



Conservation Priorities for Rare Plant Species of Southern Puget Trough Prairies

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ON THE COVER: Golden paintbrush (*Castilleja levisecta*)

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Introduction

The Puget Trough ecoregion is part of a broad, north-south trending valley system that extends from the Georgia Basin of southern British Columbia through Puget Sound and adjacent valleys of western Washington to the Willamette Valley of northwest Oregon. Within Washington, the Puget Trough is bounded on the west by the Olympic and Pacific Coast ranges, and on the east by the Cascades. Although it covers only 8% of Washington, the Puget Trough is home to more than 50% of the state's population (WDNR 2007).

Prior to western settlement, the Puget Trough was a mosaic of perennial grasslands (traditionally called 'prairie'), Oregon white oak savannas, and lowland conifer forests. The open prairie and savanna plant communities are associated with gravelly, drought-prone soils deposited by the Vashon Glacier. These plant communities developed during a warmer and drier period approximately 10,000-7,000 years ago (Kruckeberg 1991). For the past 5000 years the areal extent of prairie and savanna has been decreasing as the climate in the Puget Trough has become wetter and favored expansion of conifer forests. Those prairie landscapes that have persisted were largely maintained by wildfires set by Native Americans or associated with periodic droughts (Crawford and Hall 1997, Storm and Shebitz 2006).

The prairies of the southern Puget Trough (defined here as the area from Olympia and Joint Base Lewis-McChord south to the Columbia River and including portions of Clark, Cowlitz, Grays Harbor, Lewis, Pierce, and Thurston counties) can be divided into two types based on soil moisture. Dry prairies are found in upland areas on well-drained, gravelly soils and are dominated by *Festuca roemerii* (Roemer's fescue), *Danthonia californica* (California oatgrass), *Elymus glaucus* (blue wildrye), and *Koeleria macrantha* (Junegrass) interspersed with mosses, fruticose lichens and native forbs (Chappell et al. 2001, Crawford and Hall 1997). The Roemer's fescue-white top aster community type is considered globally imperiled (G1) by Washington Natural Heritage Program ("WNHP"; Chappell and Crawford 1997). Wet prairies occupy poorly-drained lowland sites or uplands with a shallow hardpan soils. Dominant species in these areas include *Deschampsia cespitosa* (tufted hairgrass), *Hordeum brachyantherum* (meadow barley) and *Camassia quamash* (common camas). Dry prairies tend to be more prevalent in the glacial outwash in the central area of the Puget Trough and wet prairies are common on the more weathered soils at the south end of the valley (Franklin and Dyrness 1988, Stinson 2005).

Fertile soils, abundant forage, mild climate, and an absence of trees made the prairies of southwest Washington an obvious place for emigrant farmers to settle, starting in the 1830s. Of the estimated 180,000 acres of prairie vegetation once found in the Puget Trough area (Crawford and Hall 1997), 97-99% has been converted to agriculture or cities and towns (Caplow and Miller 2004, Chappell et al. 2001). Surviving patches of prairie tend to be widely isolated and are usually smaller than five acres (DellaSala et al. 1999). Noss et al. (1995) recognized the prairies of the Puget Trough and Willamette Valley of Oregon as one of the most threatened ecosystems in North America. In addition to direct loss of habitat from agriculture and human development, the native grasslands have been impacted by competition from invasive weeds and succession to deciduous or conifer forests in the absence of fire (Crawford and Hall 1997, Stinson 2005).

Besides their ecological significance, the prairies of southwest Washington are home to several endemic plant and animal species. Four vascular plant taxa are currently listed as Threatened or Endangered under the US Endangered Species Act (Table 1). *Castilleja levisecta* (golden paintbrush) and *Lupinus oregonus* (Kincaid's sulfur lupine) are federally listed species found primarily in dry prairies, while *Lomatium bradshawii* (Bradshaw's lomatium) and *Sidalcea nelsoniana* (Nelson's checker-mallow) occur in wet prairies. One other federally listed species, *Howellia aquatilis* (Water howellia) is found in kettle wetlands at several sites within the Puget Trough that are associated with Oregon ash woodlands but is not considered a prairie obligate species (Fertig 2018). Seventeen other plant species (Table 1) are considered state Sensitive, Threatened, or Endangered by the WNHP (2017). At least six rare butterfly species are associated with remnant grasslands of western Washington (Dunn and Fleckenstein 1997), including the federally Endangered Taylors checkerspot. Six rare vertebrates are found in prairie habitats, including two regional endemics and federally Threatened taxa: Streaked horned lark and Mazama (Western) pocket gopher (Stinton 2005).

Remnant prairies in southwest Washington have been the focus of recovery efforts for the listed species (Arnett 2014). Several sites have been purchased by the state of Washington and designated as Natural Area Preserves or Wildlife Habitat Management Areas, while other areas are owned and managed by non-governmental organizations, such as The Nature Conservancy and Center for Natural Lands Management. The federal government manages the Ridgefield and Steigerwald Lake National Wildlife Refuges at the south end of the Puget Trough which have been the site of reintroduction efforts for listed plant species. Additional private lands might be afforded protection through conservation easements or through the state of Washington's voluntary Registry program.

WNHP has been working with USFWS through Section 6 funding for over a decade on projects to promote conservation of listed species in the south Puget Trough area. Past projects have included surveys of listed plants (Arnett 2009, 2010a, 2010b, 2010c, Arnett et al. 2007, 2010), research on pollinators (Fleckenstein 2014), mapping remnant prairies and assessing ecological integrity (Caplow and Miller 2004, Crawford 2013), and identifying potential prairie sites for reintroduction of listed species (Caplow 2004, Caplow and Chappell 2005, Chappell and Caplow 2004).

This report provides a summary of conservation efforts in the south Puget Trough area. In addition, we have identified prairie sites in need of conservation attention and recommended specific conservation outcomes for these sites.

Table 1. Plant Species of Special Concern from Southwestern Washington Prairies.
The number of currently protected populations of each species are in parentheses. An ‘h’ indicates a species only known from historical (pre 1978) records.

