&E plants	2A	Plant Population Augmentation - T&E plants
		2B	Plant Population Augmentation - Non T&E plants
		3A	Plant Population Creation - Non T&E plants - hand methods
15	All planting would occur 1.0 meter (3.3 ft.) or more from the nearest known T&E plant.	2A	Plant Population Augmentation - T&E plants
		2B	Plant Population Augmentation - Non T&E plants
		3A	Plant Population Creation - Non T&E plants - hand methods
16	Shade cloth and solarization methods would occur 1.5 meters (5.0 ft.) or more from T&E plants.	2A	Plant Population Augmentation - T&E plants
		2B	Plant Population Augmentation - Non T&E plants
		3A	Plant Population Creation - Non T&E plants - hand methods
		4A	Weeding - hand methods.
17	All plant materials would be native and sourced from locations 800 feet or more in elevation within a 20 mile distance from the project area	2B	Plant Population Augmentation - Non T&E plants
		2D	Plant Population Augmentation - Non T&E plants - larger mechanical methods.
		3A	Plant Population Creation - Non T&E plants - hand methods
18	Most areas of disturbance (including all burned areas) would be planted with native species, where necessary, to establish these species or to discourage establishment, repopulation or spread of weeds	4B	Weeding - larger mechanical methods.
		5	Prescribed Fire - all methods (broadcast & pile burning)
		6A	Removal of conifers with dbh 4 inches or more-hand methods
		7	Removal of shrubs, and deciduous or conifer trees with dbh less than 4 inches – all methods.
19	Planting of native vegetation in areas occupied by Fender's blue butterfly would be conducted in late spring or winter and only in between patches of extant Kincaid's lupine plants, to avoid injury to butterfly larvae.	ALL	All actions, if applicable.
20	*There is no #20 project design feature*		
21	For polygons 3, 4, and 5 (in the RFI): This action would occur only within the current extent of prairie habitat	5	Prescribed Fire - all methods (broadcast & pile burning)
		6A	Removal of conifers with dbh 4 inches or more-hand methods
		7A	Removal of shrubs, and deciduous or conifer trees with dbh less than 4 inches - hand methods

Table 2: Master List of Project Design Features & Corresponding Actions

Project Design Feature # and Description		Action # and Description	
22	*There is no #22 project design feature*		
23	Action would not occur in polygons with T&E plants.	1B	Mowing-larger mechanical methods
		2D	Plant Population Augmentation - Non T&E plants - larger mechanical methods.
		4B	Weeding - larger mechanical methods.
		6B	Removal of conifers with dbh 4 inches or more-larger mechanical methods
		7B	Removal of shrubs, and deciduous or conifer trees with dbh less than 4 inches - larger mechanical methods
		8C	Slash gathering by larger mechanical methods with on-site disposal
		8D	Slash gathering by larger mechanical methods with off-site disposal
24	Existing T&E plant populations would be marked on the ground before actions begin	2A	Plant Population Augmentation - T&E plants
		2B	Plant Population Augmentation - Non T&E plants
		3A	Plant Population Creation - Non T&E plants - hand methods
		4A	Weeding - hand methods.
		5	Prescribed Fire - all methods (broadcast & pile burning)
		6A	Removal of conifers with dbh 4 inches or more-hand methods
		7A	Removal of shrubs, and deciduous or conifer trees with dbh less than 4 inches - hand methods
25	Directional felling and removal, and other methods, would be utilized where necessary to avoid damage to T&E plants	6A	Removal of conifers with dbh 4 inches or more-hand methods
		7	Removal of shrubs, and deciduous or conifer trees with dbh less than 4 inches – all methods.
26	Propane flamer use would occur outside of the fire season and during times of low fire risk.	4A	Weeding - hand methods.
27	All prescribed fire activities would be in compliance with the Oregon Smoke Management Plan and would utilize Minimum Impact Suppression Tactics "MIST."	5	Prescribed Fire - all methods (broadcast & pile burning)
28	All prescribed fire actions would occur after plants have senesced and the Fender's blue butterfly is in diapause (larval stage).	5	Prescribed Fire - all methods (broadcast & pile burning)
		6A	Removal of conifers with dbh 4 inches or more-hand methods.
		7A	Removal of shrubs, and deciduous and conifer trees, with a dbh less than 4 inches.
		8A	Slash gathering by hand methods with on-site disposal
29	*There is no #29 project design feature*		

Table 2: Master List of Project Design Features & Corresponding Actions

Project Design Feature # and Description		Action # and Description	
30	Burn piles would be located: at least 3.0 meters (9.9 ft.) from T&E plants.	8A	Slash gathering by hand methods with on-site disposal
		8C	Slash gathering by larger mechanical methods with on-site disposal
31	Burn piles in polygons 3, 4 and 5 (in the RFI) would be placed only within the current extent of prairies and in locations that would not damage reserved conifers in the RFI conifer stands.	8A	Slash gathering by hand methods with on-site disposal
		8C	Slash gathering by larger mechanical methods with on-site disposal
32	Where the size and orientation of Fender's blue butterfly population allows, butterfly refugia within burn units would be protected with a fire break and/or watering down prior to a burn.	5	Prescribed Fire - all methods (broadcast & pile burning)
33	Mowing and burning intervals would be determined by assessment and monitoring of Fender's blue butterfly and Kincaid's lupine populations.	5	Prescribed Fire - all methods (broadcast & pile burning)
34	For areas containing both Kincaid's lupine and Fender's blue butterfly, no more than 25% of an area would be treated by burning each year. For areas with Kincaid's lupine only (no Fender's blue butterfly), up to 100% of an area could be burned in a year.	5	Prescribed Fire - all methods (broadcast & pile burning)
35	Ground or chipped slash would be used as mulch or blown into neaby conifer forest.	8A	Slash gathering by hand methods with on-site disposal
		8C	Slash gathering by larger mechanical methods with on-site disposal
36	Larger pieces of slash (not ground or chipped) disposed of in nearby conifer forest, would be scattered to reduce fire hazard.	8A	Slash gathering by hand methods with on-site disposal
		8C	Slash gathering by larger mechanical methods with on-site disposal
37	ODF riparian restrictions apply near streams and other wetlands. Rules include: avoiding placement of landing in riparian management areas; not operating ground-based equipment in stream channels except for a minimal number of temporary stream crossings; not allowing slash to accumulate in stream channels: preventing changes to stream channels as a result of ground based yarding; protection of small stream and wetlands	ALL	All actions, if applicable.
		6B	Removal of conifers with dbh 4 inches or more-larger mechanical methods
38	T&E Plants: Seed collectors would be permitted by USFWS. Collection methods would follow the most current Terms and Conditions, methods, and Authorizations of permits.	9A	Seed collection from T&E plants.
39	Non-T&E Plants: Seed Collection ----NEED Action Description & PDFS	9B	Seed collection from Non-T&E plants.
40	Monitoring: T&E Animals. Fender's blue butterfly.	10A	Survey or monitoring of Fender's blue butterfly.
41	Monitoring: T&E Plants---- Individuals that monitor KL would be permitted by the USFWS and follow the most current Terms and Conditions, methods, and Authorizations of permits. (See Appdx. X)	10B	Monitoring of T&E plants
42	This action would not occur on any lands.	2C	Plant Population Augmentation - T&E plants - larger mechanical methods
		3B	Plant Population Creation - Non T&E plants - larger mechanical methods

Table 2: Master List of Project Design Features & Corresponding Actions			
Project Design Feature # and Description		**Action # and Description**	
43	Plant Community Monitoring: Non-T&E Plants NEED Action Description & PDFS	10C	Monitoring of plant communities (Non-T&E)
44	Access routes and parking locations for work vehicles would be planned in advance to ensure no negative effects to T&E plants and Fender's blue butterfly.	5A	Broadcast burning
45	*There is no #45 project design feature*		
46	Pile covering would be in compliance with the Oregon Smoke Management Plan	8A	Slash gathering by hand methods with on-site disposal
		8C	Slash gathering by larger mechanical methods with on-site disposal
47	When action occurs on the perimeter of the conifer-dominated RFI stands, <u>within the RFI boundary</u>, tree removal would occur only within 100 feet of the perimeter of a stand, and would be limited to trees with a dbh $\leq$ 10 inches. This design feature does not apply to stands being thinned that are not in the RFI.	6B	Removal of conifers with dbh 4 inches or more-larger mechanical methods

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

4.1 ISSUE 1: WHAT ARE THE EFFECTS OF THE PROPOSED ACTION ON FEDERALLY THREATENED AND ENDANGERED AND BLM SPECIAL STATUS PLANTS AND WILDLIFE?

4.1.1 AFFECTED ENVIRONMENT

4.1.1.1 Kincaid's Lupine *(Lupinus oreganus var. kincaidii or L. sulphureus var kincaidii)*

Kincaid's Lupine is the larval host plant for Fender's Blue Butterfly, which occurs at Oak Basin. The population occurs in five subpopulations (patches) separated by conifer forest, three on BLM and two on private. The majority of Kincaid's lupine plants and Fender's Blue butterflies occur on BLM lands, a few scattered small patches occur on private. The lupine population at Oak Basin is the largest known on the Eugene District outside of the West Eugene Wetlands.

Life History: Kincaid's lupine is a perennial species in the pea or legume family *(Fabaceae*). Flowering typically occurs in May and June. Flowers are pollinated by native bees, bumblebees and butterflies. The plant reproduces by seed. Seeds are dispersed from fruits that open upon drying. The patches at Oak Basin are small and separated from one another by conifer forest, which may limit pollinator movement. The lupine at Oak Basin is an independent population, isolated from other populations of Kincaid's lupine.

Habitat: Kincaid's Lupine occurs in the Willamette Valley and Puget Trough. Habitat is typically wet native fescue prairies and rarely upland red fescue prairie.

The amount of native prairie has been reduced from the Willamette Valley as a result of suppressed wildfire, forest management practices, introduction of non-native plant species, agriculture, herbicide use, urbanization, and other development. Most Willamette Valley grasslands are seral (one stage in a sequential progression), requiring natural or human-induced disturbance, such as fire, for their maintenance. At Oak Basin changes in the fire regime allowed tree and shrub species to invade the prairies, which are now competing with and shading portions of the low-growing Kincaid's lupine populations. Kincaid's lupine is now restricted to areas of thin soils, more difficult for trees to invade. In addition, non-native species such as Himalayan blackberry (*Rubus discolor*) and tall grasses are aggressively overtaking these open spaces and are crowding out the lupine and other native species.

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

This species is federally listed as Endangered.

Life History: The life cycle of the Fender's blue butterfly is completed in one year. Adult's lay eggs during May, primarily on Kincaid's lupine. Once the larvae hatch, the caterpillars feed briefly on lupine until the lupines begin to senesce in early July. The caterpillars feed on only three species of lupine, primarily Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*), and occasionally longspur lupine (*L. arbustus*) or sickle-

keeled lupine (*L.albicaulis).* At senescence, larvae drop to the base of the lupine plants and enter diapause (a stage in the *butterfly's* life when its growth and development are suspended) and spend the fall and winter in plant debris on the ground. In February or March larvae come out of diapause, feed on lupine and continue their development. The larvae then enter their pupal stage and subsequently emerge as adult butterflies in May. Adults nectar on a number of native short-stature prairie/oak savanna plants. Adults live approximately 10-15 days, lay eggs on Kincaid's lupine and apparently rarely travel farther than two kilometers (1.2 miles) over their life span from their natal lupines (Shultz 1988 in Recovery Plan p. II-5). All non-adult life phases are referred to as „'larvae'' in this EA.

Habitat: Fender's Blue butterfly is endemic to the Willamette Valley. Specific plant habitat requirements for the species in Oak Basin include its lupine host plant, *Lupinus sulphureus* ssp*. kincaidii,* upon which eggs are laid and the larvae feed, and other nectar species for food for the adults.

There is a diversity of nectar sources present at Oak Basin. Confirmed nectar species (Schultz 1999, Hammond 1993) observed within the project area include cat's ear (*Calochortus tolmiei*), Leichtlin's camas (*Camassia leichtlinii*), common cryptantha (*Cryptantha intermedia* var. *grandiflora*), Oregon geranium (*Geranium oreganum*), common woolly sunflower (*Eriophyllum lanatum*), and Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*) and rose checkermallow (*Sidalcea virgata*). Of those species, rose checkermallow, cat's ear, Leichtlin's camas and common woolly sunflower are known to be high quantity/quality nectar producers (Schultz 2003). Additional possible nectar species observed in the project area include balsam-root (*Balsamorhiza deltoidea*), Menzies' larkspur (*Delphinium menziesii*), ookow (*Dichelostemma congestum*), rosy plectritis (*Plectritis congesta* var. *congesta*), toughleaf iris (*Iris tenax*), western buttercup (*Ranuculus occidentalis* var. *occidentalis*), western blue-eyed grass (*Sisyrinchium idahoense* var. *idahoense*) and death camas (*Zigadenus venenosus* var. *venenosus*). Species are suspected as possible nectar sources because they either bloom at the correct time and/or are confirmed nectar sources of the Puget blue butterfly (Schultz 2003). Despite a diversity of confirmed and possible nectar species present on the site, most are in low or very low abundance.

