Old Peak Meadow Habitat Enhancement Project: 2021 Annual Report

4/7/2022

Report to the City of Corvallis for agreement #PW 2019-066-250741

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Institute for Applied Ecology

PREFACE

IAE is a non-profit organization whose mission is 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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We thank Esri for their support of our GIS program. Maps were created using ArcGIS® software by Esri. ArcGIS® and ArcMap™ are the intellectual property of Esri and are used herein under license.

Cover photograph: Looking south over Old Peak Meadow on December 1, 2021.

Photo credits: All photos taken by IAE staff unless otherwise noted

SUGGESTED CITATION

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Old Peak Meadow Habitat Enhancement Project: 2021 Annual Report

1. EXECUTIVE SUMMARY

In 2021, IAE continued efforts to improve habitat at Old Peak Meadow (Old Peak) through habitat restoration, including weed abatement actions and monitoring. Herbicide applications targeted oxeye daisy (*Leucanthemum vulgare*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), annual fescue (*Vulpia sp.*), dove's-foot geranium (*Geranium molle*), false brome (*Brachypodium sylvaticum*) and tall oatgrass (*Arrhenatherum elatius)*. The meadow was previously separated into three management zones: North, Central and South. This year, the North zone received herbicide applications to maintain chemical fallow, followed by seeding with a native seed mix. The Central zone received herbicide applications to maintain chemical fallow in preparation for future revegetation. The South zone received herbicide applications to selectively target invasive weeds while maintaining desirable native plant abundance. Oxeye daisy was mowed in the South zone before the flowering heads set seed to reduce seed dispersal. Shrubs along the eastern edge remained in good condition and there was no apparent shrub mortality. This mix of restoration methods and strategic treatment times between management zones should continue to provide positive outcomes for habitat improvement across the meadow.

2. INTRODUCTION

Old Peak is a mid-elevation, remnant meadow located in the Corvallis Watershed and owned by the City of Corvallis (City). Historically, Old Peak was part of a 160-acre homestead with more open habitat (Esterson 2018). Due to decades of conifer encroachment, the open habitat was reduced to an approximately one-acre meadow. Between 2009 and 2013, the City removed 100 Douglas-fir (*Pseudotsuga menziesii*) trees, increasing the size of the meadow to approximately three acres. Songbird surveys completed between 2011 and 2013 indicated Old Peak was attracting fewer songbirds than expected, most likely a result of minimal floristic diversity and structure (Vesely 2013). In 2014, the City, along with three other partners including IAE, received a $43,000 grant from the Coast Range Stewardship Fund to improve wildlife habitat at Old Peak by diversifying plant species composition and vegetation structure of the meadow. Restoration actions by IAE have included:

- Controlling invasive species with herbicide and mowing;
- Increasing native species diversity and abundance via seeding and planting;
- Creating structural diversity within the meadow and along the meadow/forest ecotone by seeding with a variety of native forbs and grasses and planting shrubs on the east edge of the meadow; and
- Conducting plant community surveys.