Species	Common Name	USFWS Status	Washington State Status	Natural Heritage Rank	Total and Currently Protected Occurrences in SW WA Prairies
<i>Agoseris elata</i>	Tall agoseris	---	Sensitive	G4/S3	2h (0)
<i>Brodiaea rosea</i>	Harvest brodiaea	---	Extirpated	GNR/SH	1h (0)
<i>Carex densa</i>	Dense sedge	---	Sensitive	G5/S2	6 (2)
<i>Castilleja levisecta</i>	Golden paintbrush	Threatened	Threatened	G2/S2	11 (7)
<i>Cirsium remotifolium</i> var. <i>remotifolium</i>	Weak thistle	---	Sensitive	G5TNR/S1	6 (0)
<i>Delphinium leucophaeum</i>	Pale larkspur	---	Endangered	G2Q/S1	1 (0)
<i>Eryngium petiolatum</i>	Oregon coyote-thistle	---	Threatened	G4/S2	6 (1)
<i>Geranium oreganum</i>	Oregon crane’s-bill	---	Extirpated	G4G5/SX	1h (0)
<i>Githopsis specularioides</i>	Common bluecup	---	Sensitive	G5/S2S3	1h (0)
<i>Lathyrus holochlorus</i>	Thin-leaved peavine	---	Endangered	G2?/S1	1 (0)
<i>Lathyrus vestitus</i> ssp. <i>ochroleucus</i>	Pacific pea	---	Endangered	G5TNR/S1	5 (1)
<i>Lomatium bradshawii</i>	Bradshaw’s lomatium	Endangered	Endangered	G2/S1	1 (1)
<i>Lupinus oreganus</i>	Kincaid’s sulfur lupine	Endangered	Threatened	G4T2/S1S2	4 (1)
<i>Meconella oregana</i>	White meconella	---	Endangered	G2G3/S1	1h (0)
<i>Nuttallanthus texanus</i>	Texas toadflax	---	Threatened	G4G5/S1	5 (3)
<i>Orobanche californica</i> ssp. <i>grayana</i>	California broomrape	---	Endangered	G4T3T4/S1	1h (0)
<i>Oxalis suksdorfii</i>	Western yellow oxalis	---	Threatened	G4/S1	2h (0)
<i>Polemonium carneum</i>	Great polemonium	---	Threatened	G4/S2	5 (0)
<i>Sericocarpus rigidus</i> (<i>Aster curtus</i>)	White-top aster	---	Sensitive	G3/S3	54 (8)
<i>Sidalcea hirtipes</i>	Hairy-stemmed checker-mallow	---	Threatened	G2/S2	15 (0)
<i>Sidalcea nelsoniana</i>	Nelson’s checker-mallow	Endangered	Threatened	G2G3/S1	4 (2)
<i>Sidalcea virgata</i> (<i>S. malviflora</i> v. <i>virgata</i>)	Rose checker-mallow	---	Threatened	G5/S1	1 (1)
<i>Silene scouleri</i> ssp. <i>scouleri</i>	Scouler’s catchfly	---	Sensitive	G5T3T5/S1	8 (0)
<i>Symphotrichum hallii</i> (<i>Aster hallii</i>)	Hall’s aster	---	Threatened	G4/S2	5 (2)
<i>Wyethia angustifolia</i>	California compassplant	---	Sensitive	G4/S1	8 (2)

Methods

Native prairies of the south Puget Sound were identified based on a review of literature (Arnett et al. 2007, Caplow and Miller 2004, Crawford 2013, Stinson 2005) and 1:100,000 USGS maps on Google Earth. A list of prairie-obligate plant species was initially developed by Arnett et al. (2007) and modified based on recent revisions to the *WNHP Endangered, Threatened, and Sensitive Vascular Plant List* (WNHP 2017). The distribution of prairie-obligate species in remnant prairie sites was determined by intersecting digital USGS maps with species distribution data from the WNHP Biotics database. Species were included as present within a site if an extant or historical occurrence was found in the immediate area. Additional species known from the vicinity of the site (within a 10 km radius) were identified as potential species in the “Notes” column. The number of populations of each target species in the South Puget Trough study area and number of sites in protected areas (Table 1) was calculated based on Biotics data. Non-prairie species typical of oak savanna, conifer forests, or wetlands (such as *Erythronium revolutum*, *Howellia aquatilis*, *Lathyrus torreyi*, and *Trillium parviflorum*) were excluded from the analysis. The current land cover of each prairie was assessed based on Google Earth images intersected with the USGS map layer in Biotics or from brief descriptions of the areas from Arnett et al. (2007) and Caplow and Miller (2004). Potential conservation actions for each site were based on modifications to a classification system from Arnett (2014). These included acquisition, conservation easements, voluntary programs (such as the state of Washington Register of Natural Areas program, RCS 79.70), survey, or no action.

Each of the remnant prairie sites was assessed for conservation priority based on its known or potential value for conservation of federally listed or state rare prairie plant species (Table 2). The sites scored as extremely high, high, and medium high priorities for conservation each currently support at least one population of one of the four federally-listed target species, or have excellent potential for successful reintroduction of these species. Sites scored as medium or medium low are known to support populations of state of Washington rare plant species or potential habitat for these taxa. Low priority sites currently support no populations of target species and have low potential for conservation based on their current condition or management.

Table 2. Conservation Priority Scores for southwest Washington Prairie Sites.

Priority	Rationale
Ex High (Extremely High)	Site contains an extant native or out-planted population of a USFWS listed Threatened or Endangered plant species. Additional conservation measures may be desirable on adjacent lands to expand or augment the population or improve public education and outreach.
High	Site has highly-suitable potential habitat for a USFWS listed Threatened or Endangered plant species based on known occurrences from the vicinity (within a 10 km radius) or historical reports from the site; more information is needed through a survey or site visit (with landowner permission)
Medium	Site contains an extant native or out-planted population of a Washington state Species of Concern. Additional conservation measures may be desirable on adjacent lands to expand or augment the population or improve public education or outreach.
Medium-Low	Site may have potential habitat for a Washington state Species of Concern based on known occurrences in the vicinity (within a radius of 10 km) but information is needed through a survey or site visit (with landowner permission)
Low	Site has low potential as habitat for Washington state Species of Concern or has been sufficiently degraded to make it unsuited at present for conservation attention (the area might still have long-term restoration potential, but will require a larger input of resources than other prairie sites).

Conservation Recommendations for Southwest Washington Prairie Sites

Unlike animal species, plant taxa listed as Threatened or Endangered under the US Endangered Species Act are protected from direct harm ("take") only on public lands managed by the federal government or states. Since Roman times, plants have been equated with property, and legally are treated as such on privately-owned lands. Wild animals, because of their motility, have traditionally been owned by monarchs or the state, rather than being the private property of individuals. Most of the legal restrictions associated with federal listing of plants under the ESA thus do not affect private landowners, though exceptions exist for inter-state or foreign trade of listed plant species, or activities that involve federal permitting. The state of Washington does not have a state Endangered species law comparable to the federal ESA and state-listed Threatened, Endangered, or Sensitive species are not formally protected by state law. However, the WNHP assigns endangered, threatened, and sensitive status to rare plant taxa to assist in prioritization of conservation efforts.

The prairie remnants of southwest Washington do not fit the standard model of large and contiguous blocks of land prioritized for conservation efforts (Arnett 2014). Unfortunately, such areas of continuous prairie no longer exist, so conservation efforts need to focus on small, often discontinuous patches of remnant habitat or restoration of altered agricultural lands or second growth forest. Acquisition of lands is one potential tool to achieve conservation goals, but other, less conventional strategies incorporating partnerships with state, tribal, and private landowners will be essential for ensuring long-term conservation goals.

Arnett (2014) identified four “conservation recommendations” for prairie land parcels: acquisition of fee ownership, acquisition of conservation easements, voluntary registry, and

voluntary management planning/conservation guidelines for farms or private landowners. Management planning may also provide conservation benefits for sites managed by government agencies. We sites where there is insufficient information to recommend specific conservation outcomes, we recommend pursuing on-site surveys (with landowner permission) to document new occurrences or identify lands for potential reintroduction or restoration.

