

Coyote Prairie North Mitigation Bank 2020 Report



May 2021

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City of Eugene's Public Works Department



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Chapter 1. Introduction

The Coyote Prairie North Mitigation Bank (CPNMB) operates under an agreement between the Oregon Department of State Lands (DSL), Oregon Department of Environmental Quality, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the City of Eugene. The Mitigation Bank Instrument establishing this Bank was signed in 2011.

Wetland enhancement work, in the form of site preparation, began in 2008 in the East Phase of the bank and earthwork and seeding of this phase occurred in 2009. Fifth year monitoring of the East phase was completed in summer 2014, and in 2015 it was determined to have met its performance standards.

The West Phase is the final phase of the CPNMB. Site preparation began in the West Phase in 2013. Earthwork and seeding of this phase were completed in fall 2015, with planting completed January 2016. Spring/summer 2020 results represent the fifth growing season after first native seeding.

The 2015 earthwork also included conversion of an agricultural ditch to restore site hydrology at the CPNMB. The ditch, which flowed through the East Phase and through Phase 2 of the West Eugene Wetlands Mitigation Bank, was modified into a broad swale that now outlets into vegetated, restored, wet prairie. The west end of the ditch was filled to allow water to flow and infiltrate across the southeast part of the site through restored wet prairie, without being intercepted by the ditch and directed rapidly off-site.

This annual report includes the seeding and vegetation establishment data for that site-wide hydrology project, as well as credit summaries and 2020 monitoring, seeding, and planting information for the West Phase. With release and sale of the final credits, the Coyote Prairie North Mitigation Bank will be closed and the site will transition to long-term management by the City of Eugene.

Chapter 2. Credit Summary for the Coyote Prairie North Mitigation Bank

The first release of credits to the Coyote Prairie North Mitigation Bank (CPNMB) occurred in 2011. Final releases for the East Phase and 25% of the credits expected for the West Phase were released in fall 2015 following approval of the Long-Term Management Plan.

For the West Phase, a series of releases and sales followed site construction and monitoring results from the first growing season (2016). These are summarized in Tables 2.1 and 2.2. Due to a short-term increase in the presence of annual *Lythrum* species, the site did not achieve performance standards in 2018 and, therefore, no credits were requested for the 3rd growing season until after the 2019 monitoring, when both the 3rd and 4th year credits were requested and released.

The CPNMB sold 6.089 credits in 2020. The anticipated credit release schedule for the West Phase is provided in Table 2.2.

Annual credit sales from 2012 - 2019

Since 2012, the Coyote Prairie North Mitigation Bank has sold a total of 65.869 mitigation credits.

Table 2.1. Summary of CPNMB Annual Credit Sales, 2012 – 2019	
Calendar Year	Total Credits Sold
2012	0.71
2013	8.23
2014	20.06
2015	6.16
2016	5.032
2017	19.588
2018	0.00
2019	0.00
2020	6.089
Total	65.869

Table 2.2 Credit Release Summary Anticipated for West Phase of the Coyote Prairie North Mitigation Bank (39.25 credits anticipated)				
Year of Release	Percentage (Cumulative)	Performance Standard	Credits Anticipated for West Phase (Cumulative)	Credits Released
2011	15% (15%)	Approval of MBI	6.08 (6.08)	6.08
2015	25% (40%)	Approval of long-term management plan	9.81 (15.89)	9.81
2016	5% (45%)	Initial grading, seeding, and reporting of as-builts	1.79 (17.68) *	1.79
2017	10% (55%)	1 st growing season performance standards (2016 monitoring data)	3.92 (21.60)	3.92
2018	10 % (65%)	2 nd growing season performance standards (2017 monitoring data)	3.92 (25.52)	3.92
(requesting with 4 th season data)	10% (75%)	3 rd growing season performance standards (2018 monitoring data)	3.92 (29.44)	----
2020	10% (85%)	4 th growing season performance standards (2019 monitoring data)	3.92 (33.36)	7.84
2021	15% (100%)	5 th growing season performance standards (2020 monitoring data)	6.04 (39.4) **	

*adjusted down 0.17 credits to balance prior release of 6.08 credits from 2011 (MBI approval), when anticipated total credits was higher, and to address rounding error. Anticipated credits are lower than that identified in the CPNMB Instrument due to the 2015 construction of a berm and nesting areas for the federally threatened streaked horned lark.