Fender's blue butterfly's association with Kincaid's lupine and grassland nectar species result in it being strongly associated with short-stature prairie, oak savanna, and oak woodland habitats that have a mosaic of low-growing grasses and forbs, low-density canopy cover (high solar exposure), and relatively undisturbed soils.

Kincaid's Lupine and Fender's Blue Butterfly: Species Abundance, Distribution and Population Trends in the Project Area: The majority of Fender's blue butterfly occurrence in the action area is on BLM lands with a few small sub-populations also on private land.

Monitoring on the BLM portion of the population began in 2006 and on private land in 2009. Data collection included lupine cover (m^2) measurements and inflorescence counts (Table 3). Between 2006 and 2010, lupine cover on BLM land has been between 94 m^2 and 127 m^2, while inflorescences ranged between 864 and 3,646 (Giles-Johnson et al. 2010). On private land, lupine cover has been between 18.2 m^2 and 25 m^2 and inflorescences ranged between 51 and 79 (J. Jancaitis pers. communication, 2010). Counts of adults were done on BLM lands following established protocols.

Table 3: Survey & Monitoring Data for Kincaid's Lupine and Fender's Blue Butterfly.

	2006		2007		2008		2009		2010	
	ACEC	PL	**ACEC**	PL	**ACEC**	PL	**ACEC**	PL	**ACEC**	PL
Kincaid's lupine										
Cover (m^2)	**102**	N/A	**94**	N/A	**102**	N/A	**110**	**25**	**127**	**18**
Inflorescences	**864**	N/A	**3,105**	N/A	**2,350**	N/A	**1,467**	**79**	**3,646**	**51**
Fender's blue butterfly										
Eggs *	**514**	N/A	**3,887**	N/A	**3,215**	N/A	**2,234**	**61**	N/A	**2**
Adults	**23**	N/A	N/A	N/A	**45**	N/A	**83**	N/A	**38**	N/A

***** Total egg numbers were counted on private land and on the proposed ACEC in 2006. From 2007-2009, scaled egg values are reported for the proposed ACEC which were determined by counting the number of eggs per square meter of lupine cover in a subsample of the population and then extrapolating for the number of eggs based on the lupine cover estimate for the entire area.

Data reported from Giles-Johnson, et al. 2010, Paul Severns 2009 (unpublished report) and Jancaitis 2010 (pers. com.)
Abbreviations: **ACEC**= Oak Basin ACEC, **PL** = adjacent private land and **N/A** = No Data.

4.1.1.3 Taylor's Checkerspot Butterfly *(Euphydras editha taylori)*

This butterfly was classified as a „'candidate'' for Endangered Species Act listing in 2001. It is also a BLM Sensitive Species.

***Life History*:** The life cycle of this butterfly is completed in one year. Adult butterflies appear in April and May (a few weeks before Fender's blue butterfly adults appear) to mate and lay clusters of up to 1200 eggs. Adults live for an estimated 1 to 2 weeks. Generally only one to two eggs survive to adulthood (Stinson 2005, Scott 1986). Eggs hatch in approximately two weeks and must reach their fourth or fifth instar stage before their host plant senesces (Weiss et al. 1987). Larvae hatch and feed until mid-June to mid-July, then enter diapause until the following spring when they emerge to mature, pupate and become adult butterflies.

Habitat and Existing Known Locations: The species historically occurred in prairies and oak savanna of southern Vancouver Island in British Columbia, the Puget Sound of Washington, and the Willamette Valley of Oregon. Currently, the species is known to occur only in only two locations in Oregon, both in Benton County, plus ten locations in Washington, and one in British Columbia. The only known Oregon populations are a few miles west of Corvallis; at least 25 miles from the Project Area.

However, as with Fender's blue butterfly, because of its association with specific host and nectar plants, Taylor's checkerspot butterfly is strongly associated with short-stature prairie and oak savanna habitats that have a mosaic of low-growing grasses and forbs, low-density canopy cover (high solar exposure), and relatively undisturbed soils – such as Oak Basin.

Dispersal and nectaring distances for this species are poorly understood (Stinson 2005). The best available information estimates this species can disperse up to approximately 1.5 km (0.93 mi) between habitat patches (Benton County 2010 citing USFWS 2008b)

Species Abundance, Distribution and Population Trends in the Action Area: No surveys have been conducted for the species in Oak Basin. They would be necessary to accurately assess species' presence.

Oak Basin contains habitat for this species and it theoretically could be present in the Project Area. However, the limited occurrence of only two populations in Oregon 25 miles from the Project Area, its ability to disperse only small distances, and the generally low amount of host and nectar plants in or near Oak Basin, collectively diminish the chance this species is currently present at Oak Basin.

4.1.1.4 Northern Spotted Owl

Critical Habitat: Critical habitat would not be affected because proposed actions are not in or near 2008 designated critical habitat.

Existing Habitat In and Near the Project Area: On BLM lands, most of the habitat that would modified by project actions is not northern spotted owl habitat due its young age, high ratio of hardwoods to conifers (e.g. oak woodlands) or non-forested condition (e.g., prairie or oak savanna). The existing Relict Forest Island ACEC, hereto referred to as "RFI" (see Section 4.2 for further discussion on RFIs) stand of 44 acres contains

approximately 28 acres of spotted owl habitat. Approximately 12 acres are low quality suitable nesting habitat mixed with 16 acres of younger forage habitat. The suitable nesting habitat is mostly forage habitat with scattered potential nest trees. Selective removal of small trees with a diameter at breast height (DBH) of less than 11 inches would occur within 100 feet of the edge of the main conifer stand in dispersal/forage habitat. No suitable nest habitat would be affected by habitat modification. Total tree removal would impact approximately 2 acres.

On private lands, approximately 25 acres of conifer habitat would be thinned by project actions. None of this is spotted owl habitat due to its young size (conifers less than 11 inch dbh), or small patch size (less than 5 acres), or high amounts of brush and hardwoods. Additionally, stands on private lands that have trees large enough for low quality dispersal habitat (dbh $\geq$ 11 inches) also have very high amounts of trees per acre, and do not provide room for spotted owls to fly. Therefore these stands are also not habitat. Furthermore all conifer stands are small (less than 10 acres) and situated in a greater landscape of non-habitat on the edge of the Willamette Valley; thereby greatly reducing the chance that spotted owls would attempt to use these stands for roosting or dispersal to other landscape habitats.

Dispersal and forage habitat exists near the project area. However, overall habitat on BLM and private lands near Oak Basin are either non-habitat or heavily fragmented low quality dispersal stands that probably receive little use by spotted owls due to their habitat quality, lack of nearby sites, and their lack of connectivity to the greater landscape of spotted owl habitat.

Nearby Known and Predicted Sites: The closest known and predicted spotted owl sites are over 5 and 3 miles away from project actions respectively and would not be affected by project actions.

4.1.1.5 Other Special Status Animal Species (BLM Sensitive Birds)

The BLM "Sensitive" Special Status Species shown in Table 4 are discussed because their habitats exist in the Project Area. Surveys have not been conducted for any of these species and none are known to occur in the Project Area.

Table 4: Special Status Animal Species and Their Presence in Oak Basin	**Present in Oak Basin?**	**Species Association with Oak Basin Habitats**		
	"Yes" means category applies to a species			
		Prairie	*Oak Savanna*	*Oak Woodland*
Grasshopper sparrow *Ammodramus savannarum*	Potentially	Yes	Yes	Yes
Oregon Vesper sparrow *Pooecetes gramineus affinis*	Potentially	Yes	Yes	Yes
Lewis' woodpecker *Melanerpes lewis*	Potentially	No	No	Yes
Streaked Horned lark *Eremophila alpestris strigata*	No & Unlikely	Yes	No	No

Grasshopper Sparrow:
The Grasshopper sparrow is widely distributed in prairie habitats across North America. In Oregon, most populations are located in Palouse prairies of the Columbia Plateau, and it is an uncommon resident of the southern Willamette Valley. The species are known to use lightly grazed pastures, fallow fields and prairies in the Willamette Valley. Altman (1999) reported a mean home range of 3.5 acres and found the species in areas of limited amounts of suitable habitat. Ground nesting begins with egg laying in May or June with young fledging by July.

Oregon Vesper Sparrow:
This Oregon vesper sparrow occurs from British Columbia to California as a geographically isolated subspecies. The species is a ground-nester that prefers open habitats, as was historically found in prairie and savanna (including oak savanna). However, probably due to large scale loss of these habitats in the Willamette Valley, it is now most often found in lightly grazed pastures and Christmas tree farms described suitable habitat in Oregon being dominated by grasses and forbes less than 24 inches tall with up to 25% shrub/tree cover, and some open ground. Breeding pairs have been found in habitat patches as small as 15 acres. Egg laying and brooding of young occur from April to July, and even into August if a second clutch is laid. (Altman 1999).

Lewis' Woodpecker:
Lewis' woodpecker is found in Oregon primarily in the Siskiyou, Wallowa, eastern Cascade mountains, as well as suitable riparian areas in eastern Oregon. Historically the species also nested along the Columbia River and Willamette Valley. Suitable habitat includes oak dominated habitats such as riparian areas, oak savanna, and oak woodland. Nests are located in cavities, particularly in hardwoods. Breeding begins in April with young usually fledged by mid-July. Its current numbers are very low, but uncertain, in the Willamette Valley. Some sources (Altman et. al 2001) claim the species may be extinct in the Willamette Valley. Home ranges and territory needs for a pair average about 15 acres (Sousa 1982). The small amount of habitat in the Project Area is of low quality due the small size and young age of hardwoods – especially oaks (fewer nest cavities), the high densities of trees per acre, and generally small patch sizes.

Overall, presence of the species is possible, but unlikely due to the quality and amount of oak savanna and oak woodland (especially) habitat in the immediate project Area and that the species' abundance in the southern Willamette Valley is very low.

Streaked Horn Lark:
Although the Streaked horn lark can use upland prairie, or similar habitats, it is likely not present in the Project Area. Compared to habitat in the Project Area, this species prefers larger patches (150-200 acres or more) of more gravelly and open ground with lower amounts of cover (i.e.. sparse amounts of grasses and shrubs) (Pearson and Altman 2005). This species is not discussed further in this EA.

4.1.1.6 Special Status Plant Species

Sisyrinchium hitchcockii (Hitchcock's blue eyed grass):

Life History: Hitchcock's blue eyed grass is a perennial species in the Iris (Iridaceae) family. It is a small plant (to 5 dm) that looks like a clump of grass when not in flower.

The flowers appear at the tips of the leaves and are showy and dark purple. It typically flowers in early summer and reproduces by seed. Flowers are required to make a positive identification as it often occurs in mixed populations with *S. bellum*. The lack of yellow tepal bases and the extensive rhizomes are the most distinctive features.

Habitat: Hitchcock's blue eyed grass is endemic to the southern Willamette Valley and the Roseburg area of Douglas County, Oregon. It grows in open grassy areas, openings in woods and wet meadows that dry up late in the season. At Oak Basin, there is only one known site.

Eucephalus vialis (Wayside Aster):

Life History: Wayside aster is perennial species in the Aster family (Asteraceae). It is a tall (up to 2m) perennial with many stems from a stout base. The flowers are bore in large racemes and are rayless. Flowering usually occurs from mid-July to September. Although seed production is evident, seeds often appear sterile. Seedling recruitment appears limited to nonexistent within certain populations. Seeds are primarily wind dispersed, but many remain near the parent plant (Gammon 1986). Vegetative reproduction is common within populations making it often difficult to differentiate between individuals. Seedling germination has been reported from very few sites and, where this has occurred, individuals often do not reach maturity.

Aster vialis pollinators include *Bombus vosnesenskii* (bumblebees), *Lasioglossum* sp. (smaller bees), *Epicanta puncticollis* (blister beetle), and *Ochlodes sylvanoides* (skipper) (Alverson and Kuydendall 1989). Data from controlled pollination experiments demonstrate that *Aster vialis* is an obligate outcrosser and almost completely self-sterile (Kaye et al.1991). Habitat fragmentation for the species may be restricting pollen flow between populations as is evidenced by plants with apparently sterile seed. Because inbreeding depression can occur when pollen flow is restricted to a single site, maintaining as many of the known sites as possible is extremely important to the long-term viability of *Aster vialis* (Kuykendall 1991).

Although all germination treatments tested for *Aster vialis* resulted in low germination rates, studies indicate that mild heat treatments (50C/122F) enhance germination (Guerrant 1991). Additional studies are needed to determine the role of heat in breaking dormancy and whether fire or other factors influence germination and the ability to colonize new areas.

