McGowan Meadow restoration: 2022 annual report

March 2023

Report for Bureau of Land Management, Agreement #L21AC10245 and #L20AC00228

Report prepared by Rolando Beorchia and Andrew Esterson
Institute for Applied Ecology

Institute for Applied Ecology

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.

Questions regarding this report or IAE should be directed to:

Thomas Kaye (Executive Director)
Institute for Applied Ecology
4950 SW Hout St.
Corvallis, OR 97333

phone: 541-753-3099
fax: 541-753-3098
email: info@appliedeco.org

ACKNOWLEDGEMENTS

Funding for this project was provided by the Bureau of Land Management (BLM) Upper Willamette Field Office, Northwest Oregon District. We thank Northwest Oregon District botanist John Klock, Upper Willamette Field Office Botanist Jessica Celis, and Upper Willamette Field Office Forestry Technician Emily Erickson for their commitment to restoration work at this and other sensitive habitats in their field office.

Cover photograph: Bureau of Land Management implementing a prescribed burn on October 19, 2023. Photo taken by Jessica Celis.

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

SUGGESTED CITATION

Beorchia, Rolando and Andrew Esterson. 2023. McGowan Meadow restoration: 2022 annual report. Unpublished report for the Bureau of Land Management, Northwest Oregon District. Institute for Applied Ecology. Corvallis, Oregon. 12 pages plus appendices.

TABLE OF CONTENTS

LIST OF TABLES

McGowan Meadow restoration: 2022 annual report

EXECUTIVE SUMMARY

The Institute for Applied Ecology (IAE) has conducted habitat restoration at McGowan Meadow in partnership with the Bureau of Land Management (BLM) since 2008. In 2022, IAE performed a variety of restoration activities including tree removal, herbicide treatments, mowing, and seeding native species. This was the second full year in which the use of herbicides has been permitted at McGowan Meadow. IAE completed herbicide spot treatments on reed canarygrass (Phalaris arundinacea), false brome (Brachypodium sylvaticum), Himalayan blackberry (Rubus bifrons), and Fuller's teasel (Dipsacus fullonum), removed trees and shrubs to release Oregon white oak (Quercus garryana), maintained open meadow habitat with mowing, and prepared the meadow for a prescribed burn in fall 2022. Burning preparations included removing meadow edge trees and logs from the meadow interior. The BLM implemented a prescribed burn across four of the five North Meadow acres in 2022 and IAE applied a post-burn herbicide treatment and broadcast 72.5 pounds of native seed. South Meadow was mowed since it was not suitable for the prescribed burn. Future restoration activities will include chemical and mechanical weed management, mowing and/or burning to reduce woody vegetation, conifer removal to preserve open meadow habitat and release Oregon white oaks, and revegetation with appropriate native plant materials.

1. INTRODUCTION

McGowan Meadow is a 6.3-acre, regionally rare, mid-elevation wet meadow located in the Cascade foothills northeast of Springfield, Oregon (Figure 1). It is managed by the Bureau of Land Management (BLM) Upper Willamette Field Office, Northwest Oregon District. McGowan Meadow is designated as a BLM Area of Critical Environmental Concern (ACEC) and hosts a diverse community of native species, including a large population of meadow checkermallow (*Sidalcea campestris*), a BLM Species of Concern. Its mid-elevation (2000 ft) makes this site an important refugia for native prairie species that need to shift their ranges in response to climate change in the Willamette Valley.

In 2005, the Native Plant Conservation Program of the Oregon Department of Agriculture (ODA) developed a prairie habitat assessment with management recommendations for McGowan Meadow (Mitchell et al. 2005). The Institute for Applied Ecology (IAE) began working in partnership with the BLM to implement restoration at McGowan Meadow in 2008. This report describes McGowan Meadow restoration activities implemented by IAE in 2022. See Appendix A for a summary of restoration activities conducted by IAE from 2008-2022. Appendix B and Appendix C provide photo point comparisons through time at McGowan Meadow.

Prior to September 2020, manual and mechanical weed removal techniques were the only tools available to maintain the meadow and slow the spread of non-native species. Herbicides have since been approved for use in the BLM Northwest Oregon District, making it possible to remove the weed cloth installed in 2014 at McGowan Meadow and still maintain control of the underlying reed canarygrass (*Phalaris arundinacea*). While manual techniques will still be important for site management, the use of herbicides will result in more efficient and effective control of non-native weeds.

Figure 1. McGowan Meadow site location and project boundary.

