

Dorena Prairie Restoration: 2021 Annual Report



3/22/2022

Report prepared for the Bureau of Land
Management, Agreements L19AC00044
and L20AC00228

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PREFACE

IAE is a non-profit organization whose mission is the conservation of native ecosystems through restoration, research, and education. IAE provides services to public and private agencies and individuals through development and communication of information on ecosystems, species, and effective management strategies. Restoration of habitats, with a concentration on rare and invasive species, is a primary focus. IAE conducts its work through partnerships with a diverse group of agencies, organizations, and the private sector. IAE aims to link its community with native habitats through education and outreach..



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Cover photograph: *Fragaria virginiana*, Dorena Prairie.
Photo by Celeste Lebo, May 8, 2021.

SUGGESTED CITATION

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Dorena Prairie Restoration: 2021 Annual Report

1. EXECUTIVE SUMMARY

This report summarizes habitat restoration conducted by the Institute for Applied Ecology (IAE) at Dorena Prairie in 2021. IAE has partnered with the Bureau of Land Management (BLM) Upper Willamette Field Office (UWFO), Northwest Oregon District, in the restoration and maintenance of rare upland prairie habitat at Dorena Prairie since 2010. Restoration activities in 2021 included woody vegetation management, mowing and limbing of conifers to prepare the site for a prescribed burn, chemical and mechanical weed treatments, and monitoring of thin-leaved peavine (*Lathyrus holochlorus*), a BLM Sensitive Species that was introduced to the site. To meet project goals, in the fall of 2022, the UWFO will implement a prescribed fire followed by herbicide treatments, planting, and seeding to prevent woody encroachment and to reduce the extent of non-native perennial grasses.

2. INTRODUCTION

Dorena Prairie is a 6-acre upland prairie located southeast of Eugene, Oregon and west of Dorena Lake (**Figure 1**). The prairie is managed by the Bureau of Land Management (BLM) Upper Willamette Field Office, Northwest Oregon District. Dorena Prairie is designated a BLM Area of Critical Environmental Concern (ACEC) and hosts a diverse community of native plant species, including an introduced population of thin-leaved peavine (*Lathyrus holochlorus*), a BLM Sensitive Species. This report describes Dorena Prairie restoration activities implemented in 2021 funded under BLM assistance agreement #L19AC00044.

IAE began working with the BLM to restore and maintain habitat at Dorena Prairie in 2010. This prairie has undergone extensive restoration and could be a suitable location to introduce rare and/or federally listed plants. In addition, the prairie is located next to Schwarz Park, which is managed by the U.S. Army Corps of Engineers (USACE), providing an opportunity to educate the public about habitat restoration. An educational sign was installed in early 2017 to help inform the public about the ongoing work at Dorena Prairie.

3. GOAL AND OBJECTIVES

The goal of this project is to restore and maintain rare upland prairie habitat at Dorena Prairie. The primary objectives are to:

- maintain quality prairie habitat by removing non-native plants;
- prevent encroachment of woody species into the prairie;
- increase native plant diversity; and
- increase the extent of the native plant community.