Habitat: *Aster vialis* typically occurs on dry upland sites in mixed forest dominated by *Pseudotsuga menziesii* (Douglas-fir), with hardwoods of drier forests such as *Arbutus menziesii* (Pacific madrone), *Chrysolepsis chrysophylla* (golden chinquapin), and *Quercus garryana* (Oregon white oak) (Alverson and Kuykendall 1989). The species also occurs on edges between forest and meadow. While current populations of *Aster vialis* occur in sites representative of all stages of succession from recent clear-cuts to mature forest, the species preferred habitat is thought to have been historically sustained by frequent fire return intervals that create open forest conditions with widely spaced conifers. Particularly important to *Aster vialis* are gaps in the canopy where high light levels allow *Aster vialis* to flower (Alverson and Kuykendall 1989). There are two sites of Wayside Aster within the Oak Basin project: one on BLM lands and one on private lands. Both sites occur on the edge of forest openings.

4.1.2 ENVIRONMENTAL EFFECTS

4.1.2.1 Kincaid's Lupine and Fender's Blue Butterfly

Alternative 1: No Action

Under this Alternative, on BLM lands, much of the Proposed Action would not occur during the same time period (3-5 years).

Fender's blue butterfly and Kincaid's lupine populations in the Project Area are small and without management, the continued viability of the populations remain vulnerable to both stochastic and known ongoing threats such as: conifer encroachment, competitive pressure from non-native vegetation, and lack of fire (or a surrogate such as mowing or prescribed burning).

Monitoring of Kincaid's lupine and Fender's blue butterfly would likely continue under the No Action Alternative.

Management actions, which are not part of the RAC project, may continue on private lands. However, without coordination of management with BLM, those actions would only affect the portions of the Kincaid's Lupine and Fender's Blue Butterfly population on private lands and would be less effective than coordinated actions on the entire population.

Alternative 2: Restoration Actions

Overall Direct and Indirect Effects of the Action Alternative to Kincaid's lupine and Fender's Blue Butterfly:

Overall, the Action Alternative and its individual management actions analyzed in this EA are accepted by the United States Fish and Wildlife Service (USFWS). Specific actions are proposed because they address key timely management needs for both species while minimizing adverse effects to these species and other resources as best as possible. Although some individual actions could result in direct or indirect adverse effects to species (i.e., the death of Fender's blue butterfly larvae), these affects are considered unavoidable or acceptable in the greater context of the need for active management as compared to No Action. The short and long term benefits of achieving the objectives of the Action Alternative, including contributing to the recovery of Kincaid's lupine and Fender's blue butterfly, is considered to outweigh any short term adverse effects that may be incurred.

Direct and/or Indirect Effects to Fender's blue butterfly and Kincaid's lupine Common to All Actions:

All individual management actions, and the collective proposed action, would be directly and/or indirectly beneficial to both Fender's blue butterfly and Kincaid's lupine, except for actions **8C and 8D** which would result in no effect to either species.
Actions **1A**, **1B**, **4B**, **6B** and **7B** would result in no negative direct and indirect effects to Fender's blue butterfly and Kincaid's lupine. Action **1A** would be entirely beneficial to

Kincaid's lupine; and actions **1B, 4B, 6B and 7B** would be entirely beneficial to Kincaid's lupine and Fender's blue butterfly.

Actions **2C**, **2D** and **3B** are not part of the proposed action and would not occur. They are mentioned in this section due to their value as clarity in describing the proposed action and its effects.

Actions **9A**, **10A** and **10B** would be contemporaneous actions that would continue to occur regardless of whether the proposed action is implemented. They are mentioned in this assessment because they would be an iterative component of implementing the proposed action and minimizing effects to listed species (e.g. monitoring restoration actions and implementing actions with knowledge of current listed species locations). In this section their effects are stated without discussion or analysis.

Specific Direct and Indirect Effects of Individual Management Actions to Kincaid's Lupine, Fender's Blue Butterfly Individuals and their Habitats:

Adult butterflies:
With the potential exception of monitoring adult populations, no management actions would result in negative effects to adult Fender's blue butterflies due to their nature or timing (would occur outside of the times when adults are alive). All direct and indirect effects to adults would be neutral or beneficial and relate to effects to their host and nectar plants and ecosystem habitats.

Any direct effects to the species would be due to effects to larvae or the species' habitats (Kincaid's lupine host plant, nectar plant species, or general prairie, oak savanna, or oak woodland ecosystems). In this EA the term "larvae" means all butterfly life stages other than adult.

Butterfly larvae:
In this assessment, the term "larvae" means all butterfly life stages other than adult.

Little is known regarding the effects of human foot traffic on Fender's blue butterfly larvae. Larvae are believed to remain within approximately 10 centimeters (4 inches) or less of their host plants, Kincaid's lupine, during their entire life cycle. In some restoration actions with a component of human foot traffic, the amount of larvae detected has been found to be equal or greater in the year following treatment (e.g., see discussion below for management action 1A). However, no literature has directly examined for specific correlation between any direct effects to larvae due solely to human foot traffic.

Despite mitigations to prevent contact with larvae near plants, management actions **1A**, **4A**, **6A**, **7A**, **8A**, **8B**, **10B** and **10C** in this assessment would include a component of intentional or inadvertent human foot traffic within 4 inches of Kincaid's lupine in areas occupied by Fender's blue butterfly larvae. This effect would be unavoidable to accomplish key management actions for the benefit of Kincaid's lupine and Fender's blue butterfly. This assessment assumes that a small, but unknown amount, of larvae mortality could occur due solely to human foot traffic.

Discussion of specific management actions below notes (but does not discuss further) if human foot traffic crushing larvae would be a potential effect of the action.

Because Fender's blue butterfly larvae remain on or near their Kincaid's lupine host plant during their entire life cycle, management actions such as burning, planting would not result in the direct effects of crushing or otherwise physically impacting larvae when they occur approximately four inches or more away from Kincaid's lupine plants.

Butterfly habitat**:**
All management actions below would, in varying amounts, have direct or indirect beneficial effects of maintaining or enhancing or restoring one or more of the following: Kincaid's lupine (and therefore Fender's blue butterfly habitat), nectar sources for Fender's blue butterfly, and prairie, oak savanna, or oak woodland habitats in general. Only additional and more precise effects are discussed below for each action.

1A: Mowing-hand methods

Kincaid's lupine:
No direct effects to plants would occur. Mowing would occur when the lupine is dormant and using a cutting height of six inches above the ground, ensuring that only senesced parts of plants would be mowed and that no damage would occur to the root crown or rhizomes near the ground. This action would result in beneficial indirect effects to the species. Research has shown that mowed Kincaid's lupine plants are more vigorous than lupines that are not mowed (Wilson and Clark 1997. Mowing would also reduce habitat competition and shade suppression from non-native species by reducing their future seed set (depending on the timing of the action).

Fender's blue butterfly:
When this action would occur in areas not occupied by Fender's blue butterfly, there would be no direct effects to individuals. Indirect effects would occur to nectar plants that would benefit from reduced competition and shade-suppression by non-native plants; and to Kincaid's lupine as described above.

Up to 25% of areas occupied by both Kincaid's lupine and Fender's blue butterfly may be mowed in a given year. When this action would occur in areas occupied by Fender's blue butterfly, direct effects of crushing larvae by human foot traffic could occur. However, egg (and therefore larvae) abundance would increase in the year following mowing (see below). Other indirect benefits would be to habitat as described above for Kincaid's lupine. Similar beneficial effects would occur to nectar species.

The Recovery Plan (2010, pg. IV-46) states that, "annual mowing has only positive effects on Fender's blue butterfly at several life history stages (egg laying, egg to larva survival, etc.), and need not be limited to only a portion of the site, as with burning." Research findings indicated that Fender's blue butterfly egg abundance was 10-14 times higher in mowed areas because tall vegetation interferes with foraging and ovipositing (Wilson and Clark 1997). The butterfly would benefit indirectly when nectar and larval food plants increase. In another multi-year study of various mowing regimes in lupine/butterfly habitat, annual mowing substantially reduced blackberry cover and increased both butterfly egg numbers and larval survivorship relative to controls and to less frequent mowing regimes (Kaye and Benfield 2005). In addition, no evidence was found for mowing damage to dormant larvae: and larval numbers increased in mown areas the year following treatment.

1B: Mowing- larger mechanical methods

Kincaid's lupine and Fender's blue butterfly:
This action would not occur in areas known to be occupied by Fender's blue butterfly or Kincaid's lupine and there would be no negative direct effects to these species. Although this action would not occur in the immediate proximity of Kincaid's lupine, the species would indirectly benefit from potential new areas to colonize (reduced competition) and overall reduced seed set of non-native plants (discouraging their spread throughout the project area).

Indirect beneficial effects to Fender's blue butterfly would be an increase in both the flowering of nectar plants and their number and diversity in nearby prairies, as well as benefits described below for Kincaid's lupine.

2A and 2B: Plant Population Augmentation of T&E and Non-T&E Plants (hand methods).

Kincaid's Lupine:
Each lupine population is thought to be one or more clones spreading vegetatively via underground rhizomes; and subterranean spread from the root crown may connect shoots as far as 10 meters (33 feet) apart (Wilson *et al.* 2003).

Planting and site preparation methods using shadecloth, solarization or tilling methods could directly affect Kincaid's lupine by destroying unidentified rhizomes up to 10 meters from root crowns. These effects would be reduced in the areas where effects would be the greatest by marking plants and maintaining distances of 1.0-1.5 meters from plants for planting and site preparation. The Kincaid's lupine population would indirectly benefit by increasing its size and extent which would result in increased genetic variability and greater resilience to catastrophic or stochastic loss. Overall, the population would experience a net benefit due to this action.

Fender's Blue Butterfly:
This action would not result in direct negative effects to adult butterflies due to action timing (would not occur during times when adults are active). Direct effects to larvae due to human foot traffic could occur. The species would benefit from additional host and nectar plants. Overall effects to Kincaid's lupine would be beneficial (see lupine discussion above).

2C and 2D: Plant Population Augmentation of T&E and Non-T&E Plants (larger mechanical methods).

These actions would not occur as part of the proposed action.

3A: Plant Population Creation of Non-T&E Plants (hand methods)

Kincaid's Lupine:
This action could result in the direct negative effects of potentially damaging Kincaid's lupine rhizomes (outside of the 1.0-1.5 meter buffers for planting and site preparation) as described for actions 2A and 2B. However, this would occur in lesser amounts than for actions 2A and 2B because planting locations would be greater distances from individual Kincaid's lupine plants (including locations where damage to Kincaid's lupine rhizomes

could not occur).

Fender Blue Butterfly:
All effects to individuals would be the same as described for actions 2A and 2B. Except for the benefits of planting Kincaid's lupine (which would not occur under this action), all indirect effects would be beneficial and the same as those discussed for actions 2A and 2B for nectar plants.

3B: Plant Population Creation of Non-T&E Plants (larger mechanical methods)

This action would not occur as part of the proposed action.

4A and 4B: Weeding (hand and larger mechanical methods)

Weeding by larger mechanical methods would not occur in areas occupied by Kincaid's lupine and there would be no direct or indirect effects to Kincaid's lupine and Fender's blue butterfly. Beneficial indirect effects to both species would be the same as described below for weeding using hand methods.

Kincaid's Lupine:
Hand weeding of Lupine could result in the same direct negative effects of potentially damaging Kincaid's lupine rhizomes (outside of the 1.0-1.5 meter buffers for weeding and site preparation) as described for actions 2A and 2B.

Direct and indirect beneficial effects to individual plants/populations would be reduced competition and shade suppression from weeds, resulting in increased persistence, vigor and flowering of Kincaid's lupine; and potential new areas for colonization.

Fender's Blue Butterfly:
Hand weeding would not result in direct negative effects to adult butterflies due to action timing (would not occur during times when adults are active). Direct effects to larvae due to human foot traffic could occur.

Beneficial direct and indirect beneficial effects to species' habitat would be discouraging or removing weeds and their negative effects of competition and shade suppression of Kincaid's lupine and nectar plants. This would result in beneficial effects to Kincaid's lupine (described above) and nectar species, improved access to nectar plants by adults, increased ovipositing by females, and increased mating success due to better visibility of females by males.

5A: Broadcast Burning

Kincaid's lupine:
Broadcast burning would occur in no more than 25% of the population annually. This action could result in the direct effects of mortality of some individual seedlings, rhizomes and lupine seed throughout the greater population. The Benton County HCP (2010) estimated a 5% mortality of all seed (on plants and in seed bank) due to burning.