Acquisition of Fee Ownership

If funding is available and there are willing sellers, ownership of a given parcel can be transferred to a governmental land management agency (such as the US Fish and Wildlife Service, Washington Department of Natural Resources, or Washington Department of Fish and Wildlife) or a non-governmental organization, such as a land trust (examples include The Nature Conservancy, Center for Public Land Management, or Columbia Land Trust). As these rare plant species and Roemer's fescue grassland are considered priorities by the WNHP (WDNR 2018), acquisition may be supported by Washington Wildlife and Recreation Program funding for natural areas. The primary advantages of fee ownership is that plant habitat should be protected from development and adverse impacts from collection, and this protection should be for perpetuity.

Acquisition of Conservation Easements

Conservation easements are binding legal documents that confer some degree of long-term protection or management in exchange for tax incentives, a monetary payment, or regulatory relief. Unlike acquisition of fee ownership, the property typically remains in private hands, though the conditions of the easement remain attached to the property and any future owners. Easements can be conferred voluntarily, but are usually purchased with public or private funds. State agencies or non-governmental land trusts may enter into partnerships with private landowners to develop the terms of the easement and to conduct periodic monitoring to ensure that terms and conditions are being met.

Voluntary Registry

The state of Washington has a voluntary program in which landowners can be acknowledged for providing habitat for elements of conservation interest, such as rare plants, animals or representative examples of plant communities (WDNR 2018). If a potential registry sites is first identified by WNHP staff, the WNHP will contact the landowner/s to determine interest in participating in the registry. Landowners may also contact the WNHP directly if they believe they support species or ecosystems or conservation concern. WNHP staff work with interested landowners to inventory rare species populations and discuss potential management options for the site. If a proposed site is approved by the Natural Heritage Advisory Council for entry in the Register of Natural Areas are memorialized by a Certificate of Registration. The program is strictly voluntary and the landowner can opt out of the register at any time.

Management Plans

Federal or state-managed lands typically have formal management plans (updated periodically with public input) that provide broad management goals and objectives. These plans usually address federally-listed species under the Endangered Species Act or agency policy (such as the Sensitive species programs of the US Forest Service or Bureau of Land Management), but may

not deal with state-listed plant species. Likewise, private businesses may not be obligated to focus on rare plant species in their planning efforts. The US Fish and Wildlife Service and state agencies, such as the Natural Heritage Program, Natural Areas Program, or Department of Fish and Wildlife, may be able to assist other governmental agencies and interested private businesses or individuals in developing guidelines for conserving the habitat or reducing impacts to rare prairie species or their habitat. Such agreements might become binding, in the case of public land management agencies, or be voluntary on private lands, but can become an important component of overall conservation planning and be considered in meeting recovery objectives for mitigating threats.

Survey

Some properties have potential habitat for listed or state-rare plant species but have not been formally surveyed by a trained botanist to ascertain if these plants are actually present. Surveys on private lands require permission from the landowner before they may proceed. If species of interest are located, the landowner needs to be apprised of the discovery, the legal implications (usually none), and their potential management options (do nothing, enter into a conservation easement or voluntary registry, or receive input on site management). Should surveys find that a site is truly unsuitable for rare prairie species, the site's priority can be amended to reflect this new information.

Conservation Assessment for Southwest Washington Prairies

There are 102 remnant or historical prairie sites in southwestern Washington (Table 3).

All of these areas have been altered by human settlement, suppression of wildfire, and conversion to agriculture over the past two centuries. As a result, they vary in their condition and suitability as habitat for prairie-obligate plant and animal species. Only 10 remnant prairie sites in the state still contain native populations of federally listed Endangered or Threatened prairie plant species (

Table 4), while ten other sites have reintroduced populations. Another 25 prairie sites contain at least one extant or historical occurrence of a Washington state Sensitive, Threatened, or Endangered plant species (Table 3).

Of the remaining 57 prairie sites in the South Puget Trough, survey information is lacking to determine whether they support populations of federally or state-listed plant species of concern (Table 2). At least 41 of these sites could potentially contain rare plant populations (or be sites for potential reintroduction) based on the presence of known occurrences of rare prairie species within a 10 km radius. The remaining 16 sites have been altered to such a degree that they are unlikely to have populations of target species.

Table 3. Remnant Prairies of the South Puget Sound and their Conservation Significance.

(h) after a species name indicates the population is historical (last observed before 1978). Listed Threatened or Endangered species are indicated in **bold**. Conservation priority scores are defined in Table 2.

Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Adna Prairie	T13N R3W	Lewis	None	Converted to agriculture (Caplow and Miller 2004)	Unsuited at present	Low
Alpha Prairies	T13N R1E	Lewis	None	Agricultural fields and large areas of forest; <i>Sidalcea hirtipes</i> known from vicinity.	Survey needed	Medium-Low
Baker Prairie	T16N R3W	Thurston	<i>Sericocarpus rigidus</i>	Mostly residential, some small forested or open tracts, area is weedy, may have low long-term viability. <i>Nuttallanthus texanus</i> known from vicinity.	Easement or voluntary measures	Medium
Battle Ground wetlands	T4N R2E, T4N R3E	Clark	None	Battle Ground State Park mostly forested (several rare forest spp present), Patches of agricultural fields in area. <i>Cirsium remotifolium</i> (h), <i>Oxalis suksdorfii</i> (h), and <i>Polemonium carneum</i> known from vicinity.	Survey needed	Medium-Low
Bear Prairie	T2N R5E; T2N R4E	Clark	None	Patches of wet prairie, shrubs, and forest in suburban/agricultural matrix. <i>Cirsium remotifolium</i> (h) known from vicinity; Good potential for <i>Sidalcea nelsoniana</i> reintroduction	Easement, voluntary conservation	High
Beaver Creek Prairie	T13N R4W	Lewis	None	Little native vegetation remains; <i>Polemonium carneum</i> (h) known from vicinity	Unsuited at present	Low
Bernard Prairie	T18N R1W	Thurston	<i>Sericocarpus rigidus</i>	Small area of remnant grassland in suburbs of Lacey; <i>Agoseris elata</i> (h) known from vicinity.	Voluntary conservation; potential restoration	Medium
Berwick Creek Prairie	T13N R2W	Lewis	None	Mix of prairie, oak woodland, and shrub veg in suburban/agriculture matrix; <i>Sidalcea hirtipes</i> known from vicinity	Survey needed	Medium-Low
Bethel Prairie (SE of Spanaway)	T18N R3E	Pierce	<i>Sericocarpus rigidus</i> (h)	Small tract of remnant prairie with encroaching conifers, embedded within housing development and grazed pastureland	Survey needed	Medium-Low