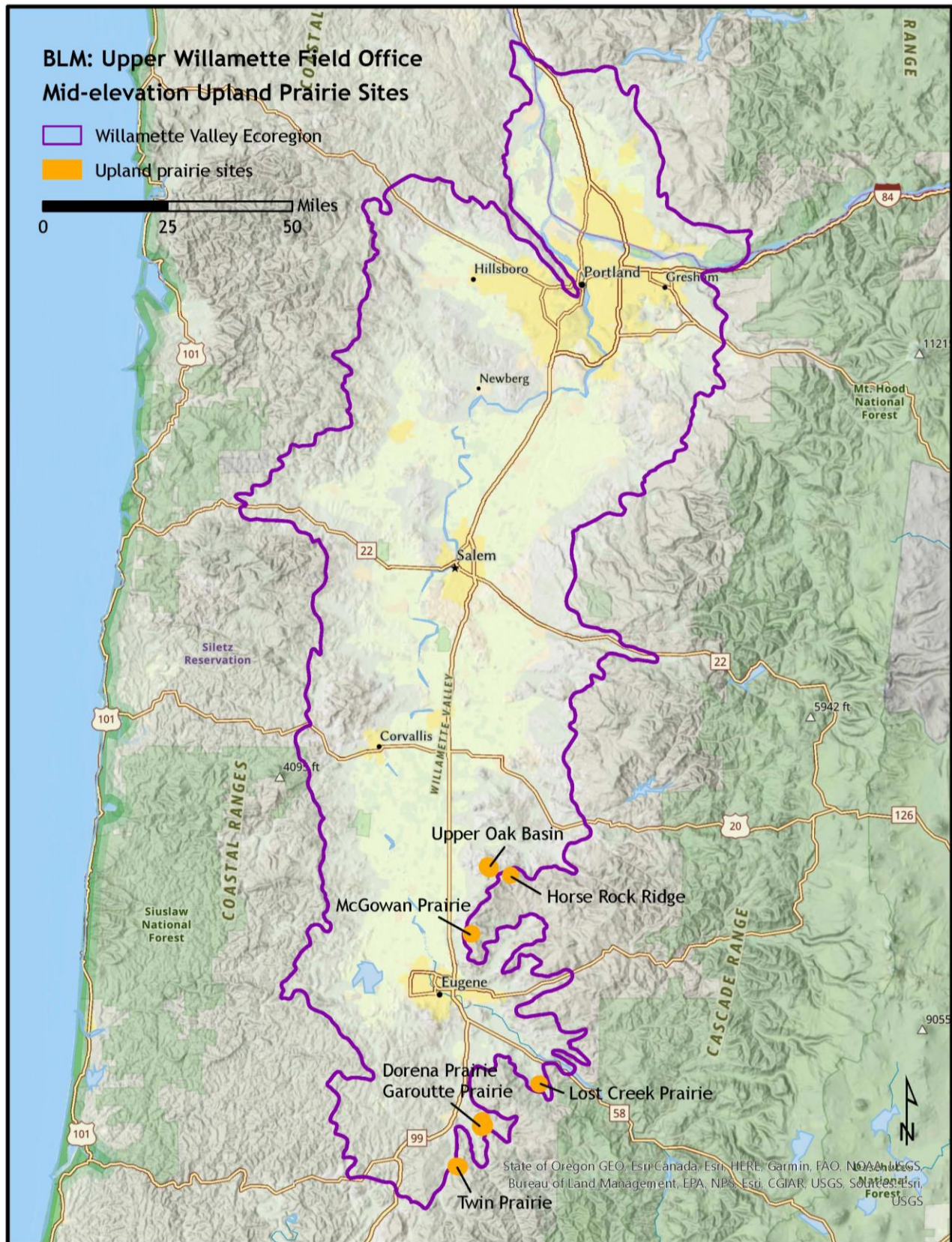


Figure 1. Upper Willamette Field Office upland prairie locations designated as Areas of Critical Environmental Concern.

4. 2021 RESTORATION ACTIVITIES

Restoration activities at Dorena Prairie in 2021 focused on reducing woody vegetation and monitoring introduction plots for thin-leaved peavine (Table 1). See Completed and proposed restoration activities (2010-2022) for a list of restoration activities completed and proposed at Dorena Prairie from 2010-2022.

Table 1. Restoration activities conducted in 2021 at Dorena Prairie by the Institute for Applied Ecology.