Indirect negative effects would be a potential small and short term reduction in the population amount or size in the following year(s) due to seed or seedling destruction. However, overall effects to lupine would be positive; including increased vigor, leaf

production and flowering of undamaged plants; and reduced competition and shade suppression from non-native and woody vegetation. Wilson and Clark (1997) found lupines in burn treatments plots were more vigorous than the control group. A 2003 study (Wilson *et al.* 2003) found Kincaid's lupine responded to broadcast burning with increased leaf and flower production.

Fender's Blue Butterfly:
The direct effects of broadcast burning would be a 100% mortality of larvae within burned areas (Wilson and Clark 1997). Adults would not be affected due to action timing (would not occur during times when adults are active). Indirect effects to individuals would be an increase in the number of butterfly eggs in areas burned the subsequent year due to increased ovipositing by females. Wilson and Clark (1997) found a 10-14 times increase in butterfly eggs the year after mowing or burning occurred. Indirect benefits to the Kincaid' lupine and nectar species habitats would occur in areas burned the subsequent year (see discussion above).

5B: Pile Burning

Kincaid's lupine:
Pile burning would result in the same negative effects as broadcast burning but in much lesser amounts. Direct effects of burning plants would occur only when piles are inadvertently placed on seedlings (not marked due to their small size) or in areas with seeds or rhizomes greater than 3.0 meters (9.9 feet) from individual plant root crowns. Beneficial indirect effects to lupine would be a small reduction in habitat competition and shade suppression from non-native species, as well as providing new areas for lupine colonization.

Fender's Blue Butterfly:
Pile burning could result in the direct effect of larvae mortality due to burning if piles are inadvertently placed over Kincaid's lupine plants. Indirect beneficial effects to Kincaid's lupine are described above and would be similar for nectar species.

6A and 7A: Removal of large and small trees and shrubs (hand methods)

Kincaid's lupine:
Design features for this action include directional felling and removal of vegetation around marked T&E plants. However, direct effects include the low chance that a small number of plants or root crowns would be inadvertently crushed by felling or removal of larger vegetation.

Beneficial direct and indirect effects to individual plants would be reducing competition and shade suppression effects from competing vegetation; resulting in increased persistence, vigor and flowering of Kincaid's lupine. Tree and large shrub removal would create new growing space for Kincaid's lupine, and would create or enhance connective corridors between prairies for movement of pollinators which would increase pollination and genetic diversity of Kincaid's lupine and other plant species.

Fender's Blue Butterfly:
Direct effects include the low chance that a small number of larvae near Kincaid's lupine plants would be inadvertently crushed by human foot traffic or by felling or removal of larger vegetation. Beneficial direct and indirect effects to species' habitat are the same

as those described for Kincaid's lupine and would also apply to nectar species. Tree and large shrub removal would create or enhance connective flight corridors between prairies resulting in opportunities to expand the spatial extent of the population, increased butterfly gene flow, enhanced access to Kincaid's lupine and host plants, a higher number of mating encounters between males and females, and general improvement of population health.

6B and 7B: Removal of large and small trees and shrubs (larger mechanical methods)

Kincaid's Lupine and Fender's Blue Butterfly:
This action would not result in any direct or negative effects to Fender's blue butterflies or Kincaid's lupine because it would not occur near existing Kincaid's lupine populations.

Except for direct beneficial effects to nearby Kincaid's lupine, beneficial direct and indirect effects to Kincaid's lupine and Fender's blue butterfly nectar species would be similar to those described under actions 6A and 7A.

8A and 8B: Slash gathering for on or off-site disposal – hand methods

This action would not result in any indirect or beneficial effects to Kincaid's lupine or Fender's blue butterfly because: gathering, treatment and disposal of slash are the first phase of action 5A and the last phase of actions 6 and 7 (see those actions for discussion of indirect or beneficial effects)

Kincaid's Lupine:
Direct effects from the gathering and piling of slash could occur if plants are crushed or prevented from sprouting as a result of inadvertently placing piles over plants or their rhizomes (when located more than 3.0 meters from the root crown).

Processing of slash by chipping or grinding and "disposal" of slash by leaving chips and very small slash in prairie habitats or by scattering into nearby forest would have no effect on Kincaid's lupine. Effects would be the same for actions 8A and 8B, except that effects due to pile creation would be fewer under action 8B because fewer piles would be created (i.e., more slash would be directly loaded onto vehicles).

Fender's Blue Butterfly:
The gathering and piling of slash could result in the direct adverse effects of larvae mortality by crushing due to human foot traffic or inadvertently placing piles over larvae, or preventing Kincaid lupine plants from sprouting, or crushing Kincaid's lupine plants as a result of inadvertently placing piles over plants.

Processing of slash by chipping or grinding and "disposal" of slash by leaving chips and very small slash in prairie habitats or by scattering into nearby forest would have no effect on Kincaid's lupine or Fender's blue butterfly. Effects would be the same for actions 8A and 8B, except that effects due to pile creation would be fewer under action 8B because fewer piles would be created (i.e., more slash would be directly loaded onto vehicles).

8C and 8D: Slash gathering for on or off-site disposal – larger mechanical methods

Kincaid's lupine and Fender's Blue Butterfly:
Effects due to slash pile burning are discussed under burning action 5B. This action (*gathering, processing, and removing slash)* would have no direct effects to either species because it would not occur in areas with Kincaid's lupine or Fender's blue butterfly. This action would have no beneficial effects to either species for reasons stated under actions 8A and 8B above.

9A: Seed collection – T&E plants

Kincaid's Lupine and Fender's Blue Butterfly:
Design features include that all seed collectors would be permitted by the USFWS and collectors would follow all methods and Terms and Conditions described in the collector permit. Methods would minimize effects to Kincaid's lupine and Fender's blue butterfly. However, this action could result in the direct effect of some larvae or plants being trampled (crushed) by human foot traffic. Direct and indirect effects would be the gathering of seed to implement Actions 2A and 2C. Direct effects to butterfly larvae due to human foot traffic are possible.

9B: Seed collection – Non-T&E plants

Kincaid's lupine and Fender's Blue Butterfly:
When this Action would occur in areas not occupied by Fender's blue butterfly or Kincaid's lupine, there would be no direct or indirect effects to individuals or their habitat. When this Action would occur in areas occupied by Fender's blue butterfly or its habitat, methods would minimize effects to the butterfly species or its habitat. However, this action could result in the direct effect of some larvae or plants being trampled (crushed) by human foot traffic. Direct and indirect effects would be the gathering of seed to implement Actions 2B and 2D.

10A: Monitoring of T&E Animals (Fender's blue butterfly)

Kincaid's Lupine and Fender's Blue Butterfly:
The specific amount, frequency, and type(s) of monitoring methods (e.g., adult vs. egg counts, different sampling intensities) would be determined annually. Subsequent monitoring and its effects would be analyzed under a separate NEPA document. It is mentioned in this EA because it is an iterative component of implementing the Action and No Action Alternatives, including being a type of mitigation by determining if and how other management actions would occur.

Depending on the type of monitoring methods, this action could result in the direct effect of injury to, or death of, Fender's blue butterfly adults or larvae. Kincaid's lupine or nectar species could be inadvertently trampled by human foot traffic (adult or egg surveys) and Kincaid's lupine leaves could be crushed by egg surveyors which examine leaves.

10A: Monitoring of T&E Plants (Kincaid's lupine)

Kincaid's Lupine and Fender's Blue Butterfly: T
See discussion under action 10A.

10C: Monitoring – plant community vegetation

Kincaid's lupine and Fender's Blue Butterfly:
The specific amount and types of monitoring methods would be determined annually based on their effectiveness of monitoring restoration actions as well as associated effects to Fender's blue butterfly and Kincaid's lupine.

Depending on the type of monitoring methods, when this action would occur in areas occupied by Kincaid's lupine or Fender's blue butterfly, it could result in the direct effect of injury to, or death of, Fender's blue butterfly larvae, or trampling of Kincaid's lupine, both due to human foot traffic. Indirect effects to the species would be gathering vital data regarding the size and health of the Oak Basin Kincaid's lupine populations and providing information on the effectiveness and design of restoration actions.

Cumulative Effects of All Actions to Kinaid's Lupine and Fender's Blue Butterfly:
The majority of remaining prairie, oak savanna, and oak woodland habitats in the Willamette Valley are on privately owned lands. The type, amount, and severity of negative cumulative effects to these habitats due to herbicide use, wood product extraction, agriculture, residential development, and other habitat conversions on private lands is unknown.

As directed by the Eugene Resource Management Plan, the BLM would continue to manage the Oak Basin ACEC for its Relevant and Important Values, maintaining current populations of Kincaid's lupine and Fender's blue butterfly.

4.1.2.2 Taylor's Checkerspot Butterfly

If surveys were to find populations of this butterfly within the project area, all potential negative effects to the species would be the similar to those described for Fender's blue butterfly. Management action 10A would not affect Taylor's checkerspot butterfly and some management actions could crush larvae on or near its host plant.

Action 1A (weeding by hand methods) could occasionally occur during times when adults are active, but would not affect the species as they could avoid the action by flying. Other project actions would not affect adult butterflies due to their timing.

Overall the Proposed Action would result in direct and indirect benefits to the species by maintaining, restoring, enhancing, or augmenting its nectar species, and the greater surrounding prairie habitats.

Any additional project design features (beyond those for Fender's blue butterfly) for Taylor's checkerspot butterfly would probably be based on management of its host plant (English plantain [*Plantago lanceolata]*) and specifics of its confirmed presence in the Project Area (e.g., its location and distribution).

Due to the low chance of populations occurring in the Project Area, its un-listed federal status as a Candidate species, and the higher priority need to manage for the local population of endangered Fender's blue butterfly and Kincaid's lupine, the Proposed Action would proceed without confirmation of the presence of Taylor's checkerspot butterfly. Surveys would be conducted for the species as soon as spring 2012.

If the species becomes federally listed, or is discovered to be present in the project area, the Proposed Action would be re-evaluated and modified, if necessary, to further minimize, or avoid, adverse effects to Taylor's checkerspot butterfly.

4.1.2.3 Northern Spotted Owl

On BLM land, the only action that would affect spotted owl habitat would be that approximately 2 acres of spotted owl dispersal/forage habitat would be treated by selective removal of small trees (less than 11 inch dbh) around their perimeter. These treatments would not alter the habitat function or quality of these stands. Untreated trees could experience improved or accelerated growth due to thinning.

There would no expected effects to spotted owl nesting due to noise disturbance because of the proximity of known and predicted sites; the low chance that spotted owls would be nesting in the vicinity of the project; and that any potential noise-disturbing actions would not occur, or would not occur during the critical nesting period of March 1 to July 15.

On private land, project actions would have no effect on spotted owls or their habitat.

4.1.2.4 Other Special Status Animal Species (BLM Sensitive Birds)

Alternative 1: No Action

Under this Alternative, no Special Status bird species would experience direct negative effects to nesting habitat, behavior or young. However, no species would experience the direct and indirect benefits of their habitat being enhanced, restored, augmented, or created in the Project Area.

Alternative 2: Restoration Actions

Should any of the Sensitive bird species below be located during the life of the project, the Proposed Action design and timing would be re-evaluated for adverse effects to these species.

Lewis' Woodpecker:
Management actions could remove suitable nest trees. However, this is unlikely to occur due to the small size of most trees being harvested.

Project Actions that occur during the nesting period could result in noise disruption to breeding behavior if they occurred from April through mid-July close to nest trees.

Project actions would result in the indirect benefits of maintaining and restoring oak savanna and oak woodland habitats and would increase the chance of the species breeding in the Project Area in the future.

Grasshopper Sparrow and Oregon Vesper Sparrow:
All potential negative effects to these species' habitats would be short term with habitat recovering the following year. Due to their nature and timing, it is unlikely that management actions would destroy nests or injure young; or that any nests and newly hatched young would be detected and actions modified to avoid adverse effects.

Most actions have the potential for noise or line-of-sight disturbance to breeding behavior if they occur during the nesting period (April through July or August for G. sparrow and May through July for O. vesper sparrow). The potential for negative effects to breeding are greatest during the early parts of the nest period and gradually lessen as young become more capable of moving away from disturbance. However, until they are fully capable of sustained flight, young are subject to predation during such movements.

Project actions would result in the indirect benefits of maintaining and restoring oak savanna and oak woodland habitats and would increase the chance of species breeding in the Project Area in the future

4.1.2.5 Other Special Status Plant Species

Alternative 1: No Action

Sisyrinchum hitchcockii:
Currently the only known site of this species is on private land, so management would be left to the private landowner.

Eucephalus vialis:
Where the Wayside aster occurs on BLM lands, a small amount of brush cutting, weeding and tree girdling would be done to maintain the species at the site. Where it occurs on private land, management would be left to the private landowner.

Alternative 2: Proposed Action

Sisyrinchum hitchcockii:
The Sisyrinchum is located along a road and is vulnerable to direct disturbance. It would be protected from direct disturbance and weeded, preventing loss of the site to weeds or disturbance.