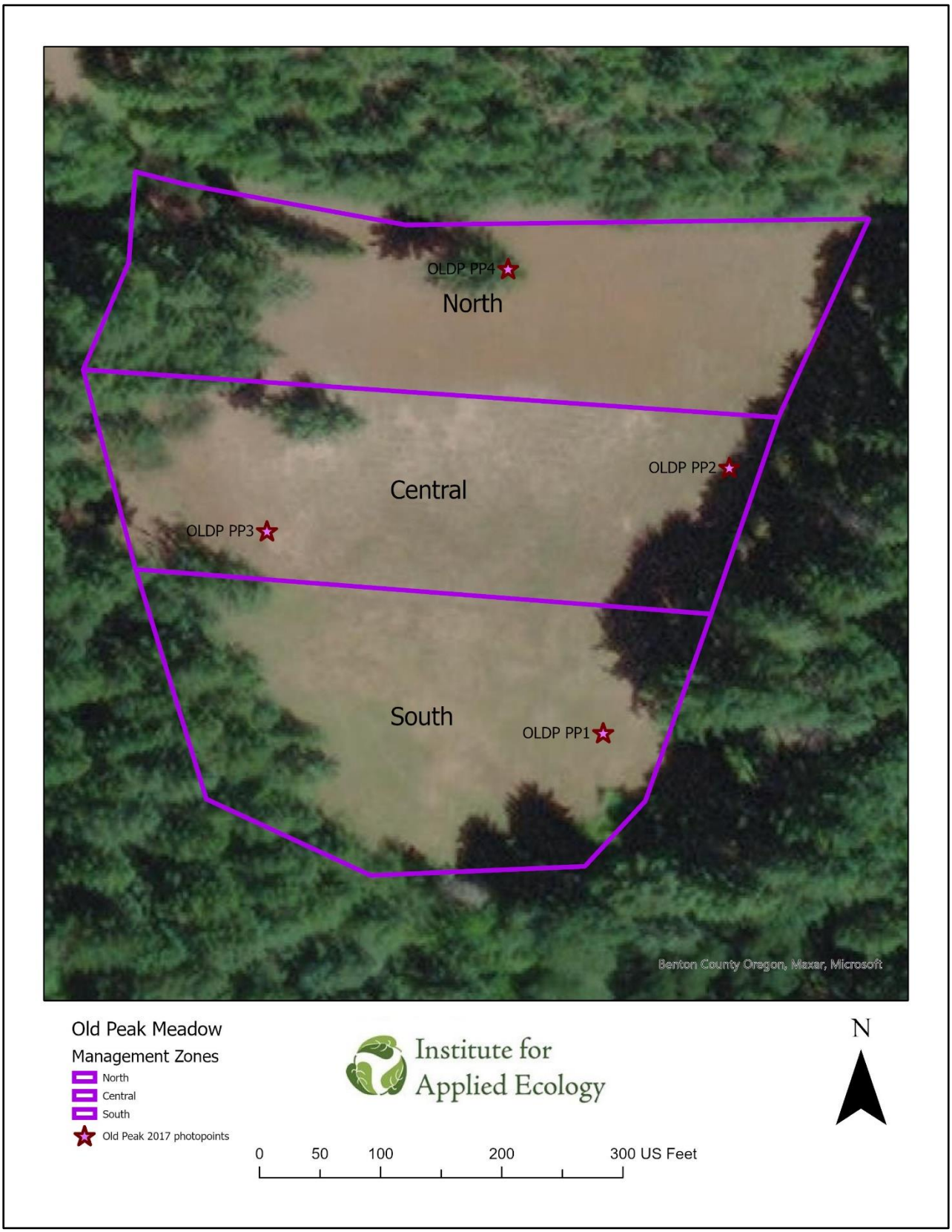

Figure 1. Old Peak management zones and photo point locations.

3. RESTORATION ACTIVITIES

2021 restoration efforts at Old Peak focused on reduction of non-native species through herbicide applications, mowing and planting native species. The North, Central and South management zones (Figure 1) are in different restoration stages, therefore treatments differ between zones.

The North zone underwent its final year of chemical fallow glyphosate treatments and was seeded with a native seed mix in the fall (see Table 2 for species included in the mix) using a Dew Drop Drill (Figure 2). Oxeye daisy flowers were manually removed to reduce seed dispersal. An oak branch fell into the meadow along the western edge and was bucked up and removed (Figure 4).

Figure 2. Rolando Beorchia sowing a native seed mix in the North zone using a Dew Drop Drill on October 6, 2021.

The Central zone was in its second year of chemical fallow and multiple broadcast glyphosate treatments were applied. In the fall, non-native species seedlings were observed and a thick layer of thatch was present, indicating that at least one more year of chemical treatments was necessary prior to introducing a native seed mix. Approximately 10-15 feet into the forest along the western edge of the meadow a patch of false brome was identified and treated with glyphosate.

The South zone had an abundance of desirable native plants, so a more selective strategy was taken to reduce invasive weeds and maintain desirable native forbs and grasses. Spot spray herbicide applications using glyphosate and broadcast herbicide applications using a selective herbicide (clopyralid) were used to reduce invasive species including oxeye daisy (*Leucanthemum vulgare*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), annual fescue (*Vulpia sp.*), dove's-foot geranium (*Geranium molle*), false brome (*Brachypodium sylvaticum*) and tall oatgrass (*Arrhenatherum elatius)*. Oxeye daisy flowers were mowed in June to reduce seed dispersal in the in the South zone.

Shrubs along the eastern edge were observed during each site visit. There was no apparent mortality to the shrubs. However, the wildlife exclosure is in poor condition because overhanging branches fell onto the fence. In addition, some of the posts have fallen or bent causing gaps in the fencing (Figure 3).