Date	Personnel	Activity
3/23/2021	IAE, Jessica Celis (UWFO BLM botanist)	Project site visit with BLM
4/9/2021	IAE, Jessica Celis (UWFO BLM botanist)	Met with BLM to discuss budgets, workplans, and BLM assistance agreements
4/19/2021	IAE, Jessica Celis (UWFO BLM botanist)	Met with BLM to discuss project work
4/22/2021	IAE	Spot-sprayed Canada thistle (<i>Cirsium arvense</i>)
6/3/2021 and 6/10/2021	IAE, Jessica Celis (UWFO BLM botanist)	Monitored thin-leaved peavine plot
7/7/2021	IAE, Looking Glass Youth Crew	Hand-pulled Canada thistle and cut Himalayan blackberry (<i>Rubus armeniacus</i>)
7/12/2021 and 7/13/2021	IAE, Jessica Celis (UWFO BLM botanist)	Met with BLM to discuss coordination of prescribed burn and site prep activities
9/30/2021	IAE	Cut and trimmed woody species and spot sprayed non-native species in thin-leaved peavine plots. Spot sprayed perennial grasses and oxeye daisy (<i>Leucanthemum vulgare</i>) in and around plots after mowing diagonal strips through plots with a weed trimmer.
10/6/2021	IAE, Jessica Celis (UWFO BLM botanist)	Met with BLM to discuss project work
10/7/2021	IAE	Covered burn piles with plastic
11/10/2021	IAE	Mowed and cleared entire meadow to prep for upcoming prescribed burn in 2022. Removed downed oak limbs and cleared small ash trees and shrub layer around meadow edges. Cut Scotch broom (<i>Cytisus scoparius</i>) plants.
11/15/2021	UWFO BLM	Burned brush piles
11/23/2021	IAE	Hand-cut blackberry with weed trimmers. Seeded bare soil created by skid steer with native grass species and thin-leaved peavine plots with a diverse native forb mix.
12/13/2021	IAE	Limbed trees up to 20 feet above the ground and topped one large Douglas-fir (<i>Pseudotsuga menziesii</i>) to create a wildlife tree to prep site for a prescribed burn in fall 2022
12/15/2021	IAE	Seeded burned brush piles with native forbs



Figure 2. 2021 management actions at Dorena Prairie.

4.1 Vegetation management

In September 2020, herbicides were approved for use on the Northwest Oregon BLM District. 2021 was the first year that IAE used herbicide to treat non-native invasive plant species at Dorena Prairie. Canada thistle, oxeye daisy, and tall oat grass were targeted for spot spraying. We also hand-pulled Canada thistle and mechanically cut blackberry and Scotch broom plants.

To maintain the thin-leaved peavine plots, annual treatments to cut and mow are recommended to reduce cover of woody species to 60%. We hand-cut larger woody species and used a weed trimmer to mow diagonal strips through plots.

In the fall of 2022, the UWFO BLM fire management team will implement a prescribed burn across all six acres of the site. To prepare the site for the burn, we implemented a number of management actions. First, we covered and burned four piles of woody debris created over the last several years. A contractor was hired and used a skid steer to mow and clear the entire meadow and remove large, downed oak limbs from the west side of the meadow. We also cleared small ash trees and woody shrubs around the east and south meadow edge. Lastly, we limbed conifers up to 20 feet above the ground and topped one large dead Douglas-fir to create a wildlife tree.



Figure 3. Mowing and stump removal at Dorena Prairie fall 2021. Photos by Celeste Lebo.

4.2 Seeding

Following prep activities for a prescribed burn, we seeded bare soil created by the skid steer with native grass species and the thin-leaved peavine plots and burn piles with a diverse native forb and grass mix (Table 2.)

Table 2. Native forb and grass species seeded at Dorena Prairie in fall 2021.