Planting new sites of this species would occur as this species would be included in the mix of species to plant, increasing the population.

Eucephalus vialis:
Wayside aster would benefit from the tree and shrub removal in the proposed action. This action would open up and improve the aster site creating a larger area of appropriate habitat, providing enough light for the plants to flower, reproduce and increase the population. Prescribed burning, in particular, may benefit Wayside aster by removing competing vegetation, and heat stratifying seeds. These benefits would allow

the population to increase.

4.2 ISSUE 2: WHAT ARE THE EFFECTS OF THE PROPOSED ACTIVITIES ON THE RELEVANT AND IMPORTANT VALUES OF THE OAK BASIN AND RELIC FOREST ISLAND (RFI) AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACECS)?

4.2.1. BACKGROUND ON ACEC NOMINATIONS

The BLM lands in the project area include two overlapping ACECs: Oak Basin ACEC and Relict Forest Islands ACEC (RFI, parcel #10). Oak Basin includes all the polygons on BLM and the Relict Forest Island includes polygons 3, 4, 5 and the forest between them (see map in Appendix A).

Oak Basin ACEC

This ACEC was originally nominated in 2005. Under the Northwest Forest Plan, it remains a „'potential'' ACEC, pending a final decision to in a subsequent EIS or RMP. BLM policy directs that potential ACECs be managed to maintain the Relevant and Important Values of the nomination. The Relevant and Important Values of this nomination are to protect:

1) Fender's blue butterfly and Kincaid's lupine populations;
2) Upland red fescue dominated prairies.

Relict Forest Islands ACEC

This RFI was first proposed for ACEC nomination in the fall of 1990. It was eventually nominated, passed screening and formally designated as an ACEC under the 1995 *Eugene District Resource Management Plan* (1995 RMP). Its location in Section 33 of Township14 South, Range 2 West, is within the Project Area and the later nominated larger Oak Basin ACEC. All Relevance and Importance Criteria in the nomination relate to protecting:

1) Mature and late seral conifer habitats.
2) Use of these habitats by raptors, including bald eagle winter roosts.
3) Refugia for plant and animal species associated with mature to late-seral conifer habitats.

4.2.2. AFFECTED ENVIRONMENT

Oak Basin ACEC

Kincaid's Lupine and Fender's Blue Butterfly:

See discussion under Issue 1, section 4.1 for a complete description of the Affected Environment for Kincaid's lupine and Fender's blue butterfly.

Upland Red Fescue Dominated Prairies:

Oak Basin ACEC contains 12 acres of upland red fescue prairie. These prairies are part of a larger complex of prairies on the west slope of the Coburg Hills. Ownership of these prairies is a checkerboard of BLM, private timber companies and individuals.

The prairies are high-quality, dominated by Roemer's (red) fescue with many prairie species such as balsam-root, camas, brodiaea, lomatium, lupine and checkermallow.

The prairies have undergone some disturbance, largely from logging and livestock grazing. Despite this, the prairies harbor populations of native grasses and forbs, as well Kincaid's lupine and many butterfly nectar species. Many of the species are unique to prairies. Lack of fire at Oak Basin has allowed trees and shrubs to invade the prairies, shading out prairie species. There are non-native grasses and forbs invading the prairies also crowding out native species. In places, blackberries are aggressively overtaking and shading out native species.

The amount of native prairie has been reduced from the Willamette Valley as a result of conversion to agriculture, urbanization, and other development. Most Willamette Valley grasslands are a seral stage, requiring natural or human-induced disturbance, historically fire, for their maintenance and to prevent transition to forest. The majority of Willamette Valley grasslands would be forested if left undisturbed over time. Native Americans probably maintained Willamette Valley prairies by manipulating fire regimes prior to European settlement (Johannessen, 1971). At Oak Basin, the thin soils make it difficult for trees to establish, which has created an unusual stable prairie community which has persisted over a long period of time. Despite the thin soils, fire suppression has allowed encroachment by conifers.

Relict Forest Islands ACEC

Mature and Late Seral Habitat:

The existing RFI stand is approximately 44 acres in size. It is comprised of approximately 16 acres of prairie, oak savanna, oak woodland, or non-conifer habitats and 28 acres are conifer dominated stands. Approximately 12 acres of the conifer habitat has scattered larger conifers that could be used by raptors required larger trees.

Use by Raptors, Including the Bald Eagle:

Depending on the species, based on tree size and structure, a subset of the conifer portion of the RFI (approximately 5 to 15 acres) is low quality nesting habitat for a variety of raptors such: as red tailed hawks, Accipiter species (sharp-shinned and coopers hawks, northern goshawk), as well as several owl species (great-horned, long-eared, barred, screech, saw-whet, pygmy). For discussion on suitability of this habitat for the northern spotted owl see Issue 1, Section 4.1. Suitability of the stand by some of these raptors is reduced due to its small size.

Bald eagles are the only raptor known to be using the RFI in recent years. Bald eagles use this, and many other nearby stands in the Coburg Hills, annually for winter roosting from approximately mid-November to mid-March. Approximately 12-15 acres of RFI stand is suitable for winter roosting by eagles. The RFI is not a suitable place for bald eagle nesting due to its lack of close enough proximity to a major water forage resource such as a river, lake or reservoir (within approximately 1.5 miles).

Refugia for Plant and Animal Species Associated with Mature to Late-Seral Conifer Habitats:

A variety of plant and animal species could use RFI conifer stand as refugia for future colonization into other nearby mature to late-seral conifer habitats. However the amount of species and individuals potentially using the stand is currently diminished based on its small size and lack of proximity to other such habitats. The west and south aspects of this stand, along with windy conditions due its ridgetop exposure, could further limit species use in the summer, if it requires cooler, more mesic conditions.

4.2.2. ENVIRONMENTAL EFFECTS

Alternative 1 - No Action

Oak Basin ACEC:

Kincaid's Lupine and Fender's Blue Butterfly:
The effects of the No-Action Alternative to these species are the same as those described under Issue 1, section 4.1.

Upland Red Fescue Dominated Prairies:
On BLM lands and under the no action alternative, activities proposed as part of the RAC proposal would not occur. Any further action at Oak Basin would be dependent upon other types of funding and most likely would be only focused on areas occupied by Kincaid's lupine and Fender's blue butterfly. These potential activities would not address the greater need for improving and increasing red fescue prairie not occupied by Kincaid's Lupine and Fender's blue butterfly. Without weeding or removal of encroaching trees and shrubs, prairies, oak savanna and oak woodlands would continue to degrade.
Management on private lands may still occur. However, BLM funding for actions proposed under the RAC Project would not be provided.

Relict Forest Islands (RFI) ACEC:
Under this alternative, the small amount of tree removal around the perimeter of the conifer stand within the RFI would not occur. Except for potential enhanced growing conditions for trees along the edge of the treated stand, all effects to the RFI conifer stand would be the same as described for the Action Alternative.

Alternative 2 - Proposed Action

Oak Basin ACEC:

Kincaid's Lupine and Fender's Blue Butterfly:
The Draft Oak Basin Management Plan was developed specifically to provide beneficial management for the Relevant and Important Values of the Oak Basin ACEC. All aspects of the Proposed Action on BLM and ACEC lands was developed to address, and be entirely consistent with, guidance in the Management Plan, the ACEC designation, and the Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington.

All Affected Environment and Environmental Affects analyses relevant to Kincaid's lupine and Fender's blue butterfly in the ACEC are discussed under Issue 1, Section 4.1.

Therefore, no further discussion of these two species, specific to their inclusion in the ACEC designation, is necessary or included in this EA.

Red-Fescue Dominated Upland Prairie:
Restoration actions are aimed at maintaining and improving prairie habitat, especially as these actions also benefit Kincaid's lupine and Fender's blue butterfly. Under the proposed actions, red fescue prairie would improve in quality and increase in quantity.

1A & 1B Mowing: By hand and large mechanical methods

Removal of tall vegetation that shades the red fescue increases its vigor and makes it more competitive. Mowing cuts the seed heads of species blooming, reducing seed set. Mowing can inhibit the growth of woody plants and maintain the open prairie aspect. Some weeds such as older Scot's Broom bushes may be killed by mowing. Mowing reduces the buildup of grass thatch by keeping the grass cut, there is less thatch. Thatch settles between the clumps of bunchgrass, reducing bare ground for seed to germinate in, mulches out some native forb species and provides habitat for voles, mice and other seed predators and grazers. Mowing during the dry season prevents effects to Kincaid's lupine or Fender's Blue butterfly.

1B Mowing: Large mechanical methods

Effects particular to large mechanical methods: mowing with machinery may damage native prairie vegetation between its wheels or tracks, especially during turns or in rough terrain, creating small areas of disturbed ground where weeds could come if not seeded afterward, but this represents a small fraction of total mown area.

2A and 2B: Plant population augmentation of T&E plants and native (not T&E) - hand methods

The effects are beneficial in that the action would increase the number and diversity of prairie species.

2C and 2D: Plant population augmentation of T&E and native (not T&E) plants – mechanical methods

The effects are beneficial in that the action would increase the number and diversity of prairie species. A few existing individuals of native prairie plants could be crushed by wheels or tracks or machinery used for planting. Machinery would not be used to plant T&E plants.

3A & 3B: Plant population creation - Hand and Machine methods

The Action would increase the species diversity of the prairie, reintroduce species to Oak basin present in nearby prairies. Selection of species would emphasis FBB larval host and adult nectar species.

4A: Weeding – Hand Methods

Removing weeds would reduce competition of growing space to native plants, either maintaining habitat or creating areas for native species to establish.

4B: Weeding- larger mechanical methods

Effects would removing weeds would be the same as under action 4A. However in areas of dense infestation, the use of equipment could result in soil disturbance (up to six inches in depth) and removal of most of the vegetation in areas of up to one acre in size. Disturbed areas would be replanted with native species to reduce the probability of weed re-infestation.

5A: Broadcast burning

Red fescue prairies developed when native peoples burned prairies regularly (Johannessen 1971). Prairies typically benefit from burning. Research indicated that fires occurring at frequent intervals maintained open prairie habitats and prevented colonization of trees and shrubs on sites where they would be able to occur if fire was excluded. Many prairie species may possess tolerance or even adaptation to fire; and non-native plant species, are be negatively affected by fire.

There is often a short loss (mortality) of individual native prairie plants, with a long term benefit of increased native plant vigor (including flowering and seed set), reduction in non-native plants, and increased reproduction of native plants. Broadcast burning reduces the use of prairies by voles, reducing herbivory. For some species, fire stimulates seed germination. Fire burns up thatch and litter creating open ground for seed to germinate in. Burning thatch and leaf litter releases nutrients typically unavailable, to the plants, providing a fertilizer effect (Alverson 2006). Fire burns up encroaching woody vegetation and trees, setting succession back.

5B: Pile Burning

The effects of pile burning are limited to the spot where the pile was burned. It often results in a small (depending on the size of the pile) area of nearly total plant mortality, creating a seed bed for weeds or native plants if seeded or planted. Pile burning can be used to deliberately kill a patch of weeds or small trees. Surrounding plants may have wilting from the heat of the pile.

6A & 7A: Removal of encroaching conifers- hand methods

Removal of trees shading prairie plants would increase plant vigor, flowering and reproduction. Trees growing in the prairie convert prairie to forest by shading out prairie plants; dropping leaves and needles which alter prairie soils by increasing humus content and altering soil biota. Leaves and needles may cover prairie plants killing them. Removing trees between the prairies would restore connectivity between the meadows, needed for movement of pollinators and gene flow between patches of KL and FBB and other native species

Trees falling and hitting ground can create areas of disturbance, the larger the tree, the more the disturbance. Disturbance occurs from cutting up and moving the boles of the

larger trees. Some existing vegetation (native and non-native) would be crushed and moved around.

6B & 7B: Removal/cutting of small diameter trees, (conifer and hardwoods) and shrubs

Areas of disturbance from machines driving to trees and shrubs to cut them, crushed vegetation from machines.

8A, 8B, & 8C: Slash removal

Effects would be similar under these slash removal methods. Areas of crushed vegetation may occur from the dragging and moving of slash to piles or collection points.

8D: Slash removal- chipping
Moving the slash to the chipper would have the same effects as 8a, 8b, and 8c. Chips would have no effect on the prairies as chips would be spread in the forest.

9A & 9B: Native and T&E species seed collection

Collectors moving among the plants could trample small number of individual native plants, especially where the plants are dense. Most of the trampled plants would recover. Seed collecting would not impact plant populations as all the seed produced in a year is not collected.
Indirectly, native plants populations would be increased by planted seed and plants.

10A and 10B: T&E and project monitoring

Small numbers of plants could be trampled during monitoring; for the most part the plants recover. The prairies would benefit by having future restoration efforts address problems discovered by monitoring.