2. GOALS AND OBJECTIVES

The purpose of this project is to assist the BLM with maintaining and improving rare mid-elevation prairie habitat in support of the native plant community and meadow checkermallow population at McGowan Meadow. There are five primary objectives of this project:

1. Control high priority invasive plants such as Fuller's teasel (*Dipsacus fullonum*), false brome (*Brachypodium sylvaticum*), Scotch broom (*Cytisus scoparius*), reed canarygrass, and Himalayan blackberry (*Rubus bifrons*)
2. Remove encroaching woody species to preserve open meadow habitat and release Oregon white oaks (*Quercus garryana*)
3. Prepare the site for regular prescribed burning
4. Increase native plant abundance and diversity
5. Maintain and monitor the meadow checkermallow population

3. 2022 RESTORATION ACTIVITIES

To help describe where management actions occur, we split McGowan Meadow into two management units: North Meadow and South Meadow. McGowan Creek Road bisects the two units and acts as a natural delineation between the two.

In 2022, IAE and the BLM removed Douglas-fir (*Pseudotsuga menziesii*) trees, implemented a prescribed burn, broadcast native seed, mowed South Meadow, applied Rodeo (glyphosate) herbicide targeting reed canarygrass, false brome, Fuller's teasel, and Himalayan blackberry, and applied Garlon 3A (triclopyr) herbicide to Himalayan blackberry (Table 1, Figure 2). See Appendix A for a complete list of management actions at McGowan Meadow from 2008-2022. Appendix B is a single photo point comparison from 2021-2022 and Appendix C shows weed cloth installation, removal, and revegetation.

Table 1. 2022 management actions at McGowan Meadow

Date	Personnel*	Management Action
Jan 26	IAE	Visited site to assess need for mowing and to prioritize upcoming tasks in preparation for planned prescribed burn.
Feb 9	IAE, BLM, LMYC	Removed wind-fallen coniferous trees and mowed South Meadow.
Feb 10	IAE, BLM, LMYC	Removed wind-fallen trees, cut three trees of 20" diameter on southern edge, and mowed South Meadow.
May 11	IAE	Treated Himalayan blackberry (*Rubus bifrons*) and Fuller's teasel (*Dipsacus fullonum*) with Rodeo (glyphosate).
Jun 30	IAE	Felled seven Douglas-fir (*Pseudotsuga menziesii*) of 20" diameter in South Meadow, piled limbs and left to dry before fall removal.
Jul 6	IAE	Site visit to check phenology, scout populations for seed collectors, assess restoration progress, collected seed and assessed that no further actions were needed for fall burning preparations. Observed many native species in flower in weed cloth removal area. Meadow checkermallow (*Sidalcea campestris*) was also in flower.
Sep 20	IAE	Treated Himalayan blackberry with Garlon 3A (triclopyr), and collected native seed.
Oct 19	BLM	Implemented a prescribed burn in North Meadow. Added boulders to reduce access points exposed after vegetation burned.
Nov 9	IAE, NCCC	Bucked and removed previously felled trees from South Meadow. Broadcast seed mix to North Meadow.
Nov 10	IAE, NCCC	Bucked and removed previously felled trees from South Meadow. String trimmer mowed the South Meadow. Treated North Meadow with Rodeo (glyphosate).
Nov 11	IAE	Broadcast seed mix to roadsides and North Meadow.

*Institute for Applied Ecology (IAE), Bureau of Land Management (BLM), Lane-Metro Youth Corps (LMYC), AmeriCorps National Civilian Community Corps (NCCC).