Species	Common Name	Growth Form	Seed Source*	Quantity (lbs.)
<i>Achillea millefolium</i>	common yarrow	forb	ME	0.02
<i>Aquilegia formosa</i>	western columbine	forb	WV	0.14
<i>Clarkia purpurea</i>	winecup clarkia	forb	ME	0.04
<i>Danthonia californica</i>	California oatgrass	grass	ME	0.50
<i>Elymus glaucus</i>	blue wildrye	grass	ME	0.58
<i>Eriophyllum lanatum</i>	common woolly sunflower	forb	ME	0.06
<i>Koeleria macrantha</i>	prairie Junegrass	grass	ME	0.03
<i>Madia elegans</i>	common madia	forb	WV	0.33
<i>Plectritis congesta</i>	shortspur seablush	forb	ME	0.05
<i>Potentilla gracilis</i>	slender cinquefoil	forb	ME	0.02
<i>Prunella vulgaris</i> var. <i>lanceolata</i>	lance selfheal	forb	ME	0.09
<i>Sidalcea malviflora</i> ssp. <i>virgata</i>	dwarf checkerbloom	forb	WV	0.52

*WV = Willamette Valley; ME = mid-elevation



Figure 4. Limbed Douglas-fir (*Pseudotsuga menziesii*) and James McAuliffe trimming blackberry while Oregon Department of Transportation mowed the roadside. Photos by Celeste Lebo and Rolando Beorchia.

4.3 Monitoring

IAE staff monitored survival of 200 thin-leaved peavine plugs that were planted in 2016 (**Figure 1**).

- Thin-leaved peavine Dorena Prairie east plot: 100 plugs planted, 22 observed (22% survival)
- Thin-leaved peavine Dorena Prairie west plot: 100 plugs planted, 0 observed (0% survival)

5. DISCUSSION

In 2021, IAE monitored survival of thin-leaved peavine planted in 2016. Four years after planting, thin-leaved peavine was still present. Compared to 2020, when only six individuals were observed, in 2021 we observed 22 individuals. Three of those were recorded as having the highest vigor rating. More extensive restoration actions, including ground preparation prior to seeding or planting and targeted weed management, could increase survival and persistence of thin-leaved peavine.

Restoration priorities for Dorena Prairie include removing non-native plants such as teasel (*Dipsacus fullonum*), tall oatgrass (*Arrhenatherum elatius*), patches of Canada thistle, Himalayan blackberry, and Scotch broom throughout the prairie and along its edges bordering Douglas-fir forest. Mechanical efforts to remove these species are implemented annually as resources allow but have limited effectiveness due

to the time and cost of removing invasive species by hand. Treating non-native species with a combination of chemical and mechanical methods should result in more efficient and effective control. Over time, we anticipate that annual herbicide treatments, followed by revegetation with native forbs and grasses will increase the abundance and diversity of native plant species across the site.

Mowing has been used biennially to prevent non-native grasses and woody species from dominating the prairie; however, data collected at Upper Oak Basin (another mid-elevation prairie in the UWFO) indicate that mowing perennial grasses, though slowing their growth, does not stop them from out-competing native species (Celis et al. 2020). Grass-specific herbicide is an effective tool to treat grasses without harming native forbs; however, grass-specific herbicides are not authorized under the current Pesticide Use Permit (PUP). Managers should consider adding grass-specific herbicides to the PUP to allow for better control of non-native grasses. Until grass-specific herbicides are allowed, we will continue to treat tall oatgrass with a broad-spectrum herbicide such as glyphosate.

Long-term site-wide efforts will be needed to alter the structure and composition of the plant community at Dorena Prairie. Natural plant succession in meadows can eventually lead to the formation of a forest community. In the absence of periodic wildfire, meadows require annual disturbance through intentional land-management actions (e.g., mowing, woody species removal, and prescribed fire). Without a regime of periodic ground disturbance at a site to maintain an early successional plant community, the site will gradually transition over time from grasses and forbs to woody shrubs and eventually to forest. Non-native plant control, revegetation by native species, and meadow expansion to release Oregon white oaks on the eastern edge of the meadow are needed to restore and maintain the site. We also recommend biennial mowing or prescribed burns every 3-5 years, followed by herbicide spot treatments and revegetation with native seed and plugs (containerized seedlings) to increase cover and diversity of native plants.