Relict Forest Islands (RFI) ACEC:

Within the RFI, all project actions would occur either: 1) in existing non-forested or non-conifer dominated habitats such as prairies, oak savanna or oak woodland; or 2) within 100 feet of the edge of the current RFI conifer stand and within the historic extent of prairie, oak savanna, and oak woodland habitats.
Project actions that would occur in existing prairies, oak savanna, or oak woodland habitats are not germane to, and would not affect, any RFI Relevant and Important Values.

Mature and Late Seral Habitat:
The existing mature and late seral conifer stand would not be affected by the Proposed Action.

Use by Raptors, Including the Bald Eagle:
Project actions that occur around the edges of the RFI conifer stand would selectively cut saplings and smaller trees with a dbh of $\leq$ 10 inches in scattered locations where conifers have encroached into the historic extent of prairies, oak savanna, and oak woodland habitats. Much of area that would be treated is where encroachment has

occurred in the twenty years since the original ACEC nomination (i.e., the size of the conifer stand is slightly larger than the original nomination due to conifer encroachment). Project actions would attempt to ameliorate this and provide some restoration of historic conditions to prairies, oak savanna, and oak woodlands.

The total amount of trees removed would be no more than 1 acre. Some small diameter trees could experience enhanced growing conditions due to reduced competition from neighboring trees.

Bald Eagle:

Except for potentially enhanced growth of trees near removed trees, bald eagle habitat would not be affected by project actions.

Overall, project actions are not expected to adversely bald eagles roosting behavior. When project actions 1A, 4A, 4B, 6A, 7A, 8A, 8B, 8C, and 8D occur during the winter roosting period, and if eagles are using, or attempting to use, the RFI stand for winter roosting, they could result in short-term noise or line-of-sight disturbance to this eagle behavior. However, most of these actions would occur infrequently and for short durations during the winter roosting period. Additionally, bald eagles have a variety of suitable winter roosting stands near the Project Area. Use of other stands for winter roosting outside of the Project Area for roosting is an adaptable behavior for the local winter population of eagles.

Other Raptors:

As with the bald eagle, other raptor habitat would not be affected by project actions. Overall, project actions could affect nesting by other raptors.

When project actions 1A, 4B, 5B, 6A, 7A, 8A, 8B, 8C, and 8D occur during the nesting periods (February through August) for other raptors and they are using, or attempting to use, the RFI for nesting, they could result in noise or line-of-sight disturbance to breeding behavior. The most likely type of disturbance would be due to noise when louder mechanical equipment is used (e.g., chain saws, mowers, tiller, weed-whackers). However, most of these actions would occur infrequently and for short durations during the nest period, and would need to occur close enough to nests to affect breeding behavior.

Refugia for Plant and Animal Species Associated with Mature to Late-Seral Conifer Habitats:

No negative direct or indirect effects are expected to other plant or animal species that might be using the RFI conifer stands for nesting or refugia.

4.3 ISSUE 3: WHAT ARE THE EFFECTS OF THE PROPOSED ACTION ON THE SPREAD OF NOXIOUS WEEDS?

4.3.2 AFFECTED ENVIRONMENT

Oak Basin has 78 weed species, 14 on the state noxious weeds list. Sixty-eight species of weeds are invasive species that pose risk to the native plant communities of Oak Basin. Weeds have come in with past disturbances such as road building, logging and grazing. Recreational and other uses bring weeds from other areas and spreads weeds

in from neighboring lands. Nearly all of the weeds on the list below compete with Kincaid's lupine.

The table below lists native and non-native plant species, of particular management concern, present within the project area. Priority List 1 species are of greatest concern and pose the greatest risk to Kincaid's lupine and the prairies, oak savanna and oak woodlands in the project area. These species are the first priority for treatment. Priority List 2 species should be treated on a case by case basis. The origin of each species is noted with „N' for native and 'I' for introduced. Species highlighted in grey should be managed aggressively as they pose the greatest risk to Kindcaid's Lupine and Fender's Blue Butterfly.

Table 5. List of weeds present at Oak Basin

Scientific Name	Common Name	Origin	Habitat	Priority List
Agrostis capillaries	Colonial bentgrass	I	prairie	2
Anthoxanthum odoratum	sweet vernalgrass	I	prairie	2
Arrhenatherum elatius	Tall oatgrass	I	prairie	1
Avena fatua	wild oatgrass	I	prairie	2
Brachypodium sylvaticum	False-brome	I	woodland	1
Bromus rigidus	Ripgut	I	prairie	2
Carduus pycnocephalus	Italian thistle	I	prairie	1
Centaurea X pratensis	meadow knapweed	I	prairie	1
Cirsium arvense	Canada thistle	I	prairie	1
Cirsium vulgare	bull thistle	I	prairie	2
*Crataegus monogyna**	English hawthorn	I	prairie	1
*Crataegus suksdorfii**	Douglas' hawthorn	N	prairie	2
Cynosurus cristatus	crested dogtail	I	prairie	2
Cynosurus echinatus	hedgehog dogtail	I	prairie	2
*Cytisus spp.**	non-native brooms (e.g. Scotch broom, Spanish broom, etc.)	I	prairie	1
Dactylis glomerata	orchard-grass	I	prairie	2
Daucus carota	Queen Anne's lace	I	prairie	2
Digitalis pururea	Foxglove	I	prairie	2
Dipsacus sylvestris	Teasel	I	prairie	2
Festuca arundinacea	tall fescue	I	prairie	1
Geranium lucidum	shining geranium	I	prairie	1
Geranium molle	dovefoot geranium	I	prairie	2
Geranium robertianum	Stinking Bob	I	forest	1
Holcus lanatus	common velvetgrass	I	prairie	2

Table 5. List of weeds present at Oak Basin				
Scientific Name	**Common Name**	**Origin**	**Habitat**	**Priority List**
Holcus mollis	creeping softgrass	I	prairie	1
Hypericum perforatum	common St. John's-wort	I	prairie	2
Hypochaeris radicata	false dandelion	I	prairie	2
Leucanthemum vulgare	oxeye daisy	I	prairie	1
Lolium perenne	perennial ryegrass	I	prairie	2
Mentha pulegium	Pennyroyal	I	prairie	1
Phalaris arundincea	Reed Canary Grass	Introduced	Prairie	1
*Prunus spinosa**	Blackthorn	introduced	Prairie & Forest	1
*Pyrus communis**	Feral pear	Introduced	prairie & forest	1
*Rosa multiflora**	multiflora rose	I	prairie	1
*Rubus armeniacus**	Himalayan blackberry	I	prairie & forest	1
*Rubus laciniatus**	evergreen blackberry	I	prairie & forest	1
*Rubus vestitus**	European blackberry	I	prairie & forest	1
Senecio jacobaea	tansy ragwort	I	prairie	2
Taeniatherum caput-medusae	Medusahead wildrye	I	prairie	1
Vicia hirsute	tiny or hairy vetch	I	prairie	2

*Woody Invasive species (tend to be more difficult to control)

4.2.2 Environmental Effects

Alternative 1: No Action

Under this Alternative, on BLM lands, much of the Proposed Action would not occur. Weed populations within the project area would most likely be maintained or expand, continuing to pose risk to native plant populations and, consequently, Kincaid's Lupine and Fender's Blue Butterfly.

Management actions, which are not part of the RAC project, may continue on private lands. However, without coordination of management with BLM, those actions would be less effective than coordinated actions on the entire population.

Alternative 2: Restoration Actions

The proposed action treats weeds at a larger scale, improving the prairie habitat overall, not just around the Kincaid's Lupine and coordinating efforts between landowners as to which weed species are priority to treat. This is especially important for prairies that stretch across ownership boundaries (parcels 2& 362 and 5& 301). The proposed action

include Early Detection and Rapid Response of new weed species over a larger scale, reducing the risk of new weed species getting a toehold in Oak Basin.

1A & 1B: Mowing – by hand and large mechanical methods

Mowing cuts the above ground growth of weeds reducing the height of weeds, reducing the amount of shading on surrounding plants. For woody invasive plants, mowing may remove most of the top growth, reducing the shading to the height the plants are cut to. An indirect effect is the reduction flowering and seed set of weeds, depending on the timing of flowering and seed set.

Mowing equipment occasionally disturbs small areas of soil, creating bare ground for weeds to come into. Due to many weed species ability to germinate quickly, weeds are often able to out compete native plants, occupying these areas. Mowing equipment can also spread weed seed from one site to another.

2A & 2B:- Plant population augmentation of T&E plants and native (not T&E) - by hand methods

Hand planting methods of augmentation have no direct effects on weeds. Planting increases the native plants that may compete with weeds, indirectly reducing weed populations. Planting with machinery has the same effects as mowing machinery.

Weeding (4 a) Weeding benefits native plant communities by removing plants that compete for light and nutrients, without weeding, weeds may come to dominant Oak Basin, ultimately out competing native and T&E plants.

Weeding involves physically removing the plants from the soils, burning the above ground portion of a plant (broadcast or propane burner, or in areas of dense infestation covering the weeds and ground with shade cloth or clear plastic). Weeding methods cause direct disturbance of soils and plants, weeding typically takes several years of treatment to be effective. Hand weeding may disturb or trample desired plants in the course of removing weeds. The soil is disturbed when plants are pulled out, creating areas of new seed bed and the potential for re-infestation. Shade cloth and solarization may kill desired plants that are intermingled with weeds.

Use of a propane flamer kills the above ground portion of herbaceous plants by burning and wilting, without disturbing the soil. This may kill annual weeds outright and kill the tops of perennial plants, preventing flowering and seed set in that year. Some inter-mingled desired plants may be killed. Fire adapted native plants would probably recover quicker from flaming than non-native plants, recolonizing the site.

4B Weeding: Larger mechanical methods

In areas of dense infestation on private land only, machinery would be used to cut, uproot, masticate and pile woody weeds (such as blackthorn). Areas of soil disturbance would result from woody vegetation being knocked over and pulled out and from the wheels and tracks of equipment moving around. Areas of bare ground would result in areas where the trees and shrubs suppressed understory vegetation. Native plants would be replanted to occupy the site. Often when an area of dense weeds is removed a surprising number of native plants reappear that were buried under the weeds.

5A: Broadcast burning

Fire kills plants indiscriminately, creating bare areas, adding nutrients and creating seed bed for native plants and weeds. Broadcast burning often kills non-native plants, while the native plants that evolved with fire often have large underground portion that survive fire and benefit from having completion removed, the nutrients created by fire burning vegetation, and their seed may need heat to germinate. Pile burning creates small bare areas which often functions as seed bed for weeds to establish.

For all actions involving removal of trees, shrubs or conifers, areas of soil disturbance may result from trees falling and from the wheels and tracks of equipment. Areas of bare ground would result in areas where the trees and shrubs suppressed understory vegetation. Where large trees are removed, disturbance may result from moving logs around.

5B: Pile Burning

Pile burning creates small bare areas which often functions as seed bed for weeds to establish. Seeding and planting after burning is needed to prevent weed from establishing in these areas.

6A & 7A: Removal of encroaching conifers- hand methods

Weeds would establish in areas of disturbed soil resulting from cutting and falling trees. In areas where trees suppressed understory vegetation bare ground would be exposed that would easy for weeds to establish in. Planting and seeding bare and disturbed ground with native plant species would reduce or prevent weeds from establishing.

6B & 7B: Removal/cutting of small diameter trees, (conifer and hardwoods) and shrubs - machine

Work would be done during the dry season (June 21 to Sept 21) to reduce disturbance to soil, the less the soil is disturbed, the fewer opportunities for weeds to come in.

Weeds would establish in areas of soil disturbance from trees falling and from the wheels and tracks of equipment as they move around. In areas where trees suppressed understory vegetation bare ground would be exposed that would easy for weeds to establish in. Planting and seeding bare and disturbed ground with native plant species would reduce or prevent weeds from establishing.

8A, 8B, 8C & 8C: Slash removal and chipping

All activities involving slash gathering, processing and disposal would result in small areas of disturbed soil which weeds would colonize.

Slash gathering by hand would disturb soil and vegetation by dragging slash, breaking and uprooting small areas of vegetation and scraping small areas of soil. By machine, could result in areas of bare soil from scraping the soil and uprooting vegetation while lifting slash. Small areas of native vegetation would be crushed by machinery driving over it. During slash scattering, small areas of disturbance would result from slash being

dragged through the forest, creating areas for weeds to come in. Planting seeding disturbed areas with native seeds would reduce weed colonization.

9A & 9B: Native and T&E species seed collection

There is the risk that personnel collecting seed could spread weed seed from infested to non-infested areas within the project area on clothing and boots. Seed collection would be a long term benefit in that plants grown from seed collected would compete with weeds.