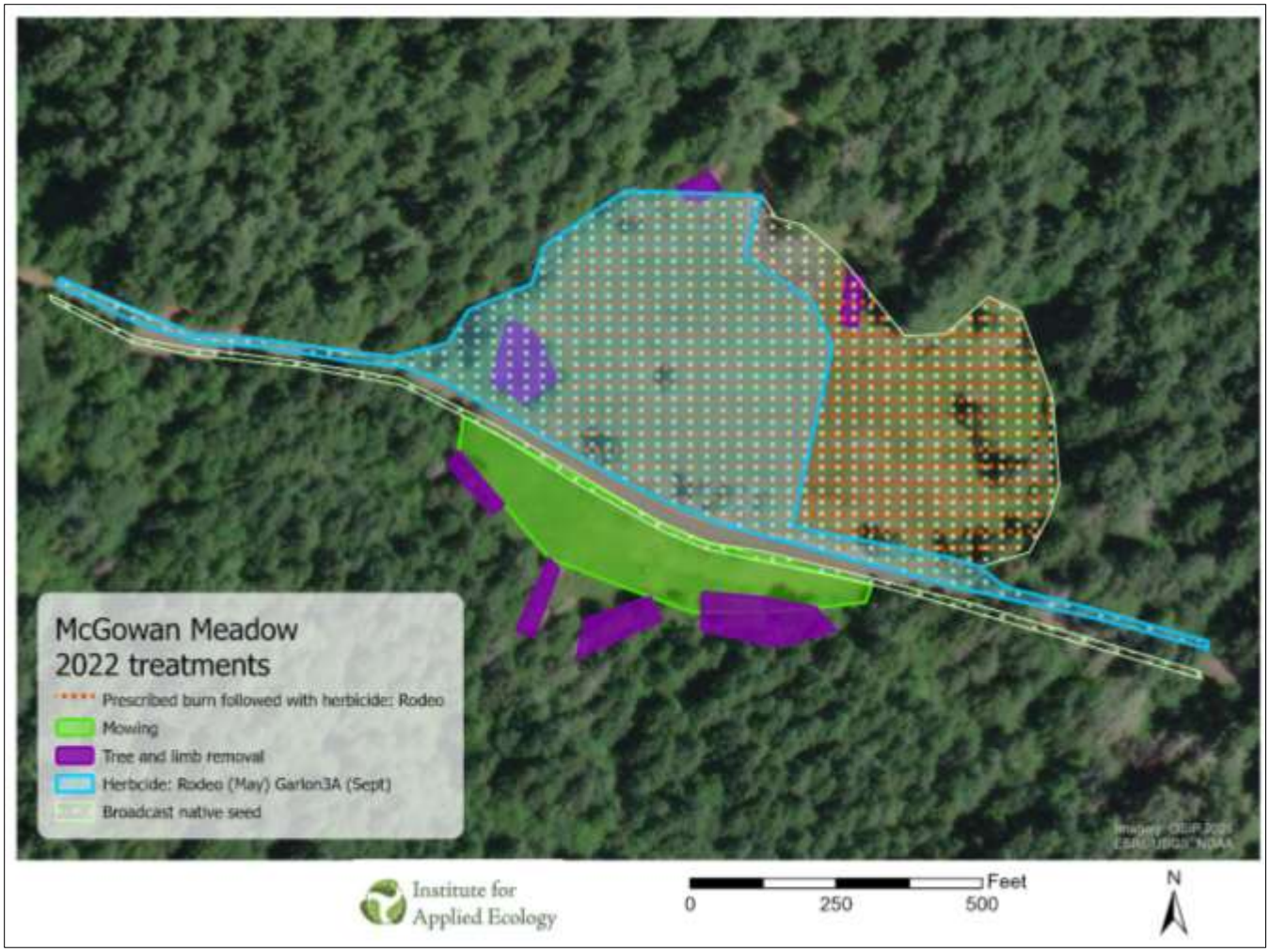

Figure 2. McGowan Meadow 2022 treatment locations.

In February 2022, with help from Lane-Metro Youth Corps (LMYC), IAE removed three Douglas-fir of 20-inch diameter as well as three larger Douglas-fir trees that fell due to winter weather. Rather than creating woodpiles that would slowly decay over decades, IAE and LMYC piled logs along the road for local residents to take home for firewood. Lane-Metro Youth Corps also removed partially decayed logs from within the meadow in preparation for prescribed burning and dispersed the material in surrounding forested areas.

Additionally, IAE and LMYC mowed South Meadow with string trimmers. South Meadow had not been mowed since 2016 whereas North Meadow was previously mowed in 2016, 2019 and 2021(Appendix A). Population monitoring for meadow checkermallow in 2021 revealed a declining population in South Meadow but an increasing population in North Meadow, potentially due to more frequent mowing (Beorchia & Esterson, 2022). Thus, we implemented a mowing treatment in 2022 in South Meadow to replicate conditions in North Meadow.

In May and September, IAE applied Garlon 3A (triclopyr) to Himalayan blackberry to reduce invasive woody presence. In June, IAE cut down seven trees of 20-inch diameter along South Meadow edge to allow more light to reach the meadow. Trees were limbed and left to dry until November when an AmeriCorps NCCC team bucked and piled the logs roadside (Figure 3).

Figure 3. Douglas-fir (*Pseudotsuga menziesii*) logs piled along McGowan Creek Road for local residents to take home for firewood.

Between summer and fall, IAE staff collected native seed that could be sowed following the anticipated fall prescribed burn, targeting species that were in high abundance throughout the meadow. Native fewleaf thistle (*Cirsium remotifolium*) was collected for post-burn seeding with the intention of filling the ecological niche previously occupied by non-native thistles, which have since been removed. Both Oregon geranium (*Geranium oreganum*) and narrowleaf mule's-ear (*Wyethia angustifolia*) bloomed in high abundance this year (Figure 4). Unfortunately, the week before IAE ecologists were able to harvest narrowleaf mule's-ear seed, escaped cattle entered the meadow and ate most of the seed heads.

Figure 4. Narrowleaf mule-ear (*Wyethia angustifolia*) (left) and Oregon geranium (*Geranium oreganum*) (right) in bloom at McGowan Meadow.

