

# Plants for People: Bringing Traditional Ecological Knowledge to Restoration (2018 Post-Implementation Status and Plant Establishment Report)



07/19/2018

Report for Oregon Watershed Enhancement Board  
(Grant Agreements # 214-3054-10944 & 11262)

Report prepared by Peter Moore and Andy Neill  
*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.



Questions regarding this report should be directed to:

Tom Kaye, Executive Director  
Institute for Applied Ecology  
563 SW Jefferson Ave  
Corvallis, Oregon 97333-4602

phone: 541-753-3099  
fax: 541-753-3098  
email: [tom@appliedeco.org](mailto:tom@appliedeco.org)

## ACKNOWLEDGMENTS

Funding for this project was provided by the Oregon Watershed Enhancement Board (OWEB), Grant Agreement Numbers 214-3054-10944 and 214-3054-11262, and we thank Liz Redon of OWEB for administering the grants. We also thank our partners from Confederated Tribes of Grand Ronde, Oregon Parks and Recreation Department, Oregon Department of Fish and Wildlife, City of Corvallis, U.S. Fish and Wildlife Service and the Corvallis Plant Materials Center for their contributions to the project. Photos in this report were taken by Peter Moore and Andy Neill, unless otherwise stated.

**Cover photograph:** Camas bulbs about to be planted at raised beds at Confederated Tribes of Grand Ronde, October 2015 (Photo: Peter Moore).

## SUGGESTED CITATION

Moore, P. and A. Neill. 2018. Plants for People: Bringing Traditional Knowledge to Restoration (2018 Post-Implementation Status and Plant Establishment Report). Report for Oregon Watershed Enhancement Board (Grant Agreements # 214-3054-10944 and 214-3054-11262). Institute for Applied Ecology, Corvallis, OR. 16 pp. plus appendices.

## TABLE OF CONTENTS

<b>PREFACE</b> .....	<b>II</b>
<b>ACKNOWLEDGMENTS</b> .....	<b>III</b>
<b>SUGGESTED CITATION</b> .....	<b>III</b>
<b>TABLE OF CONTENTS</b> .....	<b>IV</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>1. INTRODUCTION</b> .....	<b>1</b>
Project objectives.....	1
Restoration sites.....	2
Plant material program sites.....	2
<b>2. POST-IMPLEMENTATION &amp; PLANT ESTABLISHMENT ASSESSMENT</b> .....	<b>4</b>
Plant production.....	4
Integrating cultural connection with restoration.....	7
Plant establishment.....	8
<b>3. MAINTENANCE OR MODIFICATIONS SINCE PROJECT COMPLETION</b> .....	<b>11</b>
Prescribed burning.....	11
Invasive species management.....	11
Planting.....	13
<b>4. COST ACCOUNTING</b> .....	<b>14</b>
<b>5. PUBLIC AWARENESS</b> .....	<b>14</b>
<b>6. LESSONS LEARNED</b> .....	<b>15</b>
<b>7. LITERATURE CITED</b> .....	<b>15</b>
<b>8. APPENDICES</b> .....	<b>17</b>
Appendix 1. Herbert Farm and Natural Area Photo Points (2013-2018).....	17
Appendix 2. Champoeg State Park Photo Points (2013-2018).....	29

# Plants for People: Bringing Traditional Ecological Knowledge to Restoration (2018 Post-Implementation Status and Plant Establishment Report)

## EXECUTIVE SUMMARY

The Plants for People project was funded by Oregon Watershed Enhancement Board (OWEB; Grant # 214-3054-10944 and 214-3054-11262). The restoration grant was completed in 2016 and the plant establishment grant continues into 2019. This report summarizes post-implementation and plant establishment activities during 2017-18. Phase II of the project has also been funded by OWEB, and allowed the enacting of the Tribal Plant Materials Development Plan at Confederated Tribes of Grand Ronde (CTGR), including partially funding a nursery manager, maintaining the nursery and expanding plant production to new species. Continued restoration at Herbert Farm and Natural Area and Champoeg State Park has included invasive weed control and prescribed burns prior to planting native seed. Prairie and riparian monitoring and photo points are tracking the establishment of native vegetation at these sites. Public outreach included harvesting bulbs and propagation workshops at CTGR and a volunteer planting day at Herbert Farm.

## 1. INTRODUCTION

The Plants for People project integrated native plant production, culturally important plant species, and traditional ecological knowledge into restoration at two Willamette Valley sites in 2014-16 and was summarized in Moore and Neill (2017). Seeds and bare root of culturally important plant species were collected and put into production in seed increase fields, raised beds and shrub cutting beds at Confederated Tribes of Grand Ronde (CTGR) and other nurseries. Restoration at Herbert Farm and Natural Area and Champoeg State Park included herbicide treatments, mowing, and a prescribed burn to prepare sites for planting and manage weeds. Diverse native seed mixes, bare root forbs, trees, and shrubs were planted at the restoration sites. Tribal elders contributed knowledge about traditional uses and restoration plans and a Tribal Native Plant Materials Program Development Plan (Currin et al. 2016) was created to guide plant production at CTGR.

This project is funded by the Oregon Watershed Enhancement Board (OWEB) with a Restoration Grant (# 214-3054-10944) for a three year period (May 16, 2014 to December 30, 2016) and a Plant Establishment Grant (#214-3054-11262) which will be completed April, 30 2019. This report combines post-implementation project status and plant establishment activities for the two grants during 2017-18.

### **Project objectives**

The objectives of the Plants for People project were to:

- Integrate traditional ecological knowledge with standard restoration practices to restore prairie and riparian habitats and create harvesting and demonstration areas at two culturally important restoration sites: Champoeg State Park and Herbert Farm and Natural Area (Figure 1).
- Establish a Tribal Native Plant Materials Program at CTGR, with additional production at the Natural Resources Conservation Service's (NRCS) Plant Materials Center (PMC).

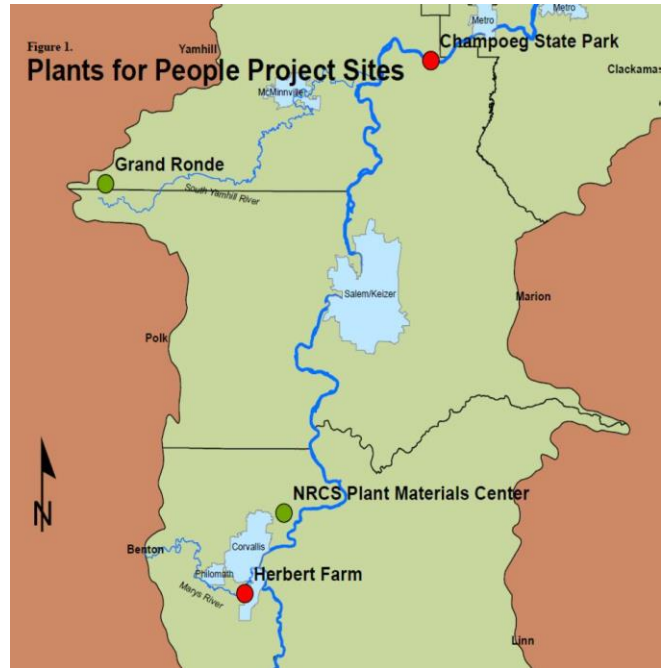
## Restoration sites

### Herbert Farm and Natural Area

Herbert Farm and Natural Area (Herbert Farm) is a 221 acre property south of Corvallis in Benton County (Figure 1). It is owned by City of Corvallis (City) and has an Oregon Department of Fish and Wildlife (ODFW) conservation easement through the Willamette Wildlife Mitigation Program (City of Corvallis 2011). IAE has been working with partners since 2013 to restore a range of habitats in Phase I areas west of Matt Creek (Menke et al. 2013), and since 2015 has been restoring areas east of Matt Creek (Moore 2017). The Plants for People project targeted restoration in Phase I areas, helping to restore former agricultural land to riparian forest (29 acres) and prairie habitats (39 acres) (Figure 2).