6. MANAGEMENT RECOMMENDATIONS

If aggressive non-native grasses and woody species are controlled, Dorena Prairie will be a strong candidate for rare species introduction. To achieve this goal, we recommend the following habitat restoration actions:

- Continue to mow every other year or begin to implement prescribed burns every three to five years to reduce thatch and control woody species.
- Continue manual removal and herbicide spot treatments of non-native plant species such as tall oatgrass, Canada thistle, Fuller's teasel, Scotch broom, and Himalayan blackberry.
- Add grass-specific herbicide to the PUP.
- Follow up herbicide treatments and prescribed burns with the seeding and planting of native forbs and grasses in disturbed areas.
- Update the species list for Dorena Prairie. Include surveys for the Bald Mountain milkvetch (*Astragalus umbraticus*) reported to the BLM from anecdotal sightings but not yet confirmed.

7. REFERENCES

- Celis, J., D.E.L. Giles, A.L. Schomaker, and M.A. Bahm. 2020. Monitoring and restoration of Kincaid's lupine (*Lupinus oreganus*) and Hitchcock's blue-eyed grass (*Sisyrinchium hitchcockii*) at Oak Basin. Unpublished report for the USDI Bureau of Land Management, Northwest Oregon District. Institute for Applied Ecology. Corvallis, Oregon.
- Esri. "World Terrain Base" [basemap]. Scale Not Given. "World Topographic Map". July 1, 2009. https://server.arcgisonline.com/ArcGIS/rest/services/World_Terrain_Base/MapServer. Accessed December 21, 2020.

APPENDIX A. COMPLETED AND PROPOSED RESTORATION ACTIVITIES (2010-2022)

2010 Management Actions

- Project was in the initial phase of planning, coordinating with partners, mapping the location of priority invasive plant species, and surveying native vegetation.
- Removal of approximately 300 Scotch broom plants and 25 Himalayan blackberry plants
- USACE mowed the entire prairie in mid-summer to reduce dominance by tall oatgrass and woody species to enhance the habitat for herbaceous species.

2011 Management Actions

- Site inspection and partner coordination
- Scotch broom and Himalayan blackberry removal
- Survey of Bald Mountain milkvetch
- USACE mowed the entire prairie in mid-summer to reduce dominance by tall oatgrass and woody species to enhance the habitat for herbaceous species.

2012 Management Actions

- Site inspection and partner coordination
- Scotch broom removal followed by seeding with upland prairie native grass and forb mix
- Site mapping and updating of plant species list
- Grew and planted pugs (containerized seedlings) from seed collected for SOS native seed collections
- Weed-wacked thistle and teasel
- USACE mowed the entire prairie in mid-summer to reduce dominance by tall oatgrass and woody species to enhance the habitat for herbaceous species.

2013 Management Actions

- Site inspection and partner coordination
- Planted 1,224 California oatgrass, 216 slender cinquefoil (*Potentilla gracilis*), 648 common rush (*Juncus effusus*), 144 dense sedge (*Carex densa*), and 648 slough sedge (*Carex obnupta*)
- Scotch broom, Himalayan blackberry, teasel, and bull thistle (*Cirsium vulgare*) removal by hand. Focus on Scotch broom and teasel removal in SE corner of prairie and Himalayan blackberry surrounding blue elderberry (*Sambucus cerulea*) in SE corner.
- Removal of seed heads of teasel
- Weed-whacked thistle and teasel
- USACE mowed the entire prairie in mid-summer to reduce dominance by tall oatgrass and woody species to enhance the habitat for herbaceous species.

2014 Management Actions

- Site inspection and partner coordination
- Planted bare-root Oregon geranium (*Geranium oreganum*) and plugs of river lupine (*Lupinus rivularis*), western columbine, and prairie violet (*Viola praemorsa*)

- Removed Scotch broom and teasel by hand and weed-whacked Himalayan blackberry and non-native woody species
- USACE mowed the entire prairie in mid-summer to reduce dominance by tall oatgrass and woody species to enhance the habitat for herbaceous species.