In October 2022, the BLM fire crew implemented a prescribed burn across four acres of North Meadow (Cover photograph, Figure 2). Three weeks after the prescribed burn, IAE staff broadcast a native seed mix (Figure 5) and treated sprouting invasive weeds with Rodeo (glyphosate). Diligent spot spraying for invasive weeds in spring 2023 will be necessary to keep false brome from establishing in North Meadow. 2022 seed was purchased collaboratively between the assistance agreements for McGowan Meadow (#L21AC10245) and UWRA Burn (#L20AC00228). The seed purchased by UWRA Burn was a predetermined "burn pile mix" purchased from Heritage Seedlings and Liners Inc. and the rest of the seed mix was developed by IAE to increase plant community diversity, specifically to fill annual forb and

wet species niches (Table 2). In total, the five-acre North Meadow was broadcast with 66 pounds of native seed at a rate of 13 lbs/acre. An additional six pounds of Roemer's fescue (*Festuca roemeri*) was broadcast along the roadsides to compete with non-native weeds that often spread from human traffic.

Figure 5. McGowan seed mix (left) and belly bag seeders filled for broadcasting after prescribed burn (right).

Recreational visitors at McGowan Meadow pose a continual threat to restoration progress at the site. In January 2022, fresh tire tracks could be seen in the meadow and in November 2022, someone cut down a six-inch diameter Oregon white oak with a survivalist pocket saw (Figure 6). To curb these activities in the future, the BLM installed boulders along the roadside to block entry points that became exposed following the prescribed burn. More boulder installations may be necessary if future treatments create additional meadow entryways.

Figure 6. Six-inch Oregon white oak (*Quercus garrayana*) cut down by a McGowan Meadow visitor.

Table 2. 2022 McGowan Meadow native seed mix.

Scientific name	Common name	Burn pile mix† (lbs)	IAE developed mix* (lbs)	Total seed (lbs)
Achillea millefolium	common yarrow	0.19	.37	0.56
Acmispon americanus	American bird's-foot trefoil	3.28		3.28
Amsinckia menziesii	Menzies' fiddleneck	0.845		0.845
Bromus carinatus	California brome		3.75	3.75
Carex densa	dense sedge		.13	0.13
Carex tumulicola	splitawn sedge		.48	0.48
Clarkia amoena ssp. Lindleyi	farewell-to-spring	0.275	.51	0.785
Clarkia purpurea	Winecup clarkia	0.1		0.1
Collinsia grandiflora	large-flowered blue-eyed Mary	0.41		0.41
Collomia grandiflora	large-flowered collomia	1.56	.66	2.22
Danthonia californica	California oatgrass		2.99	2.99
Deschampsia cespitosa	tufted hairgrass		.35	0.35
Downingia elegans	elegant calicoflower		.5	0.5
Elymus glaucus	blue wildrye		1.74	1.74
Eriophyllum lanatum	woolly sunflower	0.57	1.24	1.81
Festuca californica	California fescue		.04	0.04
Festuca roemeri	Roemer's fescue	4.745	6.16*	10.905
Geum macrophyllum	large-leaved avens	0.75	.28	1.03
Gilia capitata	bluehead gilia	7.2		7.2
Iris tenax	toughleaf iris		1.32	1.32
Juncus effusus	soft rush		.05	0.05
Lomatium nudicaule	barestem biscuitroot	0.28	1.32	1.6
Lupinus rivularis	river lupine	9.85		9.85
Madia elegans	showy tarweed	1.055	.495	1.55
Madia gracilis	grassy tarweed	0.46		0.46
Phacelia nemoralis var. oregonensis	Oregon woods phacelia	1.02		1.02
Plagiobothrys figuratus	fragrant popcornflower		.5	0.5
Plagiobothrys nothofulvus	rusty-haired popcornflower		.5	0.5
Plectritis congesta	shortspur seablush		.4	0.4
Potentilla gracilis	slender cinquefoil		.07	0.07
Prunella vulgaris var. lanceolata	common selfheal	1.185	.26	1.445
Ranunculus occidentalis	western buttercup	2.375	.71	3.085
Ranunculus orthorhynchus	straightbeak buttercup		.37	0.37
Rudbeckia occidentalis	western coneflower		.2	0.2
Sidalcea campestris	meadow checkermallow	5.695	.825	6.52
Sidalcea malviflora ssp. virgata	dwarf checkermallow	3.57	.72	4.29
Solidago canadensis	Canada goldenrod	0.085	.06	0.145
	Totals (lbs):	**45.5**	**27.0**	**72.5**
	Five acre meadow pounds per acre:	**9.1**	**4.2***	**13.25***

*Roemer's fescue (*Festuca roemerii)* from the IAE developed mix was broadcast roadside only; †Burn pile mix purchased from Heritage Seedlings and Liners Inc. with money from BLM agreement #L20AC00228.