### Champoeg State Park

Champoeg State Park (Champoeg) is a 615 acre property adjacent to the Willamette River, near Newberg in Marion County, and is managed by Oregon Parks and Recreation Department (OPRD) (Figure 1). IAE has been helping restore 45 acres of native prairie habitat (Axt 2014), including 7.9 acres of forb introduction plots, since 2013 (Figure 3).



**Figure 1.** Plants for People project sites. Red dots indicate restoration sites. Green dots indicate plant materials production sites.

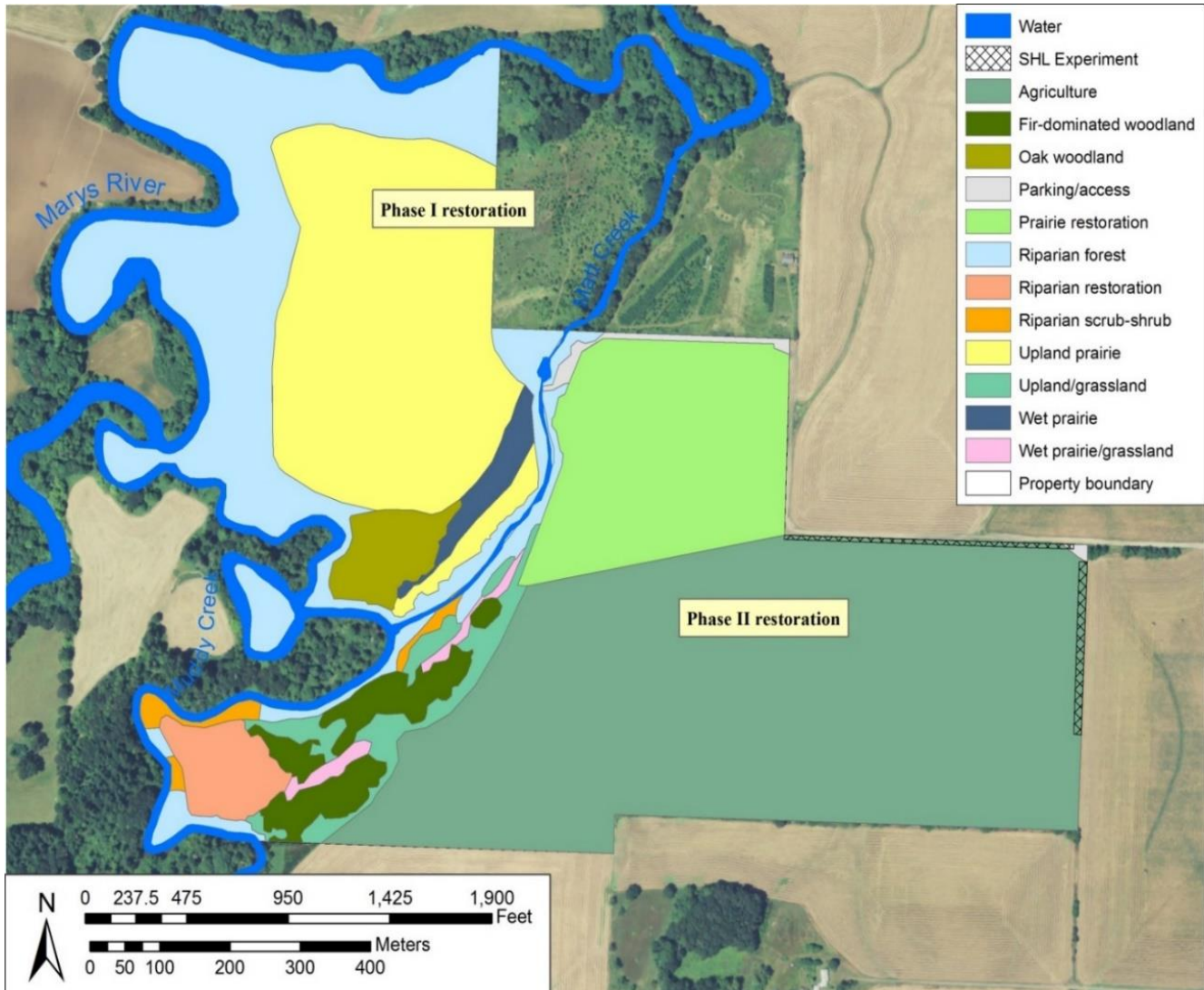
## Plant material program sites

### CTGR Natural Resources Department

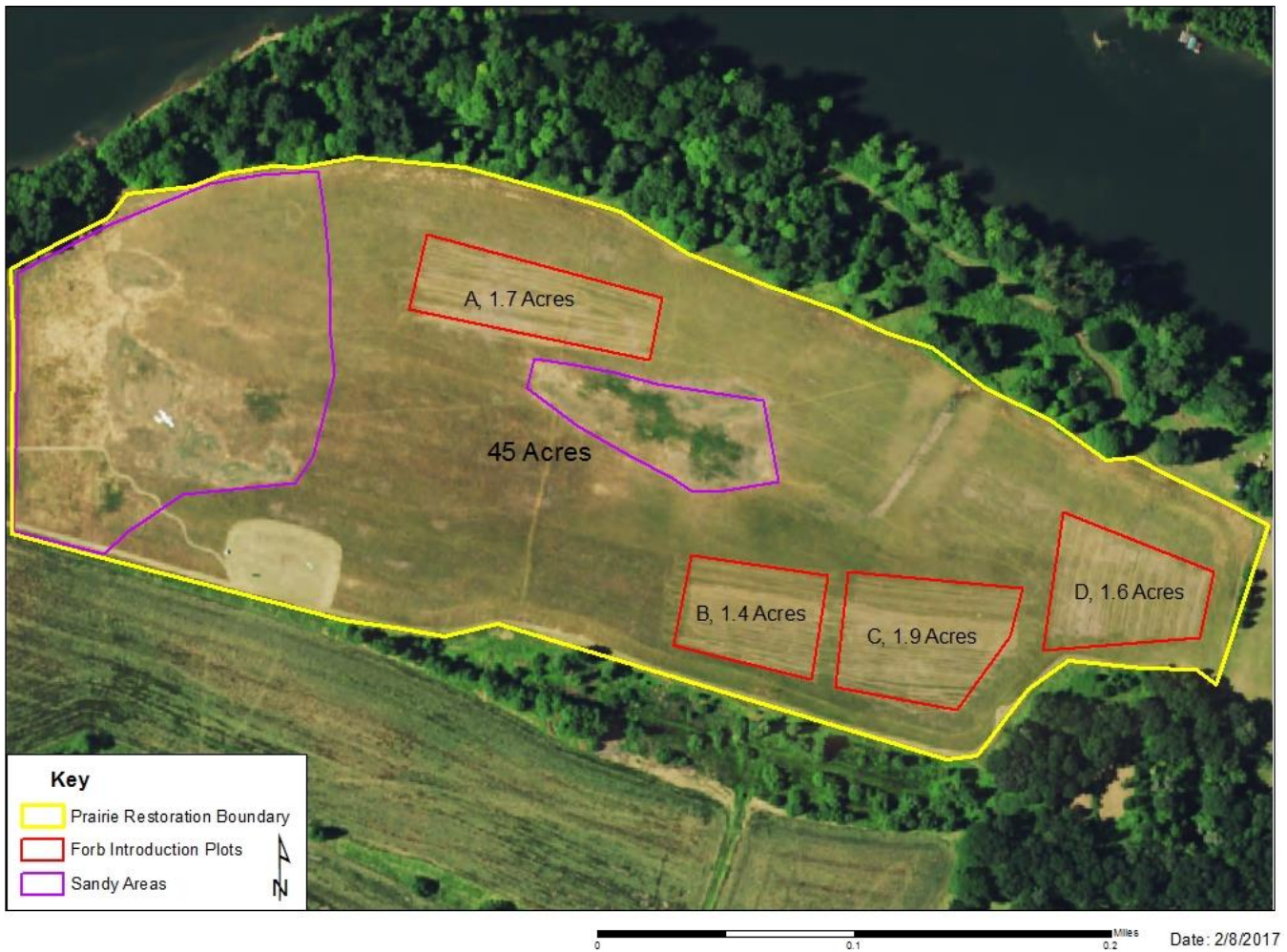
The Natural Resources Department of CTGR is located near Grand Ronde in Yamhill County (Figure 1) and was the location for new plant production beds.

### Corvallis Plant Materials Center

The Plant Materials Center (PMC), near Corvallis (Figure 1), was the location for a seed production bed and the source of some plant materials. PMC staff also provided advice on plant production.



**Figure 2.** Current habitats at Herbert Farm and Natural Area in 2016. The Plants for People project targeted restoration in Phase I restoration areas, west of Matt Creek.



**Figure 3.** Map of prairie restoration areas at Champoeg State Park. Red polygons show the location of forb introduction plots.

## 2. POST-IMPLEMENTATION & PLANT ESTABLISHMENT ASSESSMENT

Many of the project elements have continued during Phase II of the Plants for People project (funded by OWEB Grant #217-3037-14328), including maintenance and expansion of the nursery at CTGR and plant production, continued restoration at Herbert Farm and Champoeg State Park, and new restoration at three CTGR restoration areas.

### Plant production

The ongoing success of plant production during Phase I of the Plants for People project and development of the Tribal Plant Materials Development Plan has provided CTGR with structure and guidance for expanding the program. The CTGR plant materials program has expanded to include a greenhouse and new species for restoration at other CTGR project sites. Plant materials harvested through this program have provided materials for cultural events, as well as restoration projects. IAE was able to secure funds from OWEB for Phase II of the project, which includes partially funding a nursery manager, maintaining the nursery and expanding plant production to new species.