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Boistfort Prairie (Arnett 2009, 2014)	T12N R4W	Lewis	<i>Carex densa</i> , <i>Delphinium leu- cophaeum</i> , <i>Lath- yrus holochlorus</i> , <i>Lupinus oreg- anus</i> , <i>Sidalcea nelsoniana</i> , <i>Wyethia angustifolia</i>	One of the premier remnant prairie sites in WA; <i>Polemonium carneum</i> , <i>Sidalcea hirtipes</i> known from vicinity	Acquisition or Conservation Easement, voluntary measures	Ex High
Brush Prairie	T3N R2E	Clark	None	Mix of suburban/ agri- culture; <i>Carex densa</i> , <i>Cirsium remotifolium</i> (h), <i>Oxalis suksdorfii</i> (h), & <i>Sidalcea hirtipes</i> known from vicinity	Survey needed	Medium- Low
Bunker Creek Prairie	T13N R3W	Lewis	None	Mostly converted to agriculture	Probably unsuited	Low
Burnt Ridge Road Prairies	T13N R1E	Lewis	None	Mix of forest and agriculture; <i>Sidalcea hirtipes</i> (h) known from the vicinity	Survey needed	Medium- Low
Bush Prairie	T17N R2W T18N R2W	Thurston	None	<i>Agoseris elata</i> (h) reported from vicinity; mostly converted to housing & commercial development (Tumwater)	Unsuited at present	Low
Calvin Road Prairie	T13N R2E	Lewis	None	Mix of forest and agriculture; <i>Sidalcea hirtipes</i> (h) known from the vicinity	Survey needed	Medium- Low
Camp Bonneville	T2N R3E	Clark	<i>Sidalcea hirtipes</i>	Small areas of wet prairie within forest matrix at former Camp Bonneville; <i>Carex densa</i> , <i>Castilleja levisecta</i> (h), <i>Cirsium remotifolium</i> (h), <i>Geranium oreganum</i> (h), <i>Lomatium bradshawii</i> , <i>Oxalis suksdorfii</i> (h), <i>Symphyotrichum hallii</i> , <i>Wyethia angustifolia</i> known from vicinity	Camp Bonne- ville was closed in 1995 and ownership ulti- mately trans- ferred to Clark County for a future park (once site is cleared of unex- ploded ord- nance). Could be potential restoration sites for <i>Castilleja levisecta</i> and <i>Lomatium bradshawii</i> ; survey needed	High
Cedarville Prairie	T16N R5W	Grays Harbor	<i>Sericocarpus rigidus</i>	Small prairie fragments within rural residential/ agricultural matrix	Easement or voluntary conservation	Medium

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Centralia Prairie	T14N R2W	Lewis	None	Mostly urban or rural residential, small, patches of grassland within forested areas; <i>Silene scouleri</i> (h) known from vicinity	Survey needed	Medium-Low
Ceres Hill Road Prairie	T13N R4W	Lewis	None	Agricultural land interspersed with forest; potential roadside prairie; <i>Polemonium carneum</i> (h) known from vicinity	Survey needed	Medium-Low
Chambers Prairie (East Olympia)	T17N R1W	Thurston	<i>Silene scouleri</i> (h)	Mosaic of urban, forest, and rural residential	Mostly unsuitable at present	Low
Chehalis Prairie	T14N R2W	Lewis	None	Mostly urban or rural residential; some potential prairie remnants south of interstate; <i>Silene scouleri</i> (h) known from vicinity	Mostly unsuitable at present	Low
Chelatchie Prairie	T5N R3E	Clark	<i>Sidalcea hirtipes</i>	Mix of agricultural fields and forest. One of two <i>S. hirtipes</i> populations in area was slated for development in 2006.	Easement or voluntary conservation	Medium
Cinebar Prairie	T13N R2E	Lewis	None	Matrix of agricultural fields, shrublands, and forest; may have potential for some dry prairie species; <i>Sidalcea hirtipes</i> (h) known from the vicinity	Survey needed	Medium-Low
Claquato Prairie	T13N R3W	Lewis	None	Mostly converted to agriculture; no prairie species known from vicinity	Unsuitable? Survey may be needed	Low
Coal Creek	T8N R3W T9N R3W	Cowlitz	<i>Sidalcea nelsoniana</i>	Active management needed to maintain or restore wet prairie conditions	Easement or voluntary conservation	Ex High
Cowlitz Prairie	T11N R1W, T12N R1W	Lewis	<i>Eryngium petiolatum</i> , <i>Lupinus oreganus</i> , <i>Sidalcea hirtipes</i> , <i>Wyethia angustifolia</i>	Dry, clay-rich pasture being restored to prairie and oak woodland; Mixed ownership (Toledo School District & private), Lozier Preserve actively managed	Expand Lozier Prairie Preserve (Cowlitz Tribe), easement or voluntary conservation on adjacent sites	Ex High
Cowlitz Prairie East	T11N R1W	Lewis	<i>Lupinus oreganus</i>	<i>Eryngium petiolatum</i> , <i>Sidalcea hirtipes</i> , & <i>Wyethia angustifolia</i> known from vicinity	Easement or voluntary conservation	Ex High
Cowlitz River Prairie	T12N R1E	Lewis	<i>Lathyrus vestitus</i> ssp. <i>ochroleucus</i>	Might be potential habitat for <i>Lupinus oreganus</i> (known from nearby Toledo area); <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey needed; conservation easement or voluntary registry	High

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Curtin Creek	T2N R2E; T3N R2E	Clark	None	Wet meadow area, could be introduction site for <i>Lomatium bradshawii</i> or <i>Sidalcea nelsoniana</i> ; <i>Cirsium remotifolium</i> (h) and <i>Oxalis suksdorfii</i> (h) known from vicinity	Survey needed to assess restoration potential	High
Curtis Prairie	T13N R3W, T13N R4W	Lewis	None	Large area of potential prairie habitat amid agricultural fields, but needs survey; no prairie plants known from vicinity	Survey needed, but high probability of finding species (Caplow & Miller 2004)	Medium-Low
Doty Prairie	T13N R5W	Lewis	None	<i>Polemonium carneum</i> (h) known from vicinity	Mostly converted to agriculture	Low
Drews Prairie (Arnett 2014)	T11N R2W	Lewis	<i>Eryngium petiolatum</i> , <i>Lupinus oreganus</i> , <i>Sidalcea hirtipes</i> , <i>Symphyotrichum hallii</i> , <i>Wyethia angustifolia</i>	Partially surveyed (multiple land-owners), good potential for extending known occurrences	Easement or voluntary conservation	Ex High
Fargher Lake wetlands	T5N R2E	Clark	None	Blueberry farm and agricultural. Peat soils present, site may have restoration potential	Unsuited at present	Low
Fern Hill Prairie	T13N R2W	Lewis	None	Cemetery site with oak woods, much of adjacent area is developed (Chehalis), some pastures along Dillenbaugh Creek. <i>Sidalcea hirtipes</i> known from vicinity	Survey needed. Voluntary measures	Medium-Low
Fern Prairie	T2N R3E	Clark	<i>Sidalcea hirtipes</i>	Small patches of potential wet prairie in suburban/agriculture/forest matrix; <i>Carex densa</i> , <i>Castilleja levisecta</i> (h), <i>Cirsium remotifolium</i> (h), <i>Geranium oreganum</i> (h), <i>Lomatium bradshawii</i> , <i>Oxalis suksdorfii</i> (h), <i>Symphyotrichum hallii</i> , <i>Wyethia angustifolia</i> known from vicinity	Potential restoration or reintroduction site for <i>Castilleja levisecta</i> or <i>Lomatium bradshawii</i> ; survey needed	High
Ford Prairie	T16N R5W, T17N R5W	Grays Harbor	None	Mosaic of rural residential and agricultural fields; <i>Sericocarpus rigidus</i> known from vicinity	Voluntary conservation	Medium-Low