4. MANAGEMENT RECOMMENDATIONS

The overarching goal of this project is to restore regionally rare, wet meadow habitat at McGowan Meadow by controlling priority invasive species and managing woody encroachment. Cumulatively, the past fifteen years of work at McGowan meadow has achieved much of this goal. Moving forward, we suggest evaluating the desired target levels for recovery and establishing metrics for achieving these targets.

The five primary objectives for McGowan Meadow restoration (see Goals and objectives) have either been met or are requiring less intensive labor than previous years. Controlling high priority invasive plants will need to continue annually as well as monitoring meadow checkermallow every two or three years, but the other three objectives are nearing completion. The removal of encroaching woody species to release Oregon white oaks and preparing the site for prescribed burning are complete, as evident by the BLM implementing a prescribed burn in 2022. The current abundance and diversity of native plants are anecdotally high and McGowan Meadow could serve as a seed collection site for other mid-elevation meadow restoration projects. The habitat assessment and management recommendations provided by Mitchell et al. (2005) lists priorities for initial invasive plant control efforts as Scotch broom, reed canary grass, Canada thistle (*Cirsium arvense*), Himalayan blackberry, one-seeded hawthorn (*Crataegus monogyna*), Fuller's teasel and oxeye daisy (*Leucanthemum vulgare*). Current conditions for these seven species have changed considerably since 2005. Scotch broom and one-seeded hawthorn are rarely seen, Canada thistle is in low abundance, and the very small ($2m^2$) remnant patch of reed canary grass is receiving regular herbicide treatments and will likely be eradicated from the site in the coming years. Fuller's teasel, oxeye daisy and Himalayan blackberry are at moderate infestation levels and will need annual treatments to continue reducing abundance. Additionally, a meadow knapweed (*Centaurea x moncktonii*) patch previously being treated manually and chemically in South Meadow was not observed in 2021 or 2022 and has potentially been eradicated. Separating target invasive species into categories with obtainable metrics can focus efforts to reach a higher level of habitat recovery. The meadow is not currently at a self-sustaining state but could be within a few years. We suggest a conceptual shift for McGowan Meadow, moving from a restoration phase to a maintenance phase. The following maintenance goals are suggested:

1. Eradicate low abundance priority invasive plants: reed canarygrass, Scotch broom, meadow knapweed, one-seeded hawthorn;
2. Reduce high abundance priority invasive plants to below 5% cover: Fuller's teasel, false brome, Himalayan blackberry, cutleaf blackberry (Rubus laciniatus), oxeye daisy;
3. Reduce high abundance non-native grasses to 10% cover
4. Increase meadow checkermallow abundance by 50% (300 total plants);
5. Increase meadow plant community diversity by augmenting species occurring in low abundance.

With these goals in mind, the following restoration actions are recommended for 2023 and beyond:

- Implement a prescribed burn every three years if resources allow. 2025 will be the next prescribed burn year.
    - Following prescribed burns, apply glyphosate herbicide three to four weeks after burning to kill disturbance-loving invasive plants. Following herbicide application, sow a native seed mix at 10-15 lbs per acre to increase native plant species diversity and abundance.
- Mow North and South Meadow every two years to prevent native rose encroachment. The next mowing is recommended for 2024. Since conditions to successfully implement prescribed burns can be unpredictable and the combination of three year burning and two year mowing can get complicated, we suggest assessing in late fall (October/November). If prescribed burning or

mowing did not happen that current year or the previous year, mowing should happen that November.

- Census the naturally occurring population of meadow checkermallow in 2023 and every two to three years after that as resources allow.
- Herbicide treatments:
    - Continue to control and eradicate reed canarygrass by spot spraying with glyphosate in the spring and fall.
    - Spot spray false brome within the meadow and along the forest edge in summer and fall with glyphosate.
    - Spot spray Himalayan blackberry in fall with glyphosate or triclopyr.
    - Spot spray Fuller's teasel in the rosette to bolting stage in spring and fall with glyphosate or clopyralid.
    - Spot spray thistles and meadow knapweed in the bolting to bud stage in spring with clopyralid.
    - Treat roadside invasive plants within ACEC boundary in spring with glyphosate.
- Manual weed removal:
    - Hand-pull priority weeds if they are not treated with herbicide prior to flowering: Fuller's teasel, meadow knapweed, false brome, and Scotch broom. Site visits each year to pull weeds should continue for years to come.
    - Cut and bag inflorescences of Queen Anne's lace (*Daucus carota*), oxeye daisy, and thistles, and remove them from the site if they are not treated with herbicide prior to the flowering stage.
- Revegetate areas disturbed by restoration activities in the fall using a mix of native forb and grass seed. Native prairie species abundance and diversity can also be improved by augmentation with appropriate plugs, bulbs, and bare root plants.
- Evaluate vehicle access and add boulders if needed.