**The final determination of the number of credits for the West Phase will be made after a final delineation has been approved. The delineation submitted for review indicates 78.85 acres of wetlands; at 2:1, this would be 39.4 credits.

Chapter 3. Site Description, Management and Monitoring

Site Area: 240 Acres

Coyote Prairie North Mitigation Bank Area: 165 acres

Ownership: City of Eugene

Table 3.1 Coyote Prairie Unit site timeline.

Section	Year of Construction	Enhancement Acres	Monitoring Period
East Phase	2009	84	Completed
West Phase	2015	81	2016 - 2020

Location

Coyote Prairie North is located in the Coyote Creek drainage approximately 1.5 miles west of Eugene. It lies on the south side of Cantrell Road and is part of the larger Coyote Prairie enhancement site that is bisected by the east branch of Coyote Creek. The south region of the 240-acre site is part of the now-completed West Eugene Wetland Mitigation Bank and the north region of the site comprises the Coyote Prairie North Mitigation Bank. The Coyote Prairie North Mitigation Bank is divided into an East Phase and a West Phase (Fig. 3.1). The East Phase is further subdivided into the Ha-Yaba Unit (Unit 1; south) and the Walahan Unit (Unit 2; north).

Site History

The site has likely been in agricultural use since the late 1800s or early 1900s, initially as pasture, and then cropped for grass seed production beginning in the early 1970s.

Bank Goals and Objectives

The Bank has two primary goals. The first is to enhance 165 acres of slope/flat wetlands, also referred to as palustrine emergent wetlands using the Cowardin classification. The second goal is to forward conservation goals articulated in the West Eugene Wetlands Plan.

Specific objectives of the Bank include:

- Provide 165 acres of compensatory wetland mitigation credits to approved applicants within its service area to offset impacts to wetland resources. All credits will be enhancement credits generated from slope/flat wetlands under the HGM classification, also referred to as palustrine emergent wetlands using the Cowardin classification. All buffer areas will be included in enhancement areas.
- Enhance site hydrology and historic surface water flow to support the establishment of wet prairie (primarily), and vernal pool, and emergent communities (secondarily) across the site meeting specific hydrologic criteria outlined in the performance standards.