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Fords Prairie	T14N R2W, T14N R3W, T15N 2W, T15N R3W	Lewis	None	Mix of urban and rural residential and agriculture with some potential remnant prairie. <i>Sericocarpus rigidus</i> , <i>Silene scouleri</i> (h) known from the vicinity	Survey needed	Medium-Low
Frost Prairie	T15N R2W, T15N R3W, T16N R2W, T16N R3W	Thurston	<i>Castilleja levisecta</i> (out-planting), <i>Lathyrus vestitus</i> ssp. <i>ochroleucus</i> , <i>Sericocarpus rigidus</i>	<i>Silene scouleri</i> known from vicinity	Cavness out-planting site (Center for Natural Lands Management); easement or voluntary measures on adjacent sites	Ex High
Glacial Heritage Preserve	T16N R3W	Thurston	<i>Castilleja levisecta</i> (out-planting), <i>Nuttallanthus texanus</i> , <i>Sericocarpus rigidus</i>	Potential site for out-planting other rare dry prairie species	Part of Black River-Mima Prairie Glacial Heritage Preserve managed by Thurston Co.	Ex High
Gore Road Prairies	T12N R1E	Lewis	None	Mostly converted to agriculture with some woodland patches. <i>Eryngium petiolatum</i> , <i>Lathyrus vestitus</i> ssp. <i>ochroleucus</i> , <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey needed	Medium-Low
Grand Mound Prairie	T15N R3W	Thurston	<i>Sericocarpus rigidus</i> , <i>Silene scouleri</i> (h)	Mix of rural residential, agriculture and forest; remnant prairies are somewhat degraded and impacted by woody shrub invasion and development. <i>Sidalcea virgata</i> known from vicinity	Conservation easement or voluntary	Medium
Grand Prairie	T11N R2W T12N R2W	Lewis	<i>Sidalcea hirtipes</i> (h)	Oak woodland and agricultural, with some potential patches of prairie; <i>Eryngium petiolatum</i> , <i>Lupinus oregonus</i> , and <i>Wyethia angustifolia</i> known from the vicinity; potential restoration sites	Conservation easement or voluntary measures	High
Halfway Creek Meadows	T12N R4W	Lewis	<i>Polemonium carneum</i> (h), <i>Sidalcea hirtipes</i> , <i>Sidalcea nelsoniana</i>	Largest native <i>Sidalcea nelsoniana</i> population in WA, additional potential habitat in vicinity of known site; Small patches of meadows, but mostly forested; <i>Carex densa</i> known from vicinity	Survey, Conservation easement, voluntary measures	Ex High

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Jackson Prairie	T12N R1W	Lewis	<i>Lathyrus vestitus</i> var. <i>ochroleucus</i>	Matrix of small agricultural fields and forested tracts; Prairie remnants on roadsides; <i>Sidalcea hirtipes</i> known from vicinity	Survey needed; voluntary conservation	Medium
Johnson Prairie	T17N R1E T17N R1W	Thurston	<i>Sericocarpus rigidus</i>	Located within Joint Base Lewis McChord. See Tenalquot list for species known from vicinity; could be a reintroduction area for <i>Castilleja levisecta</i>	Consideration for Special Management on JBLM	High
Jorgensen Road Prairie	T12N R1E	Lewis	None	Mix of woodland, agriculture, and rural residential, some pastures may have restoration potential; <i>Lathyrus vestitus</i> var. <i>ochroleucus</i> and <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey (though no prairie spp. found in search by Arnett et al. 2007); conservation easement or voluntary measures	Medium-Low
Kennedy Road Prairie	T12N R1E	Lewis	None	Mostly agriculture and woodland; <i>Lathyrus vestitus</i> var. <i>ochroleucus</i> and <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey, voluntary measures	Medium-Low
King Corner wetlands	T4N R2E	Clark	None	Mix of agricultural lands, shrublands, and forest; <i>Cirsium remotifolium</i> (h) & <i>Polemonium carneum</i> known from vicinity	Survey needed	Medium-Low
Klaber Prairie	T12N R4W T13N R4W	Lewis	None	Mix of woodland and agriculture, site is near Boistfort Prairie and could have high restoration potential for <i>Carex densa</i> , <i>Delphinium leucophaeum</i> , <i>Lathyrus holochlorus</i> , <i>Lupinus oreganus</i> , <i>Sidalcea nelsoniana</i> , <i>Wyethia angustifolia</i>	Survey, conservation easement, voluntary measures	High
Klickitat Prairie	T12N R2E; T12N R3E	Lewis	None	Mostly converted to agriculture; <i>Sidalcea hirtipes</i> (h) known from vicinity	Probably unsuited	Low
Kruger Prairie	T13N R1W	Lewis	None	Mix of forest and agriculture; <i>Sidalcea hirtipes</i> (h) known from the vicinity	Survey needed (Arnett et al. 2007 reported “interesting spot” on road)	Medium-Low

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Lacamas Prairie	T2N R3E	Clark	<i>Carex densa</i> , <i>Eryngium petiolatum</i> , <i>Lomatium bradshawii</i> , <i>Symphyotrichum hallii</i> , <i>Wyethia angustifolia</i>	<i>Castilleja levisecta</i> (h), <i>Geranium oreganum</i> (h), <i>Oxalis suksdorfii</i> (h) and <i>Sidalcea hirtipes</i> known from vicinity	Existing Lacamas Prairie NAP & NRCA could be expanded through acquisition or easement	Ex High
Lacamas Prairie	T12N R1W	Lewis	<i>Eryngium petiolatum</i> , <i>Sidalcea hirtipes</i>	Extensive forested areas, some agriculture, and some remnant prairie or shrubland and swales with wetlands; <i>Lathyrus vestitus</i> var. <i>ochroleucus</i> known from vicinity	Survey needed, Conservation easement or voluntary measures	Medium
Lacamas Prairie	T16N R2E	Thurston	<i>Sericocarpus rigidus</i>	Small prairie remnant being encroached by forest and within suburban matrix; <i>Githopsis specularioides</i> (h) known from vicinity	Voluntary conservation measures	Medium
Layton Prairie	T11N R1W	Lewis	None	Mix of woodland, agriculture and rural residential with high restoration potential; <i>Eryngium petiolatum</i> , <i>Lupinus oreganus</i> , <i>Sidalcea hirtipes</i> , and <i>Wyethia angustifolia</i> known from vicinity	Survey needed; Conservation easement or voluntary measures	High
Lewis River Prairie	T5N R1E, T5N R2E	Clark, Cowlitz	None	Mix of agricultural fields & forest; <i>Polemonium carneum</i> (h) known from vicinity (report of <i>Lathyrus vestitus</i> var. <i>ochroleucus</i> from Arnett et al. 2007 is an error); possible reintroduction site for <i>Lupinus oreganus</i>	Survey needed	High
Lewis and Clark Prairie	T12N R1W	Lewis	<i>Lathyrus vestitus</i> var. <i>ochroleucus</i>	Lewis and Clark State Park is mostly forested, but has small area of pasture or meadow that could be a restoration site (potentially for <i>Lupinus oreganus</i>); adjacent private lands are mostly forested or agricultural; <i>Eryngium petiolatum</i> , and <i>Sidalcea hirtipes</i> known from vicinity	Coordinate with Lewis and Clark State Park on conservation planning; Conservation easement or voluntary measures on adjacent lands	High
Lewisville wetlands	T4N R2E	Clark	None	Mostly forest & small agriculture plots or rural residential; <i>Cirsium remotifolium</i> (h) & <i>Polemonium carneum</i> known from vicinity	Lewisville Co. Park might have fringe of prairie or be potential site for reintroduction/restoration	Medium-Low