A simplified timeline of these proposed activities for 2023-2025 can be found at the bottom of Appendix A.

5. REFERENCES

Beorchia R. and A. Esterson. 2022. McGowan Meadow Restoration: 2021 Annual Report. Unpublished report prepared for the Bureau of Land Management, Northwest Oregon District. Institute for Applied Ecology, Corvallis, Oregon. 14 pages plus appendices.

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.

McDonald T, Gann GD, Jonson J, and Dixon KW. 2016. International standards for the practice of ecological restoration – including principles and key concepts. Society for Ecological Restoration, Washington, D.C.

Mitchell, K., K. Amsberry and R.J. Meinke. 2005. McGowan Prairie Habitat Assessment and Management Recommendations. Prepared by the Native Plant Conservation Program, Oregon Department of Agriculture for the Bureau of Land Management, Eugene District, CCS – HEP040032.

APPENDIX A: COMPLETED AND PROPOSED MANAGEMENT ACTIONS: 2008-2025

2008

- Site inspection and partner coordination.
- Monitored meadow checkermallow (*Sidalcea campestris*).
- Seed collection of meadow checkermallow and mule's ear (*Wyethia angustifolia*).
- Brush cut Nootka rose (*Rosa nutkana*) and shrubs.
- Mowed 4 acres with front-loaded skid-steer with tracks.
- Felled and removed over 50 trees of various size including Douglas-fir (*Pseudotsuga menziesii*), Oregon ash (*Fraxinus latifolia*), incense cedar (*Calocedrus decurrens*), and English hawthorn (*Crataegus monogyna*).
- Hand pulled Fuller's teasel (*Dipsacus fullonum*), false brome (*Brachypodium sylvaticum*), Scotch broom (*Cytisus scoparius*), and Himalayan blackberry (*Rubus bifrons*).
- Mowed reed canarygrass (*Phalaris arundinacea*).
- Trillium Gardens in Eugene, OR began production of ~500 plugs each of meadow checkermallow, western yarrow (*Achillea millefolium*), Hall's aster (*Symphyotrichum hallii*), tufted hairgrass (*Deschampsia cespitosa*), splitawn sedge (*Carex tumulicola*), aspen fleabane (*Erigeron speciosus*), barestem biscuitroot (*Lomatium nudicaule*), and goldenrod (*Solidago canadensis*) to be planted in 2010.

2009

- Site inspection, partner coordination and public outreach with members of the Native Plant Society of Oregon and meeting attendees of meeting with NW Ecology Group and Central Cascades Adaptive Management Partnership.
- Monitored meadow checkermallow.
- Continued production of ~500 plugs for each of 8 species that began in 2008.
- Hand pulled Fuller's teasel, false brome, Scotch broom, Himalayan blackberry.
- Mowed reed canarygrass.
- Cut and removed of Douglas-fir, incense cedar, and English hawthorn saplings and limbs of larger trees.
- Cut stems of English hawthorn re-sprouting from stumps cut in 2008 and 2009.

2010

- Planted 348 meadow checkermallow in March and monitored survival (100) in July.
- Cut and removed of Douglas-fir (*Pseudotsuga* menziesii) and incense cedar (*Calocedrus decurrens*) saplings and limbs of larger trees.
- Hand pulled Fuller's teasel, Scotch broom, and meadow knapweed (*Centaurea x moncktonii*).
- IAE hired a labor crew to pull false brome.
- Mowed reed canarygrass prior to seed-set.
- Cut stems of English hawthorn re-sprouting from stumps cut in 2008, 2009, and 2010.
- Planted 3,388 native species plugs with dibbles. Species included meadow checkermallow, western yarrow, Hall's aster, tufted hairgrass, splitawn sedge, aspen fleabane, mule's ear (*Wyethia angustifolia*), slender cinquefoil (*Potentilla gracilis*), slough sedge (*Carex obnupta*), common rush (*Juncus effusus*), lance selfheal (*Prunella vulgaris v. lanceolata*), dwarf checkermallow (*Sidalcea malviflora* ssp. *virgata*), and goldenrod.

2011

- Installation of "No Shooting" signs by BLM.
- Monitored meadow checkermallow population and survival of 2010 plantings (64).
- Hand pulled false brome.
- IAE hired a labor crew to remove all Fuller's teasel seed heads.
- Mowed entire meadow with front-loaded skid-steer with tracks.
- To release Oregon white oak (*Quercus garryana*), BLM felled ~50 Douglas-fir trees over 10 inches in diameter. Wood was cut into firewood to be removed from the site in 2012.