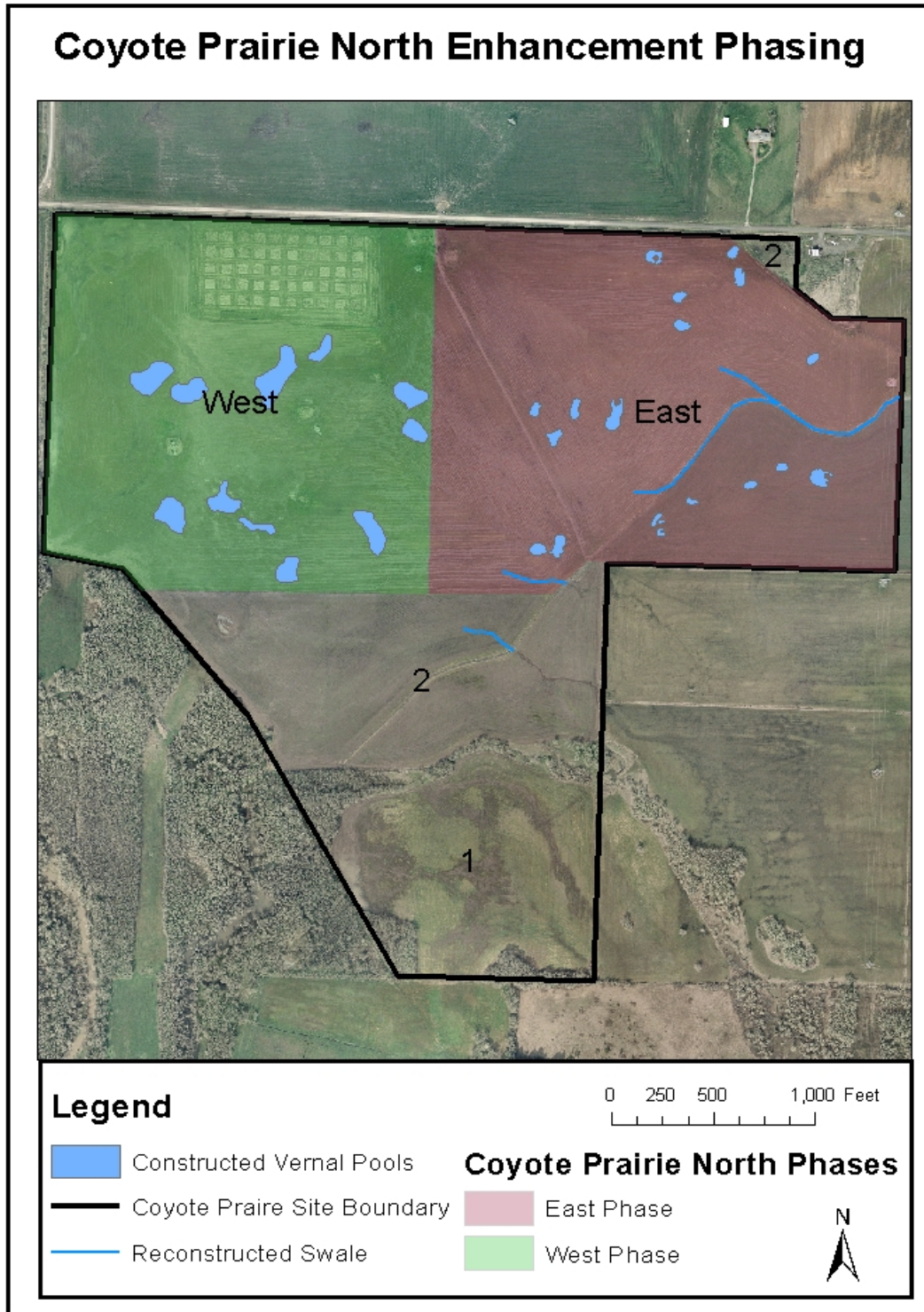


Figure 3.1 Coyote Prairie North enhancement phasing map, identifying the two enhancement phases, East (84 acres) and West (81 acres). Phases 1 and 2, of the West Eugene Wetlands Mitigation Bank, are shown to the south.

- Enhance vegetation to provide highly diverse wetland communities that are resistant to invasion and resilient to disturbance and that meet the specific criteria outlined in the performance standards. These include wetland prairie plant communities with some vernal pool and emergent plant communities. Listed and rare species will be included.
- Establish a diverse prairie plant community to provide food, shelter, and breeding areas for native prairie invertebrates, reptiles, amphibians, mammals and birds, including those listed as Oregon Conservation Strategy species by the Oregon Department of Fish and Wildlife.

Activity and Results Summary 2020

In 2020, the West Phase enhancement was in its fifth precipitation year and growing season. The hydrology of the West Phase and the adjacent Phases continues to perform as anticipated, with water moving slowly northwest across the site (rather than exiting the site via agricultural ditches), pools holding water until April, May, or June, and little sediment movement occurring as the vegetation cover increases. Native, perennial vegetation continued to establish well in the West Phase and vernal pool species are thriving, including the rare *Navarettia willamettensis*. Vegetation recovered well in the region impacted by Bonneville Power Administration's pole removal project completed in summer 2019. The 2020 vegetation monitoring for the West Phase showed that vegetation is meeting its performance standards, except for the substrate measure, where bare (combines bare ground, litter, moss) slightly exceeded the standard of $\leq 20\%$ for year 5. For the recontoured swale and filled ditch through the East Phase and Phase 2, control of invasive plant species has continued to be difficult. This area exceeded the level of invasive species cover permitted and thus did not meet the joint permit performance standard in 2020. Management of adjacent, completed phases of Coyote Prairie also continues.

West Phase Management Action Detail 2020

1. Winter and early spring observations continued to show that vernal pool outlets and margins were well vegetated in 2020, and no modifications or further erosion control was needed. The recontoured swale is revegetating and the coir netting is functioning well. Inspection of the route used by BPA for their pole-removal project showed excellent revegetation, primarily due to the high density of *Grindelia integrifolia x nana* that was already well-established in the work area.
2. City staff directed the work of seasonal staff and contract crews to control nonnative invasive species in the West Phase, and in the filled ditch and swale, using spot spraying, hand removal, and mowing. In 2020, again the most frequent non-native species needing treatment in the West Phase were non-native annual grasses (*Vulpia myuros* and *Vulpia bromoides*), barnyard grass (*Echinochloa crus-galli*), pennyroyal (*Mentha pulegium*), with patches or scattering of curly dock (*Rumex crispus*) and false dandelion (*Hypochaeris*

radicata). On the filled ditch and in the recontoured swale, staff treated primarily the nonnative grasses in the genus *Vulpia*, North African grass (*Ventenata dubia*), velvet grass (*Holcus lanatus*), and pennyroyal (*Mentha pulegium*). The annual grasses are primarily treated by mowing with weed trimmers prior to seed set.