10A & 10B: T&E and project monitoring

There is the risk that personnel could spread weed seed from infested to non-infested areas within the project area on clothing and boots, vehicles and equipment. A benefit would be that monitoring personnel would keep an eye out for new infestations of weeds and make regular assessments to determine areas needing weed treatment.

4.4 ISSUE 4: WHAT ARE THE EFFECTS OF THE PROPOSED ACTIONS ON SOILS?

4.4.1 AFFECTED ENVIRONMENT

The project area is gentle topography of ridges, shoulders, middle slopes, and small headwater tributary valleys, with south to west facing slopes relatively high on the face of the Coburg Hills. The climate is characterized by warm, wet winters and hot, dry summers. Soils are usually moist by are dry between depths of 4 to 12 inches for more than 45 consecutive days following the summer solstice (June 21).

The project area is comprised of five soil series:

- ***Nekia (silty clay loam)*** – Moderately deep (20 to 40 inches to fractured bedrock), well drained soils with moderately slow permeability; the A horizon is 5 to 10 inches thick.
- ***Panther (silty clay loam)*** – Deep to very deep (40 to 60 inches to siltstone, shale, sandstone or tuffaceous bedrock), poorly drained soils with very slow permeability; the A horizon is 10 to 24 inches thick, in swales, concave slopes and slump benches on low rolling hills.
- ***Philomath (silty clay)*** – Shallow, well drained soils with moderately slow permeability; the A horizon is 5 to 24 inches thick; depth to a paralithic contact of weakly to moderately cemented igneous rock is 12 to 20 inches; the profile cracks throughout its depth during the summer.
- ***Ritner (gravelly silty clay loam)*** – Moderately deep (20 to 40 inches to fractured bedrock), well drained soils with moderately slow permeability; the organic horizon is 0 to 3 inches thick, and the A horizon is 4 to 9 inches thick; gravel to stone-size rock fragments within the soil range from 15 to 35 percent in the upper layers, increasing with depth.
- ***Witzel (very cobbly loam)*** – Shallow (12 to 20 inches to bedrock), well drained soils with moderately slow permeability; the A horizon is 2 to 5 inches thick; rock fragments within the soil ranges from 40 to 75 percent.

Table 6. Soils at Oak Basin			
Polygon	Soil Series	Aspect	Slope Position
1	Witzel	S	Ridge, shoulder
2	Witzel, Panther	S	Ridge, shoulder
3	Witzel, Ritner	S	Ridge, shoulder
4	Witzel, Ritner	S, W	Ridge, shoulder
5	Witzel, Ritner	SW	Ridge, shoulder
271	Nekia, Philomath	NW	Valley
301	Ritner, Witzel	SW	Slope
303	Ritner, Witzel , Philomath	SW	Slope
304	Philomath, Ritner	SSW	Valley, slope
307	Philomath, Ritner	W	Slope
311	Nekia	W	Valley
312	Nekia	W	Valley
313	Ritner	W, S	Ridge
315	Witzel, Ritner, rock outcrop	W	Shoulder, slope
316	Witzel	W	Slope
343	Nekia, Philomath	W	Slope
362	Witzel, Panther, Ritner	SSW	Valley, slope
363	Philomath, Ritner	SSW	Slope
367	Philomath, Ritner, Witzel	SSW	Slope
368	Rittner, Witzel	W	Valley
369	Ritner	W	Valley
371	Nekia, Philomath	W	Valley
382	Ritner	SW	Slope
384	Witzel, Philomath, Nekia	SW	Slope
385	Nekia, Ritner, Witzel, Philomath	W	Slope

4.4.2 ENVIRONMENTAL EFFECTS

Alternative 1: No Action

No additional compaction, displacement, or changes in soil structure or chemistry would occur as a result of new activities. Residual effects to these soil parameters would continue to impair water storage, natural erosion rates and soil productivity.

Alternative 2: Restoration Actions

Project design features were developed to refine and minimize effects of proposed actions on resources, including soils. The table below connects actions and potential effects to project design features, then summarizes the effectiveness of project design features with regard to potential effects.

Project area soils have been impacted by human activity for millennia. Native people burned and travelled through the area; while later inhabitants planted native and non-native trees, logged, burned, plowed, mowed, and constructed roads. Burning consumes the organic layer; planting non-native trees changes the soil chemistry; plowing mixes soils within the upper layers and destroys soil structure; mowing, yarding associated with logging, and road construction can displace or compact soil; and road construction typically disrupts subsurface and surface water flow as well as natural

erosion rates.

Nearly every square inch of the project area has been impacted by human activity. Shoulder areas are steeper, and a few small landslides related to intense rain storms are evident. These slides are small (less than ½ acre), within ephemeral drainage features, and end on roads or flattened slopes.

Table 7. Effects of actions on soils

Action	Potential effect to soil	Project Design Feature	PDF effectiveness
All actions - larger mechanical methods	Compaction	Work would occur only during the dry season (approximately June 21 to September 21 annually; period may be reduced or extended by the Authorized Officer based on actual soil moisture in treatment areas).	Minimizes but does not eliminate soil compaction.
		The Authorized Officer must approve mechanical equipment use and timing in polygons 2 and 362 due to wetter soil types (i.e. shorter dry season)	Minimizes but does not eliminate soil compaction
Mowing - hand methods	Displacement; mixing soil layers	The cutting mechanism for hand mowing (e.g. weed whacker blade) should be a minimum of six inches above ground to prevent soil disturbance.	Effective, except for a few small areas of ground disturbance due to operator error.
Plant population augmentation (planting)		Tilling should be less than three meters square or smaller, to a maximum depth of 15 centimeters.	Minimizes areas of displacement and soil layer mixing; effective for preventing erosion of displaced soil.
Mowing - larger mechanical methods	Displacement	Larger mechanical equipment use is limited to slopes of 35% or less.	Effective.
Weeding - hand methods	Loss of organic matter	Propane flamer use will occur outside of the fire season during times of low fire risk.	Action intended to remove organic matter damaging to soil productivity as it relates to native species; effective for preventing deep burning and subsequent effects to soil chemistry.
Prescribed fire		All prescribed fire actions will be of short duration and low intensity.	Action intended to restore amounts organic matter in soil to levels appropriate for native species; effective for preventing deep burning and subsequent effects to soil chemistry.
Slash gathering by hand methods with on-site disposal	Displacement; change in soil chemistry/biology	Ground or chipped slash will be used as mulch or blown into nearby conifer forest.	Effective for preventing erosion of soil displaced during planting; may change soil chemistry or biology in local areas; chips placed in conifer forest will not substantially change local soil chemistry.

Other restoration actions that could affect soil productivity include:

- Weeding by hand pulling, which will displace small areas of soil; and

- Foot traffic for all activities, which will occasionally displace small areas of soil.

A few small landslides are found in the project area, though the relatively gentle slopes in most of the polygons are not subject to extensive landslide activity. Road construction and other activities that can concentrate water flow are not planned, so there is no reason to expect increased landslide activity in the area.

The project area has been broadly impacted by previous human activity. For instance, all polygons with proposed use of heavy mechanical equipment have been at least mowed previously. Planned activities will not extend areas affected by these actions. Recovery of soil structure lost to existing compaction may be slowed, though not restarted due to the effectiveness of project design features. Other planned actions are of minor extent (planting, hand mowing, and foot traffic) and are not expected to affect overall soil activity, or slow recovery of soil structure and productivity. Some planned activities are intended to improve soil productivity (i.e. prescribed fire and mulching) with regard to growing native vegetation.

5.0 CONSULTATION

The proposed action would be consulted on with a project specific BA. Proposed actions would probably result in a "**may affect, and likely to adversely affect**" determination for Kincaid's lupine and Fender's blue butterfly.

Proposed actions that could affect the northern spotted owl were consulted on using the *Biological Assessment of NLAA Project with the Potential to Modify the Habitat of Northern Spotted Owls – Willamette Planning Province* and would result in a "**may affect, not likely to adversely affect**" determination for the northern spotted owl.

Actions that would monitor Kincaid's lupine and Fender's blue butterfly are authorized under a permit issued by the U.S. Fish and Wildilfe Service specifically for these actions. These actions **may affect, and are likely to adversely affect** Kincaid's lupine and Fender's blue butterfly.

6.0 LIST OF PREPARERS AND REFERENCES

Name	Title	Resource/Discipline
Mike Blow	Wildlife Biologist	Wildlife
Jan Robbins	Hydrology	Soils and Hydrology
Cheryl Bright	Fuels Specialist	Fuels
Mike Sabin	Engineer	Engineering
Cheshire Mayrsohn	Botantist	Botany
John Hegg	Forester	Logging Systems
Jean Jancaitis	Willamette Valley Land Steward	Nature Conservancy Liasion
Christie Hardenbrook	Environmental Specialist	NEPA

7.0 REFERENCES

Altman, B. 1999. Status and conservation of grassland birds in the Willamette Valley. Unpublished report, Oregon Department of Fish and Wildlife, Corvallis, Oregon, USA.

Altman, B., M. Hayes, S. Janes, and R. Forbes. 2001. Chapter 10: Wildlife of Westside Grassland and Chaparral Habitats *in* D. H. Johnson and T. A. O'Neil, managing directors: Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press, Corvallis, Oregon, USA.

Benton County. 2010. Prairie Species Habitat Conservation Plan. 160 pp plus appendices. *www.co.benton.or.us/parks/hcp*.

Alverson, Edward 2006 use of Prescribed fire in Willamette Valley Native Prairies. Nature Conservancy report

Bureau of Land Management. 2008. Willamette Basin Water Quality Restoration Plan; Salem and Eugene District BLM. Document Control Number: BLM/OR/WA/AE-08/045+1792.

Chamberlin, T.W., R.D. Harr and F.H. Everest. 1991. "Timber harvesting, silviculture, and watershed processes." American Fisheries Society Special Publication 19:181-205.

Eugene District Record of Decision and Resource Management Plan. 1995. Eugene District, Bureau of Land Management.

(FEMAT) USDA Forest Service, USDC National Oceanic and Atmospheric Administration, USDC National Marine Fisheries Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, and Environmental Protection Agency.1993.Forest ecosystem management: an ecological, economic, and social assessment

Giles-Johnson, D.E.L and A.S. Thorpe, R.E Newton. 2010 Lupinus sulphureus ssp. Kinciad's (Kincaid's Lupine) and Icaricia icariodes fender (Fender's Blue Butterfly) at Oak Basin. IAe report

Johannessen, Carl, et al. "The Vegetation of the Willamette Valley." *Annals of the Association of American Geographers* 61, 1971: 286-306.

Oregon Department of Environmental Quality. 2010. Web page for Oregon's 2004/2006 Integrated Report Database, including limited waters and 303(d) list. *http://www.deq.state.or.us/wq/assessment/assessment/rpt0406/search.asp*

Oregon Water Resources Department. 2010. Interactive web page for Oregon's Water Rights Maps. *http://wrd.state.or.us/OWRD/MAPS/index.shtml#Interactive_Water_Right_Maps*

Pearson, S. F. and B. Altman. 2005. Range-wide Streaked Horned Lark Assessment and Preliminary Conservation Strategy. Washington Department of Fish and Wildlife, Olympia, Washington, USA. 25pp.

Pearson, S. F. and B. Altman. 2005. Range-wide Streaked Horned Lark Assessment and Preliminary Conservation Strategy. Washington Department of Fish and Wildlife, Olympia, Washington, USA. 25pp.

Schultz, C. B. 2001. Restoring resources for an endangered butterfly. Journal of Applied Ecology 38: 1007-1019.

Schultz, C. and E. Crone. 1998. Burning prairie to restore butterfly habitat: a modeling approach to management tradeoffs for the Fender's blue butterfly. Restoration Ecology 6(3): 244-252.

Schultz, C. B. and E. E. Crone. 2001. Edge-mediated dispersal behavior in a prairie butterfly. Ecology 82: 1879-1892.

Schultz, C. B. and E. E. Crone. 2005 Patch Size and Connectivity Thresholds for Butterfly Habitat Restoration. Conservation Biology 19:3, 887-896

Schultz, C. B. and K. Dlugosch. 1999. Effects of declining food resources on populations of the Fender's blue butterfly (Icaricia icarioides fenderi). Oecologia 119: 231-238.

Schultz, C.B. 1998. Dispersal behavior and its implications for reserve design for a rare Oregon butterfly. Conservation Biology 12: 284-292.

Schultz, C.B. and P.C. Hammond. 2003. Using population viability analysis to develop recovery criteria for endangered insects: Case study of the Fender's blue butterfly. Conservation Biology. 17:1372-1385.

Schultz, C.B., P.C. Hammond and M.V. Wilson. 2003. The biology of the Fender's blue butterfly, an endangered species of western Oregon native prairies. Natural Areas Journal. 23:61-71

Scott, J. A., 1986. The butterflies of North America: a natural history and field guide. Stanford University Press, Stanford, Calif. 64 plates, 583 p.