2012

- Bucked downed trees and removed wood and piled slash in the forest matrix.
- Seeded disturbed area with native species including western yarrow, Alaska brome (*Bromus sitchensis*), Columbia brome (*Bromus vulgaris*), California oatgrass (*Danthonia californica*), tufted hairgrass, blue wildrye (*Elymus glaucus*), Oregon sunshine (*Eriophyllum lanatum*), California fescue (*Festuca californica*), toughleaf iris (*Iris tenax*), slender cinquefoil, lance selfheal, western buttercup (*Ranunculus occidentalis*), and mule's ear.
- Hand pulled Scotch broom, Fuller's teasel, and meadow knapweed.
- Mowed large forested patch of false brome during flowering.

2013

- Planted slender cinquefoil, western coneflower (*Rudbeckia occidentalis*), and dwarf checkermallow.
- Planted 485 meadow checkermallow.
- Hand pulled false brome, Fuller's teasel, and Scotch broom.
- Mowed false brome with a brush cutter.

2014

- Hand pulling of false brome, Fuller's teasel, and bull thistle.
- Mowed entire meadow with IAE brush mower.
- Placed weed cloth over majority of reed canarygrass patch.

2015

- Repaired weed cloth covering reed canarygrass patch.
- Hand pulled false brome, Fuller's teasel, and bull thistle.

2016

- Repaired weed cloth covering reed canarygrass patch.
- Pulled and removed seed heads from reed canarygrass extending beyond the weed cloth.
- Hand removed of false brome, Fuller's teasel, Queen Anne's lace, and bull thistle.
- Contracted mowing of meadow using a skid-steer in November 2016.

2017

- Fuller's teasel removal.
- Repairing and weeding around and within weed cloth.

2018

- Hand removal of false brome, Fuller's teasel, Scotch broom, reed canary grass, and conifer saplings.
- Monitor and mapping of plant community at McGowan Meadow for the Fire Dependent Ecosystem Project (Fire Resiliency Project).

2019

- Hand removal of Fuller's teasel, false brome, and conifer seedlings and saplings within the meadow and along the meadow-forest edge.
- North Meadow was mowed to reduce effects of woody plant encroachment.
- Mowed around and within weed cloth edge where reed canarygrass was resprouting and repaired weed cloth.
- Removed approximately 24 trees ~20in. diameter and girdled another twelve.

2020

- Hand removal of Fuller's teasel and meadow knapweed.
- Weed whacked reed canarygrass around weed cloth and spot sprayed with glyphosate.
- Spot sprayed false brome, Fuller's teasel, and non-native thistle with glyphosate.
- Removed one tree, ~20" diameter and re-girdled several that were not significantly impacted by initial girdling.

2021

- Removed all weed cloth from the meadow.
- Spot sprayed reed canarygrass, false brome, Himalayan blackberry, and Fuller's teasel.
- Burn preparation:
  - Used a chainsaw to limb 41 trees and removed shrubs from meadow edge.
  - Cutaway Inc. used an auger mounted to a skid steer to grind 32 stumps and remove woody debris from interior of the meadow.
- Mowed Himalayan blackberry and manually removed Scotch broom
- Completed a census of the population of meadow checkermallow.
- Cutaway Inc. mowed North Meadow with a skid-steer in November.
- Broadcasted seed mix to exposed ground from weed cloth removal and disturbed ground from mowing.

2022

- Removed wind fallen trees, cut three trees of 20" diameter on southern edge and mowed South Meadow with Lane-Metro Youth Corps.
- Herbicide treated Himalayan blackberry, and Fuller's teasel with Rodeo (glyphosate).
- Herbicide treated Himalayan blackberry with Garlon 3A (triclopyr).
- Felled seven Douglas-fir trees of 20" diameter in the South Meadow and removed material by scattering limbs in the forest and piling logs for local residents to take.
- Implemented a prescribed burn of North Meadow. Herbicide treated North Meadow with Rodeo (glyphosate). Broadcasted seed on North Meadow and roadsides.

2023 (Proposed)

- March-June: Spot spray reed canarygrass, Himalayan blackberry, false brome, meadow knapweed, Fuller's teasel, and non-native thistle with herbicide. Manually remove inflorescences if not treated prior to flowering.
- June-July: Monitor population of meadow checkermallow.
- Oct-Nov: Broadcast native seed mix to disturbed areas.

2024 (Proposed)

- March-June: Spot spray reed canarygrass, Himalayan blackberry, false brome, meadow knapweed, Fuller's teasel, and non-native thistle with herbicide. Manually remove inflorescences if not treated prior to flowering.
- Oct-Nov: Mow North and South Meadow with deck mower or skidsteer in north and string trimmer in the south.
- Oct-Nov: Broadcast native seed mix to disturbed areas.