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Longview Prairie	T8N R2W	Cowlitz	None	Patches of potential wet prairie at edge of industrial and urban development; no rare species known from vicinity	Survey needed	Medium-Low
Lucas Valley Prairie	T13N R1W	Lewis	None	Converted to agriculture	Unsuitable	Low
Manor Wetlands (Missoula Ripples)	T3N R2E	Clark	<i>Carex densa</i> , <i>Cirsium remotifolium</i> (h)	Potential reintroduction site for wet prairie species such as <i>Sidalcea nelsoniana</i> ; <i>Oxalis suksdorfii</i> (h) known from vicinity	Conservation easement, voluntary measures, survey needed	High
Marion Prairie (Mock City)	T17N R2E T18N R2E	Pierce	<i>Sericocarpus rigidus</i>	Joint Base Lewis McChord site – much of area is used for military exercises; See Ninety-First Division Prairie list (below) for potential species from vicinity	Consideration for Special Management on JBLM (more suitable sites exist elsewhere on JBLM)	Medium
Middle Fork Road Prairie	T13N R1E	Lewis	None	Mix of agriculture and rural residential with narrow strips of riparian woodland; <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey Needed	Medium Low
Mill Plain	T1N R2E, 2N R2E, T2N R3E	Clark	<i>Castilleja levisecta</i> (h; type locality)	Area is mostly residential today, <i>Sidalcea hirtipes</i> (h) known from vicinity	Unsuitable	Low
Mima Prairie	T16N R3W	Thurston	<i>Castilleja levisecta</i> (out- planting), <i>Sericocarpus rigidus</i>	Potential site for reintroduction of other rare dry prairie species.	Much of area already protected in Mima Mounds NAP; easement or voluntary measures for adjacent private lands	Ex High
Mossyrock Prairie	T12N R2E T12N R3E	Lewis	None	Woodlands and agricultural fields mixed with rural residential; no target species known from vicinity.	Survey needed	Medium- Low
Mud Creek (Hockinson area)	T3N R2E; T3N R3E	Clark	None (Arnett et al. 2007 mention “Dense sedge” at site, but it is unclear whether this refers to <i>Carex densa</i> , or thick sedge vegetation).	Mixed agriculture/rural residential, but with good potential for restoration or re-introduction of wet prairie species (such as <i>Lomatium bradshawii</i> or <i>Sidalcea nelsoniana</i>); <i>Carex densa</i> , <i>Cirsium remotifolium</i> (h), <i>Oxalis suksdorfii</i> (h) and <i>Sidalcea hirtipes</i> (h) known from vicinity.	Survey needed; voluntary conservation	High

Table 3., continued						
Prairie Site	Township/ Range	County	Rare Plants Known Present	Notes	Potential Conservation Action	Priority
Napavine Prairie	T12N R2W	Lewis	<i>Lathyrus vestitus</i> ssp. <i>ochroleucus</i>	Mostly agricultural, but some roadside prairie fragments may remain; also rural residential & forested	Survey needed; voluntary conservation	Medium
Newaukum Prairie	T13N R1W, T13N R2W	Lewis	None	Urban or rural residential, agriculture, and forest with some riparian vegetation along watercourses and potential for wet prairie habitat; <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey needed	Medium- Low
Ninety-First Division Prairie	T18N R1E, T18N R2E	Pierce	<i>Nuttallanthus</i> <i>texanus</i> , <i>Sericocarpus</i> <i>rigidus</i>	Largest remnant dry prairie in WA; <i>Castilleja levisecta</i> (h), & <i>Silene scouleri</i> known from vicinity; potential reintroduction site for rare dry prairie species	Managed by DOD (Joint Base Lewis- McChord);	High
Olympia Airport	T17N R2W	Thurston	None	<i>Agoseris elata</i> (h) reported from vicinity; Potential reintroduction area for rare prairie species	Conservation easement or voluntary measures	Medium- Low
Onalaska Prairie	T13N R1E	Lewis	None	Agriculture, woodland, and rural residential; <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey needed	Medium- Low
Opplet Road Prairie	T13N R1E, T13N R1W	Lewis	None	Mostly forest and shrubland, some pasture areas (might have restoration potential); <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey needed	Medium- Low
Orchards Prairie	T2N R2E	Clark	None	Mostly all developed, but potential habitat might occur for restoration in highway interchange and adjacent golf resort. <i>Carex densa</i> , <i>Castilleja</i> <i>levisecta</i> (h), <i>Cirsium</i> <i>remotifolium</i> (h), <i>Oxalis</i> <i>suksdorfii</i> (h), and <i>Sidalcea hirtipes</i> known from vicinity	Survey needed to assess restoration potential	Medium
Pe Ell Prairie	T13N R5W	Lewis	<i>Polemonium</i> <i>carneum</i> (h)	Mostly converted to agriculture and rural residential, some patches of forest and shrubland	Survey needed, voluntary measures	Medium- Low
Pleasant Valley Road Prairie	T13N R3W	Lewis	None	Mix of agriculture, forest, and rural residential	May be unsuitable	Low

Table 3., continued						
Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site
Ridgefield NWR	T4N R1W	Clark	<i>Sidalcea nelsoniana</i> (out-planting)	Good potential for reintroduction of other wet prairie plant species, including <i>Lomatium bradshawii</i> ; <i>Polemonium carneum</i> (h) known from vicinity	Federally protected (National Wildlife Refuge); good potential for other reintroductions	Ex High
Rock Prairie	T16N R2W	Thurston	<i>Sericocarpus rigidus</i>	Site has history of high grazing use, some invasion by woody vegetation; possible restoration site	Easement or voluntary conservation	Medium
Rock Creek Prairie	T4N R2E T4N R3E	Clark	None	Mix of rural residential, agriculture, and forest; no prairie species known from vicinity	Survey needed	Low
Rocky Prairie	T16N R2W T17N R1W	Thurston	<i>Castilleja levisecta</i> , <i>Sericocarpus rigidus</i>	<i>Carex densa</i> , <i>Nuttallanthus texanus</i> , & <i>Symphyotrichum hallii</i> known from vicinity	N end of area is protected within Rocky Prairie NAP; acquisition, easement, or voluntary conservation on adjacent private lands	Ex High
Roy Prairie	T17N R1E	Pierce	<i>Castilleja levisecta</i> (h)	Much of area is developed, but some patches of farmland near JBLM border. See Ninety-First Division Prairie list for species known from the vicinity.	Potential area for reintroduction of <i>Castilleja levisecta</i> , survey needed	High
Ruth Prairie	T16N R1E	Thurston	None	Extensive areas of agricultural land and forest with rural residential; Utility corridor through area has open vegetation; <i>Sericocarpus rigidus</i> known from vicinity	Survey needed	Medium-Low
Salkum Prairie	T12N R1E	Lewis	None	Mix of woodland, agriculture & rural residential, some pastures may have restoration potential; <i>Lathyrus vestitus</i> var. <i>ochroleucus</i> and <i>Sidalcea hirtipes</i> (h) known from vicinity	Survey needed	Medium-Low
Salmon Creek wetlands	T3N R1E	Clark	None	Scattered patches of wet prairie habitat along creek in open space within suburban development; <i>Carex densa</i> , <i>Cirsium remotifolium</i> (h), and <i>Oxalis suksdorfii</i> (h) known from vicinity	Survey needed	Medium-Low