## Seed production beds

- Coast tarweed (*Madia sativa*): A 0.2 acre production bed of coast tarweed was sown in the fall of 2015 and 10 pounds of seed was harvested from this field before it was discontinued in 2016. The production seed is currently in cold storage at PMC.
- Cow parsnip (*Heracleum lanatum*): a production bed was created at CTGR in spring 2016. The first seed harvest of 2.3 pounds from this field in 2017 was a year earlier than expected (Figure 4, Table 1).
- Barestem biscuitroot plugs were grown at PMC in 2016, and were used in 2017 to establish a seed production field at IAE's farm near Buena Vista, Oregon. This field is shared with the Willamette Valley Native Plant Partnership (WVNPP), and CTGR will receive a future share of seed from this field as part of the Plants for People project.
- Two new seed production fields will be shared with WVNPP. Plugs of Oregon iris (*Iris tenax*) will be installed at IAE's farm in fall 2018 and narrowleaf onion (*Allium amplexans*) wild seed is currently being collected to use to establish a seed production field of this species.



**Figure 4.** Cow parsnip bed and harvest of seed at Confederated Tribes of Grand Ronde in 2017. Photos by Peter Moore and Jeremy Ojua.

## Raised Beds

Two 60' x 5' raised beds at the Natural Resources Department headquarters at CTGR have continued to be highly successful growing large camas (*Camassia leichtlinii*) in one bed (Figure 5) and Gairdner's yampah (*Perideridia gairdneri*) in half of the second bed, allowing harvest of seed and bulbs/roots for restoration in each year since 2016.

With the exception of Tolmie star-tulip (*Calochortus tolmiei*), the remaining three species have grown well in the second half of the second raised bed (Figure 5, Table 1); however, management of the bed has become problematic with yampah spreading by seed through the rest of the bed. Most likely, in the future, the crown brodiaea (*Brodiaea coronaria*), narrowleaf onion (*Allium amplexans*) and barestem biscuitroot will be transplanted elsewhere, and the bed will be devoted to production of yampah.



**Figure 5.** Spring growth of camas (left) and other species, such as crown brodiaea (middle) and narrowleaf onion (right) in raised beds in Grand Ronde in 2017.

### Cutting beds

Two 60' x 5' cutting beds have been used to propagate six native shrub species (Table 1). Pacific willow (*Salix lucida*) has been the most successful (Figure 6), followed by redosier dogwood (*Cornus sericea* ssp. *sericea*) and Pacific ninebark (*Physocarpus capitatus*). The three other species did not survive well, probably in part due to the site being too wet during the winter.