Figure 3. Wildlife exclosure with broken fence and bent and/or removed posts.

Figure 4. Rolando Beorchia (IAE) bucking up an Oregon white oak (*Quercus garryana*) limb that fell in the North zone on May 20, 2021.

Table 1. 2021 management actions

Month	Personnel	Action
January	IAE, City, T Mt.	Project partner site visit and Imazapyr treatment efficacy check
April	IAE	Broadcast glyphosate application to North and Central zones. Spot treated with sponge dapper in South zone.
April	IAE	Spot sprayed glyphosate on non-native plants in entire meadow.
May	IAE	Spot sprayed perennial weeds in all zones. Mowed half of South zone with string trimmer. Bucked and removed one wind fallen Oregon white oak (Quercus garryana) from the meadow.
June	IAE	Broadcast clopyralid in South zone. Spot sprayed glyphosate in North and Central zones and on false brome (*Brachypodium sylvaticum)* on western edge of meadow.
June	IAE	Mowed South zone to control oxeye daisy (*Leucanthemum vulgare*)
June	IAE	Broadcast glyphosate on North and Central zones.
October	IAE	Broadcast glyphosate to North and Central zones.
October	IAE	Seeded 16 lbs of a native seed mix in the North zone using a Dew Drop Drill pulled behind an atv.

*Institute for Applied Ecology (IAE); City of Corvallis (City); Trout Mountain (T Mt.)

4. PLANT MATERIALS

In 2021, IAE purchased seed for the North zone to supplement seed ordered in 2020 and 2018. In total, there was approximately 62.5 pounds of seed available for revegetating Old Peak. Sixteen pounds of seed was dispersed in the North zone in 2021 using a Dew Drop Drill pulled behind an ATV (Figure 2). The remainder of the seed will be used in 2022 to seed North and Central zones (Table 2).

Table 2. Old Peak North zone seed mix composition and 2022 seed inventory

Species/Variety	Common Name	2021 North zone mix (lbs)	Seed for 2022
Achillea millefolium	common yarrow	0.17	0.326
Acmispon americanus	American bird's-foot trefoil	2.91	2.110
Aquilegia formosa	western columbine	0.564	4.436
Calochortus tolmiei	Cat's ear	0.389	0.320
Carex pachystachya	chamisso sedge	0.085	0.195
Carex tumulicola	splitawn sedge	0.26	0.000
Clarkia amoena ssp. lindleyi	farewell-to-spring	0.24	0.160
Collinsia grandiflora	large-flowered blue-eyed	0.372	0.728
Danthonia californica	California oatgrass	1	7.400
Elymus glaucus	blue wildrye	0.96	8.840
Epilobium densiflorum	denseflower willowherb	0.2	5.350
Eriophyllum lanatum	woolly sunflower	0.227	1.513
Festuca roemeri	Roemer's fescue	0.509	7.851
Gilia capitata	bluehead gilia	0.187	1.413
Iris tenax	toughleaf iris	3	1.500
Lupinus latifolius	broadleaf lupine	0.69	0.000
Lupinus polyphyllus	small-flowered lupine	1.74	0.000
Madia elegans	showy tarweed	0.78	0.000
Plectritis congesta	shortspur seablush	0.19	0.560
Potentilla gracilis	slender cinquefoil	0.178	0.810
Prunella vulgaris var. lanceolata	common selfheal	0.57	1.490
Ranunculus occidentalis	western buttercup	0.871	0.000
Sidalcea malviflora ssp. virgata	dwarf checkermallow	0.3	0.936
	Total	**16.392**	**45.938**

5. 2022 MANAGEMENT RECOMMENDATIONS

The overarching goal of this project is to restore meadow habitat at Old Peak Meadow by controlling priority invasive species and revegetating with native species. To achieve this goal, the following restoration actions are recommended in 2022:

- Herbicide treatments
    - Spot spray glyphosate on invasive weeds underneath and around shrubs in the spring or summer.
    - Spot spray glyphosate on invasive weeds in North and South zones in spring and summer.
    - Spot spray false brome around edges of the meadow.
    - Broadcast grass specific herbicide on South zone in the spring: one or two treatments as needed.
    - Broadcast glyphosate and/or imapzpyr on Central zone to maintain chemical fallow
- Remove shrub exclosure in the spring or summer.
- Take photopoint photos in the spring.
- Mow South zone in the summer to reduce oxeye daisy seed set. The North and Central zones are newly seeds and fallowed, respectively, therefore, the entire site does not require mowing.
- Broadcast or use a Dew Drop Drill to sow native seed mix in the Central zone in the fall if the ground is prepared (i.e., minimal thatch and non-native species)

6. REFERENCES

Esterson, A. 2018. Old Peak Meadow management history and 5-year management plan. Unpublished report prepared for the City of Corvallis. Institute for Applied Ecology, Corvallis, OR.