Table 3., continued						
Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site
Salzer Valley Road Prairie	T14N R2W	Lewis	None	Mix of pasture and forest lands and some rural residential; no target species known from vicinity but site may have good restoration potential	Survey needed	Medium-Low
Scatter Creek	T16N R2W T16N R3W	Thurston	<i>Castilleja levisecta</i> (out-planting), <i>Nuttallanthus texanus</i> , <i>Sericocarpus rigidus</i> , <i>Sidalcea virgata</i> , <i>Symphotrichum hallii</i> , <i>Wyethia angustifolia</i>	Mazama pocket gophers present (Stinton 2005). Primary management issue is invasion of <i>Arrhenatherum elatius</i> (Caplow & Chappell 2005).	Scatter Creek Wildlife Area WDFW (mix of leased private lands that could be developed); acquisition or easement for adjacent lands or voluntary measures	Ex High
Shanghai Creek meadows	T2N R3E	Clark	<i>Carex densa</i>	Mix of agricultural fields, rural residential, and forest near Camp Bonneville with similar restoration potential for wet prairie species; <i>Castilleja levisecta</i> (h), <i>Cirsium remotifolium</i> (h), <i>Geranium oreganum</i> (h), <i>Oxalis suksdorfii</i> (h), & <i>Sidalcea hirtipes</i> known from vicinity	Survey needed	High
Silver Lake Prairies	T10N R1W	Cowlitz	None	Mostly forested with some patches of agricultural lands; no rare prairie plants known from vicinity	Unsuitable at present	Low
Smith Prairie	T16N R2E	Thurston	None	Mostly subdivided or reforested, low restoration potential	Unsuitable at present	Low
Stearns Creek Prairie	T13N R3W	Lewis	None	Mix of agricultural fields and forest; no prairie species known from vicinity, but area may not have been searched	May be unsuitable, but survey needed	Medium-Low
Steigerwald Lake NWR	T1N R4E	Clark	<i>Castilleja levisecta</i> (out-planting), <i>Sidalcea nelsoniana</i> (out-planting)	Potential reintroduction site for other wet prairie species (potentially <i>Lomatium bradshawii</i>); <i>Cirsium remotifolium</i> (h) known from vicinity	Site already protected (National Wildlife Refuge)	Ex High
Stillman Prairie	T12N R4W	Lewis	None	Site is part of greater Boistfort Prairie area and has potential for similar species, including <i>Carex densa</i> , <i>Delphinium leucophaeum</i> , <i>Lupinus oreganus</i> , <i>Sidalcea nelsoniana</i> , <i>Wyethia angustifolia</i>	Survey needed; conservation easement, voluntary registry	High

Table 3., continued						
Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site
Tenalquot (includes Weir Prairie)	T17N R1W, T17N R1E, T16N R1W, T16N R1E	Thurston	<i>Castilleja levisecta</i> (out-planting), <i>Sericocarpus rigidus</i> , <i>Silene scouleri</i> , <i>Symphyotrichum hallii</i>	Partly within Joint Base Lewis-McChord and Tenalquot Preserve; <i>Castilleja levisecta</i> population includes high # of hybrids with <i>C. hispida</i> , reducing its value for meeting recovery goals.	Site partly protected; consideration for special management on JBLM portion	Medium (priority lower due to hybridiz. issues)
Tenino	T16N R1W	Thurston	<i>Castilleja levisecta</i> (out-planting)	<i>Sericocarpus rigidus</i> , & <i>Silene scouleri</i> known from vicinity	Site already being conserved by Wolf Haven International; potential for additional restoration or out-planting of other rare species	Ex High
Thirteenth Division Prairie	T18N R2E, T18N R3E	Pierce	<i>Sericocarpus rigidus</i> , <i>Silene scouleri</i>	Relatively large prairie block bordered by forest and riparian corridor; <i>Castilleja levisecta</i> (h) known from vicinity, might be a potential reintroduction site.	Within Thirteenth Division Prairie RNA (JBLM);	High
Toutle Prairie	T10N R1W	Cowlitz	None	Mostly forested with some patches of agricultural lands; no rare prairie plants known from vicinity	Unsuitable at present	Low
Twin Oaks Prairie	T13N R3W	Lewis	None	Mix of agricultural fields and forest; no prairie species recorded from vicinity	May be unsuited, but survey needed	Medium-Low
Waunch Prairie (NE of Cenralia)	T15N R2W	Lewis, Thurston	None	Large reservoir at south end of valley, rest mostly agricultural land; <i>Silene scouleri</i> (h) known from vicinity	Mostly unsuitable at present	Low
West Rocky Prairie	T16N R1W, T16N R2W	Thurston	<i>Carex densa</i> , <i>Castilleja levisecta</i> (out-planting), <i>Nuttallanthus texanus</i> , <i>Sericocarpus rigidus</i> , <i>Symphyotrichum hallii</i>	Relatively large block of mounded prairie, though with high percentage of non-native grasses; <i>Castilleja levisecta</i> population includes high # of hybrids with <i>C. hispida</i> , reducing its value for meeting recovery goals.	Already managed by WA Dept of Fish and Wildlife, acquisition or easement of inholdings or adjacent areas of suitable habitat	Medium (priority lower due to hybridiz. issues)
Whipple Creek Wet Prairie	T3N R1E	Clark	<i>Carex densa</i>	Mostly agricultural and forest, small patches of wet prairie; <i>Cirsium remotifolium</i> (h) known from vicinity	Whipple Creek County Park mostly forested and unsuitable; survey needed	Medium

Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site	Prairie Site
Yacolt Prairie	T4N R3E	Clark	None	Potential reintroduction site for wet prairie species such as <i>Sidalcea nelsoniana</i>	Survey needed	High
Yelm Prairie	T17N R1E, T17N R2E	Thurston	<i>Castilleja levisecta</i> (h), <i>Sericocarpus rigidus</i> , <i>Silene scouleri</i> (h)	Small prairie remnants within an urban matrix; low re-introduction or restoration potential	Voluntary conservation	Medium

Table 4. Locations of federally-listed Threatened and Endangered Plant Species in Southwest Washington Prairies.