**Figure 6.** Pacific willow cutting bed at the Natural Resources Department in Grand Ronde, February 2018.

**Table 1.** Plant material production for the Plants for People project in 2017.

<b>Bed Type</b>	<b>Common name</b>	<b>Species</b>	<b>Location of bed</b>	<b>Harvest in 2017</b>
<b>Seed production bed</b>	Coast tarweed	<i>Madia sativa</i>	PMC	Field discontinued
	Cow parsnip	<i>Heracleum lanatum</i>	CTGR	2.3 lb seed
	Barestem biscuitroot	<i>Lomatium nudicaule</i>	IAE farm	0
<b>Raised Bed</b>	Gardner's yampah	<i>Perideridia gairdneri</i>	CTGR	23 oz seed + 200 roots
	Large camas	<i>Camassia leichtlinii</i>	CTGR	23 oz seed + 320 bulbs
	Tolmie star-tulip	<i>Calochortus tolmiei</i>	CTGR	0
	Crown brodiaea	<i>Brodiaea coronaria</i>	CTGR	8.8 oz seed
	Narrowleaf onion	<i>Allium amplexans</i>	CTGR	1.9 oz seed
	Barestem biscuitroot	<i>Lomatium nudicaule</i>	CTGR	28 oz seed
	<b>Cutting bed</b>	Lewis' mock orange	<i>Philadelphus lewisii</i>	CTGR
Pacific ninebark		<i>Physocarpus capitatus</i>	CTGR	0
Redosier dogwood		<i>Cornus sericea sericea</i>	CTGR	0
Pacific willow		<i>Salix lucida</i>	CTGR	0
Ocean spray		<i>Holodiscus discolor</i>	CTGR	0
Indian plum		<i>Oemleria cerasiformis</i>	CTGR	0

## Integrating cultural connection with restoration

In 2017 project partners began planning for a cultural event and planting day in fall 2018 at Champoeg State Park. The goal of the event is to engage tribal members in restoration at Champoeg, focusing on an area proposed for future traditional harvesting of cultural species by tribal members. In addition, a harvest plan for cultural plants at Champoeg is being prepared as part of Phase II of the Plants for People Project.

Prescribed fire, a valuable tool used by Native Americans to manage the land and native vegetation in pre-European settlement times, was used to manage prairie habitat at Herbert Farm and Champoeg during 2017 (see Section 3).

Bulbs and roots were harvested from the nursery at Grand Ronde and planted by IAE volunteers and tribal staff at Herbert Farm (see Section 3).

## Plant establishment

### Prairie monitoring at Herbert Farm

Prairie monitoring was conducted in June 2017 (Menke 2017) for the City of Corvallis to comply with its obligations under the Benton County Prairie Species Habitat Conservation Plan (Benton County 2010). Twenty-five plots (2m x 2m) were sampled for community composition and cover in Phase I prairies. This data provides a comparison with pre-project monitoring that was conducted in 2013 (Menke and Moore 2013). Results of the reports are summarized below and in Table 2 to provide perspective on the progress of restoration.

**Table 2.** Vegetation cover in monitored plots in Phase I prairies at Herbert Farm in 2013 and 2017.

Area	# of plots	Percent (%) Vegetative Cover (Absolute)							
		2013				2017			
		Native	Exotic	Shrub/ tree	Thatch/ litter	Native	Exotic	Shrub/ tree	Thatch/ litter
Upland (2 acres)	5	33.4	51.6	9.4	9.8	21.5	66.7	16.1	17
Wet prairie (2 acres)	5	15.3	79.7	1.6	8	47.9	57.1	0	5.6
Upland prairie and wet swales (37 acres)	15*	0	89.7	0	1	83.2	10.4	0	13.4

\*Field was a monoculture of annual ryegrass so only 3 of the 15 plots were sampled in 2013.

In the two-acre upland prairie, there was a decrease in native cover and encroachment by native shrubs between 2013 and 2017 (Table 2). Increases in cover of exotic species may be a result of annual mowing being too late in the season to limit seeding, and the limited amount of herbicide control, due to presence of threatened species. It is possible that native composition may improve over the next few years, as seed sown after the prescribed burn in fall 2016 becomes established. Augmentation of the populations of Nelson's checkermallow (*Sidalcea nelsoniana*), Kincaid's lupine (*Lupinus oregonus*) and peacock larkspur (*Delphinium pavonaceum*) has expanded their distribution.

The two-acre wet prairie increased in native cover from 15% to almost 50% over four years. This area was broadcast with herbicide in 2014-2015 and seeded with native species in fall 2015. The main native components are tufted hairgrass (*Deschampsia cespitosa*) and meadow barley (*Hordeum brachyantherum*), both of which were included in the 2015 seed mix.

The newly restored 37-acre prairie increased from zero to 83% native cover in four years, since the former agriculture field was in chemical fallow in 2013-2014, and seeded with native species in 2014, 2015 and 2016. Common native forbs include showy tarweed (*Madia elegans*), Oregon sunshine (*Eriophyllum lanatum*), Puget Sound gumweed (*Grindelia integrifolia*), and Scouler's popcornflower (*Plagiobothrys scouleri*), and common native grasses include tufted hairgrass, Roemer's fescue (*Festuca roemerii*), and meadow barley. Introduced grasses are patchy in distribution but include annual (Italian) ryegrass (*Lolium perenne* ssp. *multiflorum*), colonial bentgrass (*Agrostis capillaris*) and creeping bentgrass (*Agrostis stolonifera*).

In 2018, it was visually apparent that the native vegetation had shifted from annuals, such as the tarweed that dominated much of the prairie in 2017, to a greater prevalence of perennials, such as Oregon sunshine (Figure 7).



**Figure 7.** Showy tarweed (left) was common in restored upland in July 2017, while Oregon sunshine (right) increased its presence in the same area in May 2018.

### **Riparian monitoring at Herbert Farm**

In the riparian areas in Phase I, trees and shrubs were planted in 28 acres in March 2015 and inter-planted in the same area in February 2016. Monitoring of riparian plots (Moore *et al.* 2017) was summarized in the final Plants for People project report (Moore and Neill 2017). Counts of a subsample of surviving trees and shrubs have also been made on 17 non-random transects (Table 3). First year survival in 2015 was low because of an early drought in spring and summer of 2015. The additional planting in 2016, coupled with higher survival, resulted in some recovery in numbers by August 2017. The resulting density at two transects in August 2017 was 268 stems per acre in low density areas and 1249 stems per acre in high density plantings. As plants establish they have grown above the competing grasses and bushed out, particularly in the lower elevation areas which retain more moisture during the summer than the adjacent uplands (Figure 8). For comparison, a small sample of trees and shrubs that were planted in February 2017 in the new Phase II riparian area were evaluated in August 2017. The survival during the first growing season was double that observed in the Phase I riparian plantings during 2015. This may reflect higher than average rainfall in spring 2017.



**Figure 8.** Low density (left) and high density (right) riparian plantings at Herbert Farm in May 2018.

**Table 3.** Total counts of trees and shrubs from 17 transects in Phase I riparian areas and two transects in Phase II riparian areas at Herbert Farm 2015-2017.