3. Nonnative invasive species control using spot herbicide applications was needed for the lark pads to keep these areas sparsely vegetated through June. No surveys for larks were conducted this year and no larks were known to nest on the site.
4. No native seed was dispersed at the site in 2020.

Monitoring

Hydrology. Methods and Results.

Staff continued to check West Phase vernal pool and northwest corner hydrology during the wet season of 2020 and determined they function as anticipated. A modified wetland delineation that will serve as an addendum to the pre-construction wetland delineation, was conducted from February to July 2020 to confirm if wetland hydrology was modified in areas where 2015 earthwork occurred and to identify creditable acreage. This modified wetland delineation is provided in Appendix C.

To further demonstrate the site-wide performance standards addressing hydrology, UAV photos taken during the wet season of 2018, 2019, and 2020 are provided below:



Fig. 3.2 West Phase constructed vernal pools and northwest corner inundation, March 19, 2020. Pools and northwest corner inundation are described in performance standard PSH5.

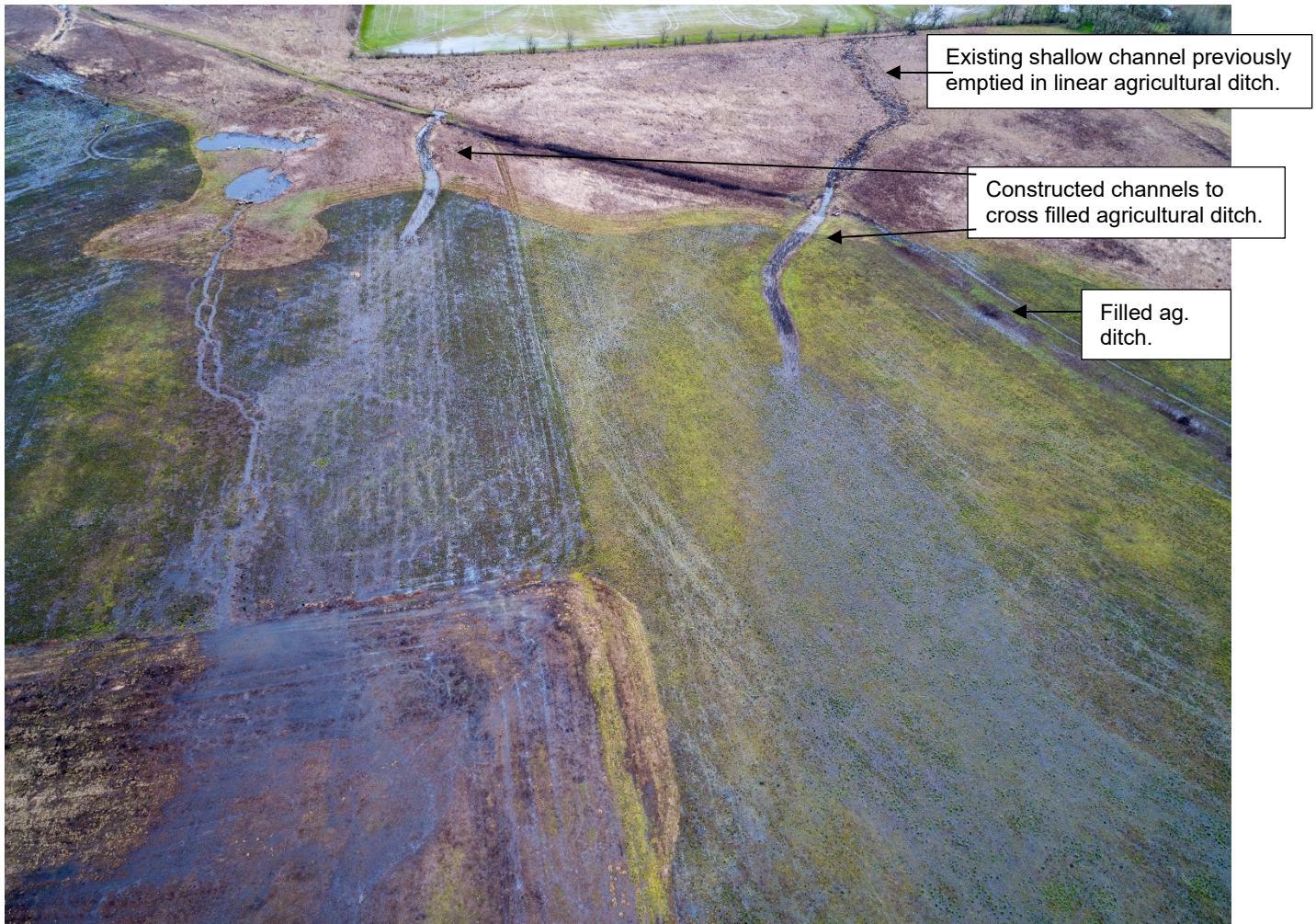


Fig. 3.3 Surface water now passes beyond the agricultural ditch, moving north into the East and West Phases (above). Short constructed crossings and filling of the agricultural ditch promote surface flow movement. Prior to enhancement, surface and shallow channel flows were intercepted by the agricultural ditch and rapidly transported off-site. This demonstrates success for hydrologic performance criteria PSH3.

Fig. 3.4 Closer photo of crossing, showing broad surface flow at outlet (left). Surface water is visible due to prescribed fire conducted about 4 months prior to this Jan. 31, 2018 photo.



Fig. 3.5 Water is released from the former agricultural ditch, now recontoured into a broader, vegetated swale. Water released at outlets spreads across the well-vegetated, wet prairie of the East Phase. Water that does not infiltrate moves into pools in the East and West Phases and during storm events inundates the West Phase’s northwest corner. Surface water is visible in this January 2018 photo due to the prescribed ecological burn conducted in fall 2017. This photo shows successful achievement of PSH4.

Vegetation. Methods: Vegetation monitoring consisted of the fifth year of quantitative point-intercept monitoring of the entire West Phase on June 1 -5, and point-intercept monitoring along the recontoured swale and filled ditch on June 5 and 8. In addition, vegetation monitoring included site-wide walking surveys to record all species encountered in May, June, and August. Appendix A more fully describes vegetation monitoring methods.