2015 Management Actions

- Site inspection and partner coordination
- Manual removal of Scotch broom and Himalayan blackberry

2016 Management Actions

- Site inspection and partner coordination
- Planted 200 thin-leaved peavine plugs in two introduction plots and 198 showy milkweed (*Asclepias speciosa*) plugs
- Manual removal of Scotch broom and Himalayan blackberry
- Hired subcontractor to mow entire prairie in mid-summer

2017 Management Actions

- Site inspection and partner coordination
- Interpretive sign installation
- Monitored thin-leaved peavine introduction plots
- Manual removal of Himalayan blackberry
- Limbed Douglas-fir

2018 Management Actions

- Site inspection and partner coordination
- Monitored planted thin-leaved peavine introduction plots
- Removed Scotch broom and Himalayan blackberry from within and around plots planted with thin-leaved peavine

2019 Management Actions

- Site inspection and partner coordination
- Monitored planted thin-leaved peavine introduction plots
- IAE mowed entire prairie in mid-summer.
- Manual removal of Scotch broom and Himalayan blackberry. Removed lower limbs of large Douglas-fir trees and felled smaller trees along the southern and eastern edges of the prairie.
- Piled limbs in open meadow with the AmeriCorps Blue 5 youth crew

2020 Management Actions

- Site inspection and partner coordination
- Monitored thin-leaved peavine introduction plots
- Hand-pulled Scotch broom

- Bucked and removed wind-fallen Oregon white oak from thin-leaved peavine plots with AmeriCorps Blue 4 crew
- Planted 500 small camas (*Camassia quamash*) bulbs with AmeriCorps Blue 4 crew

2021 Management Actions

- Site inspection and partner coordination
- Spot-sprayed Canada thistle
- Monitored thin-leaved peavine introduction plots
- Manual and mechanical removal of Canada thistle, Scotch broom, and blackberry
- Cut and trimmed woody species and spot sprayed invasive species in thin-leaved peavine plots. Spot sprayed perennial grasses and oxeye daisy in and around plots after mowing diagonal strips through plots with a weed trimmer.
- Contracted skid-steer operator, Cutaway, Inc., to mow entire meadow to prepare for fall 2022 prescribed burn. Removed downed oak limbs from meadow. Cleared small ash trees and shrub layer around meadow edges.
- Seeded bare soil created by skid steer with native grass species and thin-leaved peavine plots with a diverse native forb mix.
- Limbed trees up to 20 feet above the ground and topped one large Douglas-fir to create a wildlife tree to prep site for a prescribed burn in fall 2022
- Burned brush piles and seeded exposed bare ground

2022 Management Actions (proposed)

- Site inspection and partner coordination
- Monitor introduced thin-leaved peavine as part of BLM assistance agreement L19AC00044.
- Hand-pull or spot-spray Scotch broom, Canada thistle, oxeye daisy, and teasel.
- Mow and spot-spray Himalayan blackberry throughout the prairie and at forest edge.
- Treat non-native perennial grasses with herbicide around thin-leaved peavine plots when peavine plants are dormant.
- Implement a prescribed burn of the entire prairie in fall 2022, followed by a broadcast-spray herbicide application of glyphosate and then seeding.
- Update plant species list and survey for Bald Mountain milkvetch.

APPENDIX B. DIRECTIONS TO DORENA PRAIRIE FROM CORVALLIS, OREGON

Starting location: Corvallis, OR

1. Get on I-5 south from OR 34E (10.8 mi).
2. Follow I-5 south to Cottage Grove (follow signs to Dorena Lake).
3. Take exit 174 from I-5 (53.0 mi).
4. Take Row River (left off the exit) for 5.5 miles until you get to Schwartz Park.
5. Park at Schwartz Park.
6. Dorena Prairie is on the east side of the park.