Date (Action)	Estimated number of live stems (and % survival) per planting density category				Comment
	Phase I			Phase II	
	Low density (7 acres)	High density (21 acres)	Total	High density (4.5 acres)	
March 2015 (planted)	264	691	955	n/a	Original number planted
November 2015 (monitored)	145 (55%)	263 (38%)	408 (43%)	n/a	Number survived first growing season
February 2016 (planted)	~66	~173	~239	n/a	Approximately 25% additional trees were inter-planted into the Phase I areas
<b>Total planted</b>	<b>~330</b>	<b>~864</b>	<b>~1194</b>	<b>n/a</b>	
August 2016 (monitored)	200 (~61%)	490 (57%)	690 (58%)	n/a	Total counted from 2 cohorts
February 2017 (planted)	n/a	n/a	n/a	195	
August 2017 (monitored)	222* (67%)	407 (47%)	629 (53%)	176 (90%)	

\* The increase in survival in the Phase I low density area from August 2016 to August 2017 is most likely due to monitoring staff missing live stems in August of 2016 (i.e. stems appeared to be dead but recovered) and/or subsampling error.

### Prairie monitoring at Champoeg State Park

Many of the species seeded and planted in the four forb introduction areas have become established and were observed flowering in 2017 and 2018. Specifically, Oregon sunshine, farewell-to-spring (*Clarkia amoena*), common yarrow (*Achillea millefolium*), slender cinquefoil (*Potentilla gracilis*), common selfheal (*Prunella lanceolata*) and American bird's foot trefoil (*Acmispon americanus*) were flowering in all four forb introduction areas. Many of the other forbs have been observed flowering in some or all four blocks but in lower abundances. Sedges, rushes and western goldenrod (*Solidago lepida* var. *salebrosa*) have not been observed, although these species can be slow-growing and might remain obscured by the abundance of tufted hairgrass. The prescribed fire that was conducted in 2017 could stimulate viable seeds in the seed bank and additional forb species could emerge during subsequent growing seasons. Prairie restoration at Champoeg State Park continues and planting and seeding of forbs and grasses is planned for fall 2018 and fall 2019 with funds from OPRD and other restoration grants.

### Photo points

Ten photo points were established in Phase I areas of Herbert Farm and four photo points were established at Champoeg. Photographs were taken in multiple directions at each point annually at similar times of year. Sample photographs are shown in the appendices and a full set of photos is held on IAE files.

### 3. MAINTENANCE OR MODIFICATIONS SINCE PROJECT COMPLETION

#### Prescribed burning

A prescribed burn of the 45-acre prairie at Champoeg State Park was conducted by a fire crew from the CTGR Natural Resources Department in late September 2017 (Figure 9).

A prescribed burn was conducted by the Corvallis Fire Department at the 37-acre restoration prairie at Herbert Farm in early October of 2017 (Figure 9).



**Figure 9.** Staff from Confederated Tribes of Grand Ronde conducting a prescribed burn at Champoeg State Park on September 28, 2017 (left) and a prescribed burn at Herbert Farm on October 4, 2017 (right, photo Michel Wiman).

#### Invasive species management

IAE staff, subcontractors and partners conducted spot spray herbicide treatments, mowing, and hand weeding in prairie and riparian habitat project areas at Herbert Farm (Table 4) and Champoeg (Table 5) during 2017 and 2018 to manage introduced broadleaf and grass weeds or reduce thatch (Figure 10). For example, weed treatments continue in the prairies to control thistles (*Cirsium arvense* and *C. vulgare*), tansy ragwort (*Jacobaea vulgaris*), and velvetgrass (*Holcus lanatus*). These efforts were mainly funded by grants from ODFW and OPRD, but OWEB plant establishment grant funds contributed to IAE staff time. Partners, including ODFW, U.S. Fish and Wildlife Service (USFWS), the City of Corvallis, and OPRD continued to conduct complementary actions such as herbicide treatments and mowing throughout the reporting period (Figure 10, Table 4, Table 5).

**Table 4.** Schedule of restoration actions that occurred in Phase I areas of Herbert Farm and Natural Area in 2017-18.

Year	Habitat	Riparian forest	Upland prairie	Woodland	Wet prairie	Upland prairie
	acres	29	37	4	2	2
	Plants for People Phase I project acreage	29	37			2
	Funder	ODFW, OWEB	ODFW, OWEB	ODFW	ODFW	ODFW, OWEB
2017	April				Plant milkweed	Plant Kincaid's lupine plugs
	May	Spray riparian rows	Spot spray Monitor veg plots		Monitor veg plots	Monitor veg plots
	June	Hand mow high density rows, tractor & hand mow low density rows. Photopoints	Photopoints Spot spray		Photopoints Spot spray	Photopoints
	July	Spot spray, photopoints	Planning for burn, photopoints			
	August		City mow fire line ODFW mow prairie	City: mow	City: mow	City: mow
	September	Spot spray	City Fire: Prescribed burn			Spot spray
	October	Spot spray	USFWS: drill seed, incl. Kincaid's lupine & Golden paintbrush; hand seed wet swales			
	November		Plant bare root materials			
2018	March		Plant Kincaid's lupine plugs			Plant Kincaid's lupine plugs
	April	Spray HD and LD rows				
	May	Hand mow HD, tractor & hand mow LD	Spot spray		Spot spray	Spot spray
	June	Spot spray, photopoints	Spot spray, photopoints	Spot spray, photopoints	Spot spray, photopoints	Spot spray, photopoints



**Table 5.** Schedule of restoration actions at Champoeg State Park in 2017 and 2018

Year	Season	Habitat type		
		Forb introduction plots (6.6 acres)	Grassy meadow (27.4 acres)	Sandy areas (11 acres)
2017	Spring (Mar-May)	Weed assessments and spot spray	Weed assessments and broadcast spray with broadleaf specific	Weed assessments and broadcast spray of glyphosate
	Summer (Jun-Aug)	Spot Spray	Spot Spray	Spot Spray
	Fall (Sep-Nov)	Prescribed burn and broadcast seeding of forbs	Prescribed burn and broadcast seeding of forbs	Prescribed burn, mow and broadcast seeding of grasses
2018	Spring (Mar-May)	Weed assessments and spot spray	Weed assessments and spot spray	Weed assessments
	Summer (June)	Weed assessments and spot spray	Weed assessments and spot spray	Weed assessments and spot spray



**Figure 10.** A crew member from R. Franco Restoration mowing riparian rows at Herbert Farm in June 2017 (left) and Oregon Department of Fish and Wildlife staff mowing the restoration prairie at Herbert Farm in September prior to the prescribed burn (right).

## Planting

The prescribed burns at Herbert Farm and Champoeg reduced thatch and exposed soil for sowing native seed in the fall of 2017.

## Champoeg State Park

Grass seed had been purchased previously with Plants for People OWEB funds (Moore and Neill 2017) and held in storage until the prescribed burn could be conducted at Champoeg in 2017. The grass seed was broadcast in the sandy areas of the prairie (Figure 3) in October 2017.

## Herbert Farm and Natural Area

A forb-grass mix, including seed of Kincaid's lupine and golden paintbrush (*Castilleja levisecta*), was seeded with a no-till drill or broadcast over the 37-acre restoration area at Herbert farm in October 2017.

The Plants for People project held a volunteer planting day at Herbert Farm on November 3, 2017 and 1120 great camas, 250 other bulbs, 200 Gairdner's yampah, and 394 showy milkweed (*Asclepias speciosum*) were planted. Three hundred and twenty camas bulbs and the yampah roots were harvested from the CTGR nursery for the event.