Results: The West Phase continued to be well-vegetated with diverse native species in its fifth growing season. Native vegetation cover was 93.4% (absolute cover; Table 3.2), similar to 2018 and 2019, with the densest perennial vegetation in the north central area and the greatest bare ground occurring in vernal pools and in scattered patches in the central and southwest regions where inundation is extended. This meets the performance criterion for native vascular plant cover to be greater than 75% by year 5. Again, *Grindelia integrifolia x nana* and *Deschampsia cespitosa* were the two most common species, with a combined cover of 38%. In 2020, bareground increased to 22.6% from 17% in 2018 and 2019. Although this does not meet the 5th year performance criteria of bare ground less than 20%, a review of the cover categories within that total shows that bare soil surface was about 9%, ground with surface litter was 13% and moss cover was 1%. The extent of vernal pools and the inundation area in the northwest corner of greater than 10 acres may be responsible for the larger area without vascular plants. Ecologically, this does not seem problematic for this site, in terms of erosion potential or plant community establishment.

During point-intercept monitoring, 36 native species and 10 nonnative species were recorded at sampling points. During meandering surveys, 76 native species and 43 nonnative species were found (species list Appendix B). It is typical that many fewer species will be sampled at the points than will be encountered during surveys throughout the site, since many species occur in small, localized patches and only 8 points per acre are collected.

On a site-wide basis, only 4 native species had over 5% cover, similar to 2019. The diversity performance criteria require that at least 6 native species have over 5% absolute cover in at least 10% of the area sampled. In many sites and years, the 6 native species requirement is achieved site-wide, as occurred in the West Phase through 2018. In 2020, it was achieved in the southern (approximately one-quarter) of the site, where 3 graminoids (*Juncus occidentalis*, *Carex densa*, and *C. unilateralis*) and 3 forbs (*Grindelia integrifolia x nana*, *Madia glomerata*, and *Bidens frondosa*) achieved over 5% cover.

The Coyote Prairie North Mitigation Bank Instrument's definition of an invasive species was adapted from the Department of State Land's definition. It considers the following as invasive plant species: (1) those that occur on the Oregon Department of Agriculture's Noxious Weed List; (2) The following species: *Phalaris arundinacea*, *Mentha pulegium*, *Holcus lanatus*, and *Anthoxanthum odoratum*; (3) the last crop on the site (in this case *Lolium multiflorum*) and (4) beginning in year two, a non-native species that comprises more than 15% cover over at least 10% of the vegetation monitoring area and increases from one monitoring year to the next.