2025 (Proposed)

- March-June: Spot spray reed canarygrass, Himalayan blackberry, false brome, meadow knapweed, Fuller's teasel, and non-native thistle with herbicide. Manually remove inflorescences if not treated prior to flowering.
- Oct: Prescribed burn.
- Oct-Nov: Treat invasive weeds with glyphosate 3-5 weeks after prescribed burning.
- Oct-Nov: Broadcast native seed mix to disturbed areas, plant plugs and bulbs if available.

APPENDIX B: PHOTO POINT THROUGH ONE YEAR: 2021-2022

APPENDIX C: WEED CLOTH REMOVAL AND REVEGETATION PHOTOS: 2011-2022

Photopoint monitoring did not occur for weed cloth treatment areas. The following images show the area inundated with reed canary grass (*Phalaris arundinacea*) (Figure 7, 2011), the installation of weed cloth (2014), the aging weed cloth area (2020), the bare ground after removal (2021) and the recent revegetation progress (2022) (Figure 8, Figure 9). The photo sets in Figure 8 and Figure 9 each use a reference tree to orient the reader since the photos are taken from varying locations and angles. The photos looking east (Figure 8) use the Oregon white oak (*Quercus garryana*) circled in black. The photos looking north (Figure 9) use the Douglas-fir (*Pseudotsuga menziesii*) circled in blue. Combined Figures 7, 8 and 9 show the extent of the large "L" shaped weed cloth treatment area over the course of twelve years.

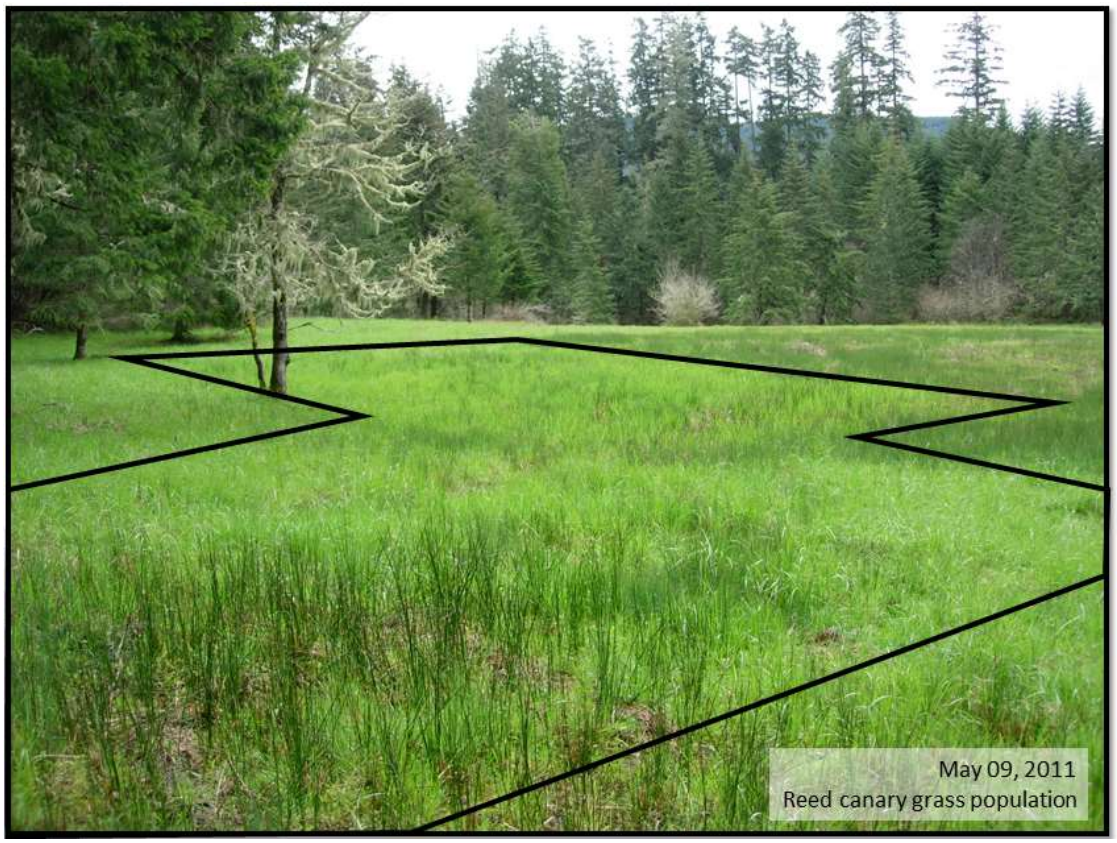

Figure 7. Reed canary grass (*Phalaris arundinacea)* population looking southeast on May 09, 2011 with an overlay to visualize the approximate placement of weed cloth installed 2014.

Figure 8. Weed cloth treatment area looking east from 2014 to 2023.

Figure 9. Weed cloth treatment area looking north from 2014 to 2023.