## 4. COST ACCOUNTING

\$1,320 was allocated from the restoration grant for post-implementation reporting. \$475 was expended on conducting photo points and reporting in 2018.

Of the plant establishment budget, \$1,866 is available for restoration, monitoring and project reporting. \$361 was expended on project reporting in 2018.

Phase II of the Plants for People project is being funded by OWEB and is building on the work achieved in Phase I at the CTGR nursery, and restoration at Herbert Farm and Champoeg State Park. IAE also is conducting ongoing restoration at these sites through grants from ODFW, OPRD and USFWS and in-kind contributions are also provided by these partners, as well as by the City of Corvallis and CTGR.

## 5. PUBLIC AWARENESS

The nursery at CTGR has grown into an educational resource for tribal members. Jeremy Ojua, the nursery manager, hosted several visits by school children during 2017, including the Chinuk wawa language immersion class, who were learning about the importance of camas in their culture.

The children also participated in a harvest of 320 camas bulbs and 200 Gairdner's yampah from the nursery and these were planted as part of the volunteer planting day at Herbert Farm in November 2017. Both events were described in an IAE web story <https://appliedeco.org/tribal-nursery-raises-plants-and-awareness/> and on IAE's Facebook page <https://www.facebook.com/Applied.Ecology/>.

A series of native plant propagation workshops were jointly run by IAE and CTGR in February 2018. School children from the tribal community learned how to plant bulbs, sow native seed and plant tree cuttings, as well as learn about some of the traditional cultural uses of the plants (Figure 11). See IAE web story at <https://appliedeco.org/children-learn-culture-through-growing-plants/> and Smoke Signals article: <https://www.grandronde.org/news/smoke-signals/2018/02/28/program-plants-seeds-of-cultural-knowledge-in-youth/>

Peter Moore (IAE) and Jeremy Ojua (CTGR) gave a joint presentation on the Plants for People project to the Cascadia Prairie Oak Partnership conference, held in Eugene in April 2018.



**Figure 11.** Confederated Tribes of Grand Ronde school children learn how to plant and grow culturally important species such as camas during workshops in February 2018.

## 6. LESSONS LEARNED

Starting a new nursery has its challenges, but the pilot program at CTGR started during this project was very successful. It is important to seek advice from plant propagation experts – we received invaluable native plant propagation information from Amy Bartow and Tyler Ross from PMC and Lynda Boyer from Heritage Seedlings, Inc. which helped set the framework for success of the plant materials program at CTGR. The Tribal Native Plant Materials Development Plan provided the basis for buy-in from the Tribal Council, through the approval of the plan, and set the expansion of the nursery into motion.

The elder visits to restoration sites in 2014 were an important opportunity for incorporating traditional knowledge into restoration. Valuable discussions were started about accessibility to traditional harvesting areas, use of herbicides, and re-connecting the tribal community to culturally important sites. With time, this improved connection will lead to more sites being available for cultural harvest. These discussions have continued in 2018 through planning for a cultural event and a harvesting plan for Champoeg State Park.

## 7. LITERATURE CITED

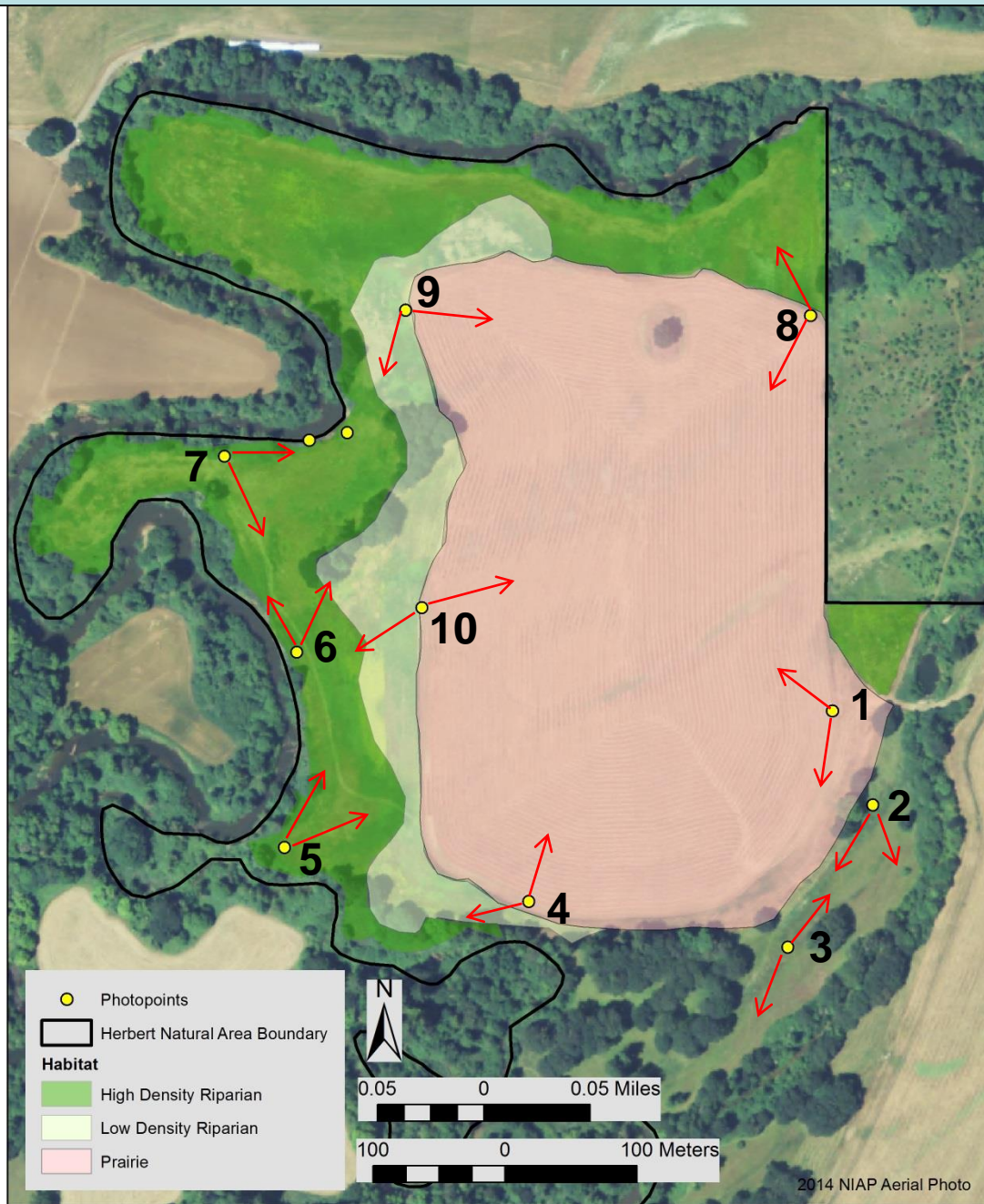
- Axt, B. 2014. Champoeg Prairie Restoration Plan. Prepared for Oregon Parks and Recreation Department. Institute for Applied Ecology. Corvallis, Oregon. 18 pp. + appendices.
- Benton County. 2010. Prairie Species Habitat Conservation Plan. 160 pp plus appendices. [www.co.benton.or.us/parks/hcp](http://www.co.benton.or.us/parks/hcp).
- City of Corvallis. 2011. Herbert Farm and Natural Area Management Plan 2011 to 2021. Corvallis Parks and Recreation Department, Corvallis, Oregon. 75 pp + appendices.
- Currin, R., P. Moore and A. Neill. 2016. Tribal Plant Materials Program Development Plan for the Confederated Tribes of Grand Ronde. Institute for Applied Ecology, Corvallis, Oregon. 30 pp + appendices.
- Menke, C. 2017. 2017 City of Corvallis HCP Effectiveness Monitoring. Report to City of Corvallis. Institute for Applied Ecology, Corvallis, Oregon. 16 pp.