Esterson, A. 2019. Old Peak Meadow Habitat Enhancement Project: 2018 Annual Report. Unpublished report prepared for the City of Corvallis. Institute for Applied Ecology, Corvallis, OR.

Vesely, D. 2013. Monitoring songbird populations at the meadow restoration project, Siuslaw National Forest. Unpublished report for the U.S.D.A Siuslaw National Forest. Oregon Wildlife Institute. Corvallis, OR.

APPENDIX A. OLD PEAK MANAGEMENT HISTORY (2009-2021)

Year	Date	Action	Who*
2009-2013	Unknown	Removed over 100 Douglas-fir (*Pseudotsuga menziesii*) from meadow	City/Contractor
	Unknown	Removed lower limbs of conifers along east edge of site	City/Contractor
	Unknown	Placed some of the felled Douglas-fir along the eastern edge for wildlife habitat	City/Contractor
	Unknown	Mowed meadow to reduce tall oatgrass (*Arrhenatherum elatius*) seed production	City
	Unknown	Spot sprayed false brome (*Brachypodium sylvaticum*)	City
	Unknown	Snag creation around heritage trees in the surrounding conifer stand	City
2011-2012	Unknown	Planted 120 trees and shrubs along eastern edge	City
2012	Unknown	Plastic weed barrier put around planted shrubs	IAE
	Unknown	Seedlings watered 2-3 times	IAE
2011-2013	Unknown	Songbird surveys completed	OWI
2014	Unknown	Snag creation	City
	Unknown	Planted community survey	IAE
	Unknown	Prescribed burn	ODF
	Unknown	Grass specific herbicide application to control non-native grasses	IAE
	Unknown	Native seeding	IAE
	Unknown	Spot spray glyphosate to control thistles (*Cirsium* sp.), false brome, fescue (*Vulpia* sp.) and false dandelion (*Hypochaeris radicata*)	IAE
2015	Unknown	Planted 500 shrubs and 20 oak trees	IAE
	Unknown	Built enclosures around shrubs	IAE/City
	Unknown	Planted bulbs, runners and plugs: onion (*Allium amplectens* and *A. acuminatum*), strawberry (*Fragaria virginiana*) and iris (*Iris tenax*)	IAE
	Unknown	Seeded meadow with native seed mix	IAE
	Unknown	Spot sprayed glyphosate to control thistles, false brome, rattail fescue and false dandelion	IAE

Year	Date	Action	Who*
2016	16-Apr	Spot sprayed Poast to control non-native grasses	IAE
	Summer Months	Watered planted shrubs	OHA
	Unknown	Spot sprayed glyphosate to control thistles, false brome, rattail fescue and false dandelion	IAE
2017	21-Mar	Established four photo points; take photo point pictures	IAE
	1-May	Spot sprayed oxeye daisy (*Leucanthemum vulgare*) and foxglove (*Digitalis purpurea*) using clopyralid and glyphosate, respectively	IAE
	10-May	Took photo point pictures	IAE
	10-May	Community data survey	IAE
	15-May	Treated portions of meadow to control oxeye daisy with clopyralid	IAE
	15-May	Spot sprayed glyphosate to control rattail fescue	IAE
	June	Watered planted shrubs	OHA
	June	Spot sprayed false brome using glyphosate	IAE
	20-Jun	Took photo point pictures	IAE
	July	Watered planted shrubs	OHA
	1-Jul	Mowed entire site	City
	August	Watered planted shrubs	OHA
	2-Oct	Spot sprayed oxeye daisy with clopyralid	IAE
2017	6-Dec	Planted chocolate lily *(Fritillaria affinis)* bulbs	IAE
2018	29-Mar	Broadcast fusilade across entire meadow with a boom sprayer mounted on an ATV	IAE
	3-May	Broadcast fusilade across entire meadow using a backpack sprayer mounted on an ATV	IAE
	4-May	Broadcast fusilade across entire meadow using a backpack sprayer mounted on an ATV	IAE
	7-May	Broadcast fusilade across entire meadow using a backpack sprayer mounted on an ATV	IAE