Species, WNHP Element Occurrence (EO) #	Last Obs	Natural or Out-planted	County	Location	Ownership/Management
<i>Castilleja levisecta</i> EO 10	1889	N	Clark	Mill Plain (Ft. Vancouver)	private
<i>Castilleja levisecta</i> EO 11	2016	N	Thurston	Rocky Prairie	Rocky Prairie NAP, private
<i>Castilleja levisecta</i> EO 18	1889	N	Pierce or Thurston	Roy	private
<i>Castilleja levisecta</i>	2017	O	Thurston	Cavness	Center for Natural Land Management
<i>Castilleja levisecta</i>	2017	O	Thurston	Glacial Heritage Preserve	Glacial Heritage Preserve
<i>Castilleja levisecta</i>	2017	O	Thurston	Mima Mounds	Mima Mounds NAP
<i>Castilleja levisecta</i>	2017	O	Thurston	Morgan/Tenalquot	TNC or other NGO
<i>Castilleja levisecta</i>	2017	O	Thurston	Scatter Creek South	WDFW Wildlife Recreation Area
<i>Castilleja levisecta</i>	2017	O	Clark	Steigerwald Lake NWR	Steigerwald Lake NWR
<i>Castilleja levisecta</i>	2017	O	Thurston	West Rocky Prairie	WDFW
<i>Castilleja levisecta</i>	2017	O	Thurston	Wolf Haven, Tenino	Wolf Haven International
<i>Lomatium bradshawii</i> EO 01	2017	N	Clark	Lacamas Meadow	Lacamas Prairie NAP, private
<i>Lupinus oreganus</i> EO 01	2016	N, O	Lewis	Boistfort Prairie	private
<i>Lupinus oreganus</i> EO 03	2017	N	Lewis	Cowlitz Prairie	Lozier Prairie Preserve (Cowlitz Tribe), Toldeo School District, private
<i>Lupinus oreganus</i> EO 04	2016	N	Lewis	Drews Prairie	private
<i>Lupinus oreganus</i> EO 05	2016	N	Lewis	Cowlitz Prairie East	private
<i>Sidalcea nelsoniana</i> EO 01	2014	N	Cowlitz	Coal Creek	private
<i>Sidalcea nelsoniana</i> EO 02	2014	N	Lewis	Halfway Creek	private
<i>Sidalcea nelsoniana</i>	2017	O	Clark	Ridgefield NWR (Smith Lake, 100 acre field N & S, Texas Island)	Ridgefield NWR
<i>Sidalcea nelsoniana</i>	2017	O	Clark	Steigerwald Lake NWR (CLT/Straub Field, Trailhead Point, East Stevenson Field)	Steigerwald Lake NWR

Extremely High Priority Sites

We ranked 15 prairie sites in southwest Washington as Extremely High priorities for conservation attention. All of these sites contain at least one extant population of one of the four federally listed Threatened or Endangered prairie plant species (Table 3). Portions of six of these sites are currently protected by the state of Washington as Natural Area Preserves or Wildlife Management Areas (Lacamas, Mima, and Rocky prairies and Scatter Creek) or by the federal government as National Wildlife Refuges (Ridgefield and Steigerwald). Four other sites are privately owned by land trusts (Frost Prairie by the Center for Natural Land Management), conservation groups (Tenino prairie by Wolf Haven International), tribes (Lozier Prairie Preserve by the Cowlitz Tribe), or county governments (Glacial Heritage Preserve by Thurston County). These existing protected areas contain 11 populations of all four federally listed prairie plant species and 18 occurrences of nine other Washington state plant species of concern (Table 1).

Five additional extremely high priority areas are privately owned (Boistfort, Coal Creek, Cowlitz Prairie East, Drews Prairie, and Halfway Creek Meadows). These sites support seven additional occurrences of federally-listed plants and populations of three Washington species of concern (*Delphinium leucophaeum*, *Lathyrus holochlorus*, and *Polemonium carneum*), increasing the number of protected rare prairie plant species to 16. We recommend outreach to the owners of these sites to explore their interest in pursuing conservation actions, including the Register of Natural Areas, conservation easements, or, acquisition (if there is interest by an agency or land trust).

High Priority Sites

Nineteen prairie sites in southwestern Washington are a high priority for conservation attention because of their potential as new reintroduction sites for the four federally listed prairie plant species (Table 2). These areas are all in the vicinity of known occurrences and have similar environmental conditions conducive to successful out-plantings. Four of these sites are currently under state or federal jurisdiction (Lewis and Clark State Park and Joint Base Lewis-McChord), while a fifth is being transferred from federal to county management (Camp Bonneville). The remaining 14 sites are privately owned. Protecting all of these sites through conservation easement, voluntary registry, or development of management plans would protect four additional state rare plant species (*Cirsium remotifolium*, *Geranium oreganum*, *Oxalis suksdorfii*, and *Silene scouleri*) that are not presently protected elsewhere in southwestern Washington. These sites may also be suitable for reintroduction of at least seven new populations of *Castilleja levisecta*, four occurrences of *Lomatium bradshawii*, six occurrences of *Lupinus oreganus*, and seven populations of *Sidalcea nelsoniana*. Successful establishment and protection of these populations would help meet recovery goals for each of these listed species (US Fish and Wildlife Service 2010).

Medium Priority Sites

Sixteen remnant prairie sites are medium priority for conservation attention. Each of these sites contains at least one occurrence of a state-listed prairie species. All but three are privately owned sites. Two sites that contain mixed populations of *Castilleja levisecta*, *C. hispida*, and their F1 hybrids (Tenalquot and West Rocky prairies) are included in this category as the

presence of extensive hybridization no longer qualifies them for meeting Golden paintbrush recovery criteria (Fertig 2018). Two other sites may have historically supported *Castilleja levisecta* populations, but these are now extirpated or the areas may no longer contain suitable habitat or management for reintroduction (Orchard and Yelm prairies). The Marion Prairie site is located on Joint Base Lewis-McChord in an area actively used for military training and may not be suitable for formal protection. The Whipple Creek Wet Prairie is mostly contained within Whipple Creek County Park in Clark County, but this site has become densely forested and may require active vegetation treatment to restore prairie species.

Medium priority sites are considered to have lower potential for reintroduction of the four federally-listed prairie species than Extremely High or High priority sites. These areas may have potential for re-establishment of Washington state rare prairie species, however, especially taxa that are considered historical in the south Puget Trough region. At least seven state-listed species have not been relocated since 1978 (Table 1) and are not found in existing protected areas within the study area; all of these might be considered a priority for potential reintroduction in suitable habitats.

Further outreach is needed to determine landowner interest in conservation actions. If the landowners are interested, we recommend working with them to develop management plans for these remnants. High-quality sites may be appropriate for addition to the Register of Natural Areas.

Medium-Low Priority Sites

Thirty-four sites have no known rare species but still retain enough fragments of prairie vegetation and are in the vicinity of known occurrences of rare prairie-obligate plants, that they warrant being surveyed by a trained botanist (with landowner permission). If these sites should contain rare species, they might be considered for additional conservation attention, such as easement, registry, or voluntary planning. Sites that are found to be unsuitable based on ground visits can be relegated to the low priority list, though may be appropriate for long-term prairie restoration by private organizations.

Low Priority Sites

Eighteen sites have been almost completely converted from native prairie to agricultural fields, second-growth forest, weedy shrublands, or urban or rural development and are unsuited at present for conserving federally-listed or state rare prairie plant species. These sites might still have potential for long-term restoration, but other areas in better condition should be considered first.

Conclusions

There are several opportunities for conservation to benefit federally- and state-listed prairie species in southwest Washington. The WNHP has established contact with several landowners to explore their interest in participating in the Register of Natural Areas (supported by F15AF00955). On-going outreach with these and other landowners will help identify sites for active conservation actions.

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