Severns, P.M. 2003a. Inbreeding and small population size reduce seed set in a threatened and fragmented plant species, Lupinus sulphureus ssp. Kincaidii (Fabaceae). Biological Conservation. 110(2): 221-229.

Sousa, P. J. 1982. Habitat suitability index models: Lewis' woodpecker. U.S. Department of the Interior, Fish and Wildlife Service publication FWS/OBS-82/10.32. 14 pp.

Steinfeld, David E. 1997. Soil Compaction after Yarding Small Diameter Douglas-fir. Res. Pap. PNW-RP-504. Portland, OR: U.S. Department of Agriculture.

Stinson, D.W. 2005. Washing State Status Report for the Mazama Pocket Gopher, Streaked Horn Lark, and Taylor's Checkerspot Butterfly. Washington Department of Fish and Wildlife, Olympia, WA. Pp129 + xii.

USDA and USDI. 2008. Biological Assessment for LAA Projects with the Potential to Modify the Habitat of Northern Spotted Owls. 118 pp.

USDI, BLM. 2008. Willamette Basin Water Quality Restoration Plan. Eugene District Office, Eugene, OR.

USDC, National Marine Fisheries Service 2005. Final Assessment of NOAA Fisheries Critical Habitat Analytical Review Teams For 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead. Portland, OR.

USDI, Bureau of Land Management. October 2008. Revision of the Resource Managements Plans of the Western Oregon Bureau of Land Management. Final Environmental Impact Statement (EIS). 1066 pp.

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

Weiss, S.B., White, R. R., Murphy, D.D., Ehrlich, P.R., 1987, Growth and Dispersal of Larvae of the Checkerspot Butterfly Euphydryas editha, Oikos Vol. 50, No. 2 (Oct., 1987), pp. 161-166

Wilson, M. V., T. Erhart, P. C. Hammond, T. N. Kaye, K. Kuykendall, A. Liston, A. F. Robinson, Jr., C. B. Schultz, and P. M. Severns. 2003. Biology of Kincaid's lupine (Lupinus sulphureus spp. kincaidii [Smith] Phillips), a threatened species of western Oregon native prairies, USA. Natural Areas Journal 23(1):72-83.

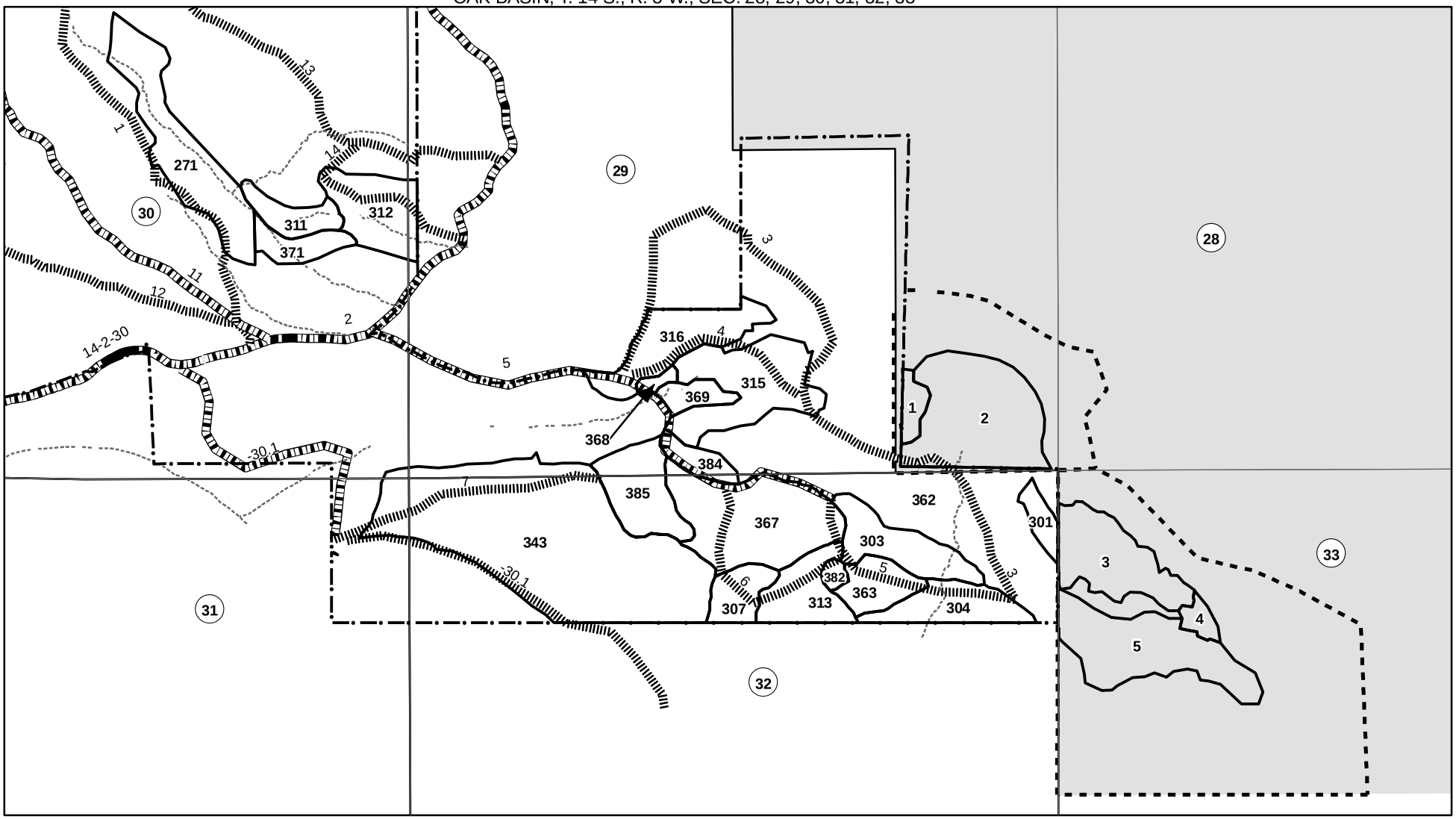
Wilson, M. V. and D. L. Clark. 1997. Effects of fire, mowing, and mowing with herbicide on native prairie of Baskett Butte, Baskett Slough NWR. Prepared for U.S. Fish and Wildlife Service, Western Oregon Refuges.

APPENDIX A: MAPS

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENVIRONMENTAL ASSESSMENT

OAK BASIN, T. 14 S., R. 3 W., SEC. 28, 29, 30, 31, 32, 33



Oak Basin Boundary

Oak Basin Tree Farm Boundary

Proposed RAC Area

Bureau of Land Management Ownership

Private Ownership

Section

Rocked Road

Dirt Road

stream

Note: The Oak Basin Tree Farm boundary does not match the BLM ownership lines or the Oak Basin Boundary. This is the result of a data error that will be fixed in the future

N

0 1,000 2,000 Feet

07/11/11

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 were 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.

United States Department of the Interior
Bureau of Land Management
Oregon State Office
P.O. Box 2965
Portland, Oregon 97208-2965

APPENDIX B:

Proposed Oak Basin Management Actions and Their Corresponding Recovery Plan Recovery Actions.					
Oak Basin Action # and Description		**Recovery Action # and Description by Species**			
			Fender's Blue Butterfly		***Kincaid's Lupine***
1	**Mowing**	**1.1.4.1**	**Set back succession and reduce competition from non-native plants.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-native plants.**
1A	Mowing- hand methods	1.1.4.1.2	Mowing.	1.2.3.5.1.2	Mowing.
1B	Mowing- large mechanical methods*				
2	**Plant Population Augmentation**	**1.1.4.2**	**Restore native prairie species, with an emphasis on larval host plants and adult nectar sources.**	**1.2.3.5.3**	**Augment populations, as necessary.**
2A	Plant Population Augmentation of T&E Plants - hand methods	1.1.4.2.1	Restore and enhance populations of larval host plants.	1.2.3.5.3.3	Implement population augmentation.
2B	Plant population augmentation of Non T&E (native) plants - hand methods	1.1.4.2.2	Restore and enhance populations of nectar sources.	1.2.3.5.1.4	Eliminate non-native plants to extent practicable and restore native prairie species.
2C	Plant populations augmentation of T&E plants - mechanical methods*	1.1.4.2.1	Restore and enhance populations of larval host plants.	1.2.3.5.1.4	Implement population augmentation.
2D	Plant population augmentation of Non T&E (native) plants – mechanical methods*	1.1.4.2.2	Restore and enhance populations of nectar sources.	1.2.3.5.1.4	Eliminate non-native plants to extent practicable and restore native prairie species.
3	**Plant population creation**	**1.1.4.2**	**Restore native prairie species, with an emphasis on larval host plants and adult nectar sources.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-native plants.**
3A	Plant population creation of Non T&E (native) plants - hand methods	1.1.4.2.2	Restore and enhance populations of nectar sources.	1.2.3.5.1.4	Eliminate non-native plants to extent practicable and restore native prairie species.
3B	Plant population creation of Non T&E (native) plants– mechanical methods*				

Proposed Oak Basin Management Actions and Their Corresponding Recovery Plan Recovery Actions.					
Oak Basin Action # and Description		**Recovery Action # and Description by Species**			
			Fender's Blue Butterfly		***Kincaid's Lupine***
4	**Weeding**	**1.1.4.1**	**Set back succession and reduce competition from non-native plants.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-native plants.**
4A	Weeding - hand methods	1.1.4.1.4	Habitat management using other methods as appropriate, pending results of ongoing and planned research.	1.2.3.5.1.4	Eliminate non-native plants to extent practicable and restore native prairie species.
4B	Weeding – mechanical methods*				
5	**Prescribed Fire**	**1.1.4.1**	**Set back succession and reduce competition from non-native plants.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-native plants.**
5A	Broadcast burning	1.1.4.1.1	Prescribed fire.	1.2.3.5.1.1	Prescribed fire.
5B	Pile burning	1.1.4.1.3	Manual removal of woody plants.	1.2.3.5.1.3	Remove woody plants.
6	**Removal of encroaching conifers**	**1.1.4.1**	**Set back succession and reduce competition from non-native plants.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-native plants.**
6A	Removal of encroaching conifers with a dbh of 4” and larger–hand methods	1.1.4.1.3	Manual removal of woody plants.	1.2.3.5.1.3	Remove woody plants.
6B	Removal of encroaching conifers with a dbh of 4” and larger –mechanical methods*				
7	**Removal of shrubs, deciduous trees, and conifers with a dbh of less than 4 inches –hand methods.**	**1.1.4.1**	**Set back succession and reduce competition from non-native plants.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-native plants.**
7A	Remove deciduous trees, shrubs and conifers less than 4”dbh- hand methods	1.1.4.1.3	Manual removal of woody plants.	1.2.3.5.1.3	Remove woody plants.
7B	Remove hardwoods, shrubs and conifers less than 4”dbh – mechanical methods*				
8	**Slash gathering, processing and disposal**	**1.1.4.1**	**Set back succession and reduce competition from non-native plants.**	**1.2.3.5.1**	**Manage population sites to set back woody plant invasion and reduce competition from non-**

Proposed Oak Basin Management Actions and Their Corresponding Recovery Plan Recovery Actions.					
Oak Basin Action # and Description		**Recovery Action # and Description by Species**			
			Fender's Blue Butterfly		***Kincaid's Lupine***
					native plants.
8A	Slash gathering by hand methods with on-site disposal	1.1.4.1.3	Manual removal of woody plants.	1.2.3.5.1.3	Remove woody plants.
8B	Slash gathering by hand methods with off-site disposal*				
8C	Slash gathering by machine methods with on-site disposal*				
8D	Slash gathering by machine methods with off-site disposal*				
9	**Seed collection**	**1.1.4.2**	**Restore native prairie species, with an emphasis on larval host plants and adult nectar sources.**	**1.2.3.5.1.4**	**Eliminate non-native plants to extent practicable and restore native prairie species.**
9A	Seed collection- T & E plants	1.1.4.2.1	Restore and enhance populations of larval host plants.	1.2.3.5.3.3	Implement population augmentation.
9B	Seed collection- non-T & E plants	1.1.4.2.2	Restore and enhance populations of nectar sources.	1.2.3.5.1.4	Eliminate non-native plants to extent practicable and restore native prairie species.
10	**Monitoring of restoration activities**			**1.2.5**	**Monitor populations.**
10A	Monitoring –T&E plants & animals	1.1.7	Monitor population abundance at all functioning network and independent population sites.	1.2.5.2	Monitor populations and trends, evaluate effectiveness of management actions and apply adaptive management practices, as appropriate.
10B	Monitoring- plant community vegetation	1.1.8	Monitor prairie quality at all functioning network and independent population sites.	1.2.6	Monitor prairie quality at all population sites.
* These methods would not be used in polygons occupied by T&E plants or animals, but would be used to improve habitat in polygons without T&E species.					