- Menke, C., P. Moore and M. Gisler. 2013. Herbert Farm and Natural Area Restoration Plan Phase I: 2013-2017. Prepared for the City of Corvallis and Oregon Department of Fish and Wildlife. Institute for Applied Ecology, Corvallis, Oregon. 45 pp. + appendices.
- Menke, C. and P. Moore. 2013. Herbert Farm and Natural Area Baseline Monitoring. Unpublished report prepared for the City of Corvallis. Institute for Applied Ecology, Corvallis, Oregon. 14 pp.
- Moore, P. 2017. Herbert Farm and Natural Area Restoration Plan Phase II: 2017-2023. Prepared for the City of Corvallis and Oregon Department of Fish and Wildlife. Institute for Applied Ecology, Corvallis, Oregon. 58 pp. + appendices.
- Moore, P. and A. Neill. 2017. Plants for People: Bringing Traditional Knowledge to Restoration, 2014-2016. Project Completion Report for OWEB Restoration Grant # 214-3054-10944. Institute for Applied Ecology, Corvallis, Oregon. 28 pp. plus appendices.
- Moore, P., A. Ramthun and C. Menke. 2017. 2016 Vegetation Monitoring at Herbert Farm and Natural Area. Unpublished report prepared for the City of Corvallis and Oregon Department of Fish and Wildlife. Institute for Applied Ecology, Corvallis, Oregon.

## 8. APPENDICES

### **Appendix 1. Herbert Farm and Natural Area Photo Points (2013-2018)**

# Appendix 1: Herbert Farm & Natural Area photo points, 2013-2018.



Number	GPS location	Direction (degrees)
PP1	44 31' 17.2"; 123 17' 45.4"	186, 284
PP2	44 31' 14.9"; 123 17' 44.0"	210, 158
PP3	44 31' 11.4"; 123 17' 46.9"	28, 217
PP4	44 31' 12.5"; 123 17' 55.8"	12, 260
PP5	44 31' 13.8"; 123 18' 04.2"	24, 75
PP6	44 31' 18.6"; 123 18' 03.8"	320, 17
PP7	44 31' 23.4"; 123 18' 06.3"	90, 165
PP8	44 31' 26.9"; 123 17' 46.2"	225, 326
PP9	44 31' 27.0"; 123 18' 00.1"	200, 95
PP10	44 31' 19.7"; 123 17' 59.5"	346, 80

Red arrows indicate approximate direction that photos were taken

# Photo point 1

1 (186°): Pretreatment – harvested ryegrass, June 28, 2013



1 (186°): Project completion, after second seeding of prairie forbs & grasses in 2015; May 31, 2016



1 (186°): Post-project. After prescribed burn and seeding in 2017; June 6, 2018



1 (284°): Pretreatment – ryegrass field, April 24, 2013



1 (284°): Project completion, after second seeding of prairie forbs & grasses in 2015; May 31, 2016



1 (284°): Post-project. After prescribed burn and seeding in 2017; June 6, 2018



## Photo point 2

2 (210°): Pre-treatment - reed canary-grass in foreground, May 10, 2013



2 (210°): Project completion, after seeding with native forbs & grasses in 2015; May 31, 2016



2 (210°): Post-project, June 6, 2018



2 (158°): After one year treatment, April 15, 2014



2 (158°): Project completion, after seeding with native forbs & grasses in 2015; May 31, 2016



2 (158°): Post-project, June 6, 2018





## Photo point 3

3 (28°): Pre-treatment – mowed swale,  
September 18, 2012



3 (28°): Project completion, after  
seeding with native forbs & grasses in  
2015; May 31, 2016



3 (28°): Post-project,  
June 6, 2018



3 (217°): After spot spraying,  
April 15, 2014



3 (217°): Project completion, after  
seeding with native forbs & grasses in  
2015; May 31, 2016



3 (217°): Post-project,  
June 6, 2018



## Photo point 4

4 (12°): After 1 year site treatment,  
April 15, 2014



4 (12°): Project completion, after 2<sup>nd</sup>  
year of seeding forbs and grasses,  
May 31, 2016



4 (12°): Post-project. After prescribed  
burn and seeding in 2017;  
June 6, 2018



4 (260°): Pre-treatment – fallow  
grassland, April 24, 2013



4 (260°): Project completion, after  
seeding & 2<sup>nd</sup> year of planting  
riparian trees & shrubs, May 31, 2016



4 (260°): Post-project.  
June 6, 2018



## Photo point 5

5 (24°): Pre-treatment – blackberry in riparian margin, April 24, 2013



5 (24°): Project completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016



5 (24°): Post-project.  
June 6, 2018



5 (75°): after one year of site preparation, April 15, 2014



5 (75°): Project completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016

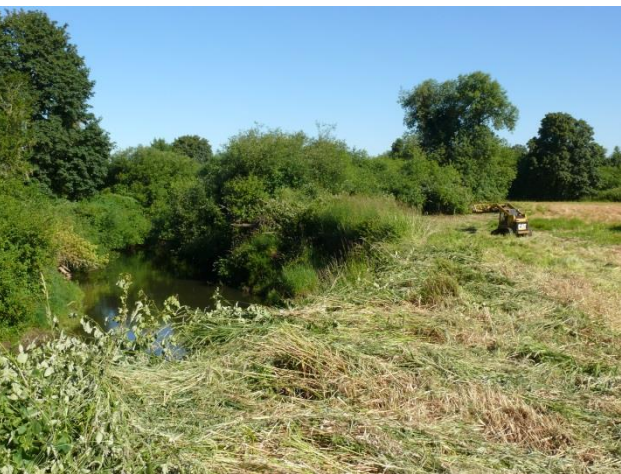


5B: Post-project.  
June 6, 2018



## Photo point 6

6 (320°): Mowed blackberry & reed canarygrass, June 6, 2013



6 (320°): Project Completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016