Year	Date	Action	Who*
	16-May	Spot sprayed a 1.5% solution of glyphosate to target oxeye daisy, Canada thistle (*Cirsium arvense*), foxglove, and dove's foot geranium (*Geranium molle*)	IAE
	18-May	Spot sprayed a 1.5% solution of glyphosate to target oxeye daisy, Canada thistle, foxglove, and dove's foot geranium	IAE
	22-May	Spot sprayed a 1.5% solution of glyphosate to target oxeye daisy, Canada thistle, foxglove, and dove's foot geranium	IAE
	31-May	Mowed tall oatgrass and oxeye daisy with string trimmer	IAE
	6-Jun	Mowed tall oxeye daisy with string trimmer	IAE
	28-Jun	Spot sprayed a 1.5% solution of glyphosate to target false brome, oxeye daisy and Canada thistle	IAE
	28-Jun	Mowed entire site	City
	3-Jul	Mowed around shrub enclosures with string trimmer	IAE
	27-Sep	Mowed North zone for imazapyr preparation	IAE
	12-Oct	Imazapyr broadcast application on North zone	IAE
	12-Nov	Broadcast Poast over entire site	IAE
	20-Nov	Spot sprayed glyphosate to oxeye daisy	IAE
2019	10-Jan	Site visit	IAE
	17-Apr	Fusilade application across entire site with boom sprayer	IRM
	17-Apr	Glyphosate application targeting fescues, thistles and oxeye daisy in North zone	IRM
2019	10-May	Fusilade application using a boom sprayer mounted on an ATV in Central and South zones targeting non-native grasses; Glyphosate spot treatment targeting fescues and thistles	IAE, IRM
	4-Jun	Plant community survey	IAE
	24-Jun	Site mow	City

Year	Date	Action	Who*
2020	26-Feb	Site visit	IAE
	10-Mar	Glyphosate application with ATV wand sprayer in North zone; Treated foxglove, bull thistle (*Cirsium vulgare*) and oxeye daisy	IAE
	12-Mar	Glyphosate application with ATV wand sprayer in North zone; Treated foxglove, bull thistle and oxeye daisy	IAE
	28-May	Site visit	IAE
	3-Jun	Glyphosate and clopyralid spot treatment for bull thistle and oxeye daisy	IAE
	15-Jun	Site wide mow	City
	15-Jul	Site visit, photo points	IAE
	22-Jul	Glyphosate spot treatment in North zone targeting false brome along eastern edge; clopyralid spot treated thistles along southern and western edge	IAE
	24-Jul	Partner site visit	IAE, City
	18-Oct	Repair shrub enclosures	OHA
	9-Nov	Site visit to flag zones prior to broadcast spray	IAE
	2-Dec	Imazapyr treatment in North and Central zones; triclopyr applied to edges by enclosures and under tree drip lines	IRM
2021	7-Jan	Project partner site visit and Imazapyr treatment efficacy check	IAE, City, T Mt.
	5-Apr	Broadcast glyphosate application to North and Central zones. Spot treated with sponge dapper in South zone.	IAE
	27-Apr	Spot sprayed glyphosate on non-native plants in entire meadow.	IAE
	20-May	Spot sprayed perennial weeds in all zones. Mowed half of South zone with string trimmer. Bucked and removed one wind fallen oak from the meadow.	IAE
	2-Jun	Broadcast clopyralid in South zone. Spot sprayed glyphosate in North and Central zones and false brome on western edge of meadow.	IAE
	11-Jun	Mowed South zone to control oxeye daisy	IAE
	24-Jun	Broadcast glyphosate on North and Central zones.	IAE
	7-Oct	Broadcast glyphosate to North and Central zones.	IAE
	7-Oct	Seeded 16 lbs of native seed mix in the North zone using a dew drop drill pulled behind an ATV.	IAE

*City of Corvallis (CITY), Institute for Applied Ecology (IAE), Oregon Hunter's Association (OHA), Integrated Resource Management (IRM). Oregon Wildlife Institute (OWI), Trout Mountain (T Mt.)