6 (320°): Post-project. June 6, 2018



6 (17°): After one year site preparation, April 15, 2014



6 (17°): Project Completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016



6 (17°): Post-project. June 6, 2018



## Photo point 7

7 (90°): Pre-treatment – blackberry,  
September 13, 2013



7 (90°): Project completion, after  
seeding & 2<sup>nd</sup> year of planting  
riparian trees & shrubs, May 31, 2016



7 (90°): Post-project.  
June 6, 2018



7 (165°): Fallow grassland after 1  
year site preparation, April 15, 2014



7 (165°): Project completion, after  
seeding & 2<sup>nd</sup> year of planting  
riparian trees & shrubs, May 31, 2016



7 (165°): Post-project.  
June 6, 2018



## Photo point 8

8 (225°): Pre-treatment – ryegrass field, April 24, 2013



8 (225°): Project completion, after 2<sup>nd</sup> year of seeding forbs and grasses, May 31, 2016



8 (225°): Post-project. After prescribed burn and seeding in 2017; June 6, 2018



8 (326°): After 1 year site preparation, April 15, 2014



8 (326°): Project completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016



8 (326°): After second year planting trees, 31 May 2016



## Photo point 9

9 (200°): After 2 years of site prep and 1<sup>st</sup> year tree planting, April 21, 2015



9 (200°): Project completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016



9 (200°): Post-project. June 6, 2018



9 (95°): After 2 years site prep and first forb seeding, 21 April 2015



9 (95°): Project completion, after 2<sup>nd</sup> year of seeding forbs and grasses, May 31, 2016



9 (95°): Post-project. After prescribed burn and seeding in 2017; June 6, 2018



## Photo point 10

10 (346°): After 2 years site prep and 1st year planting trees, April 21, 2014



10 (346°): Project completion, after seeding & 2<sup>nd</sup> year of planting riparian trees & shrubs, May 31, 2016



10 (346°): Post-project. June 6, 2018



10 (80°): After first year sowing native forbs, April 21, 2015



10 (80°): Project completion, after 2<sup>nd</sup> year of seeding forbs and grasses, May 31, 2016



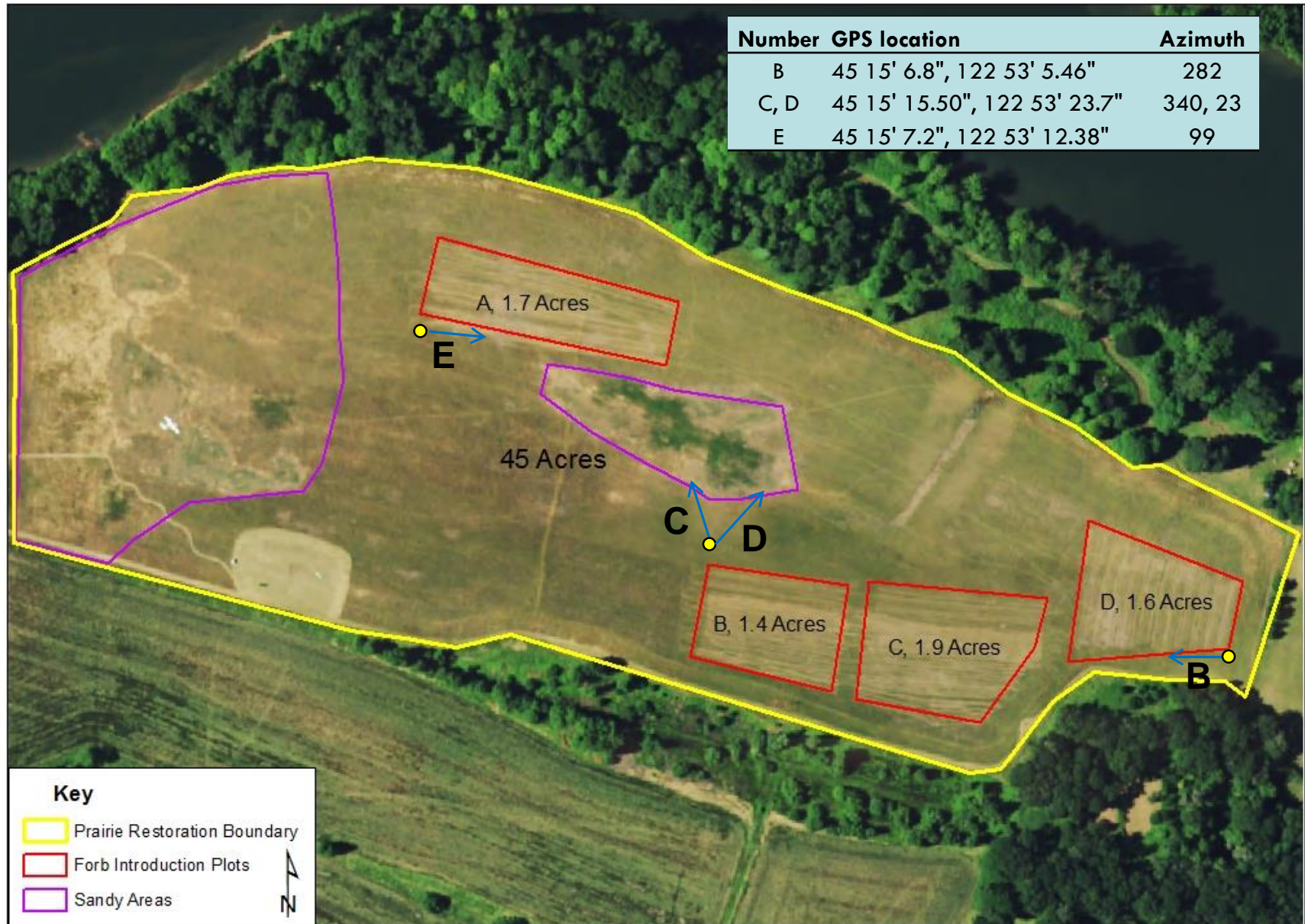
10 (80°): Post-project. After prescribed burn and seeding in 2017; June 6, 2018



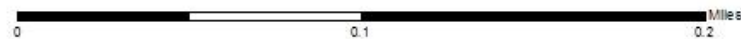


## **Appendix 2. Champoeg State Park Photo Points (2013-2018)**

# Appendix 2. Champoeg State Park photo points, 2013-2018.



Blue arrows indicate approximate direction that photos were taken



Date: 2/8/2017

## Photo points B and C

B (282°): Pre-project. Before forb introduction plot creation, August 2013.



B (282°): Project completion. Plant establishment in forb introduction plot and after mowing, August 2016.



B (282°): Post-project, May 20, 2018



C (340°): Before herbicide treatments, May 2014



C (340°): After herbicide treatments, August 2016



C (340°): Post-project, May 20, 2018



## Photo points D and E

D (23°): Pre-treatment. Meadow with tufted hairgrass, August 2013



D (23°): Project completion. Meadow with tufted hairgrass, August 2016



D (23°): Post-project, May 20, 2018



E (99°): Pre-treatment: before forb introduction plot creation, July 2013



E (99°): Project completion. Plant establishment in forb introduction plot, May 2016



E (99°): Post-project, May 20, 2018