Based on the first 3 criteria, above, these non-native species were present with measureable cover in prior years in the West Phase and are considered invasive: *Mentha pulegium* (specifically identified), *Ventenata dubia* and *Phalaris arundinacea* (Oregon noxious weed List B). For the fourth criterion, *Vulpia myuros/ V. bromoides* met the threshold of invasive in 2019, so remained on the list this year. No other non-native species increased and had a minimum

cover that could equate to at least 15% cover over at least of one-tenth of the West Phase. The cover of all invasive species combined in 2020 was 3.7% and the cover of all non-native species (invasive and non-invasive, absolute) was 13% (12.7% relative).

The two nonnative annual species, *Lythrum hyssopifolium* and *Lythrum portula*, met the fourth criterion for an invasive species in 2019, due to a short-term increase in cover from 2017 to 2018, but their cover declined in 2019 and 2020 without human control, from a combined 24.9% down to 6.0% cover. Because these *Lythrum* species appear to have had a one-year spike in cover and are annuals that appear to be declining as native perennial vegetation increases, we do not consider them invasive on this site.

Table 3.2. Coyote Prairie North Mitigation Bank, West Phase, Point-intercept Monitoring Results, 2020.

Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species intercepted during monitoring.

	Area Sampled: 81 acres	Sample Size: 629 points		
		Wet Prairie with vernal pools		
Origin ¹	Species or Guild	% Cover	CI Low	CI High
	Native (absolute cover)	80.3		
	Invasive Nonnative (absolute cover)	3.7		
	Nonnative, excluding invasives (absolute cover); annual <i>Lythrum</i> sp included	9.4		
	Total Plant Cover (absolute cover)	93.4		
	Bare ground or litter (no vascular plants, moss may occur)	22.6		
	Native² (a relative cover value)	70.4	68.0	72.8
	All Nonnative² (a relative cover value)	12.7	11.8	15.5
Native	<i>Grindelia integrifolia</i>	27.8	25.5	30.2
Native	<i>Deschampsia cespitosa</i>	10.2	8.6	11.9
Native	<i>Alopecurus geniculatus</i>	5.1	4.0	6.4
Native	<i>Carex densa</i>	5.1	4.0	6.4
Native	<i>Juncus occidentalis</i>	4.6	3.6	5.9
Native	<i>Carex unilateralis</i>	3.8	2.9	5.0
Native	<i>Bidens frondosa</i>	2.9	2.0	3.9
Native	<i>Madia glomerata</i>	2.4	1.6	3.4
Native	<i>Epilobium brachycarpum</i>	2.1	1.4	3.0
Native	<i>Eleocharis palustris</i>	1.9	1.2	2.8
Native	<i>Galium trifidum</i>	1.6	1.0	2.4
Native	<i>Prunella vulgaris var. lanceolata</i>	1.3	0.7	2.1
Native	<i>Agrostis exarata</i>	1.1	0.6	1.9
Native	<i>Lasthenia glaberrima</i>	1.1	0.6	1.9
Native	<i>Eleocharis obtusa</i>	1.0	0.5	1.7
Native	<i>Eryngium petiolatum</i>	0.8	0.4	1.5
Native	<i>Downingia elegans</i>	0.6	0.3	1.3
Native	<i>Gnaphalium palustre</i>	0.6	0.3	1.3
Native	<i>Hordeum brachyantherum</i>	0.6	0.3	1.3
Native	<i>Alisma triviale</i>	0.5	0.2	1.1
Native	<i>Beckmannia syzigachne</i>	0.5	0.2	1.1
Native	<i>Epilobium ciliatum</i>	0.5	0.2	1.1
Native	<i>Gratiola ebracteata</i>	0.5	0.2	1.1

Native	<i>Plagiobothrys figuratus</i>	0.5	0.2	1.1
Native	<i>Potentilla gracilis</i>	0.5	0.2	1.1
Native	<i>Rumex salicifolius</i>	0.5	0.2	1.1
Native	<i>Sidalcea cusickii</i>	0.5	0.2	1.1
Native	<i>Epilobium densiflorum</i>	0.3	0.1	0.8
Native	<i>Microseris laciniata</i>	0.3	0.1	0.8
Native	<i>Navarretia willamettensis</i>	0.3	0.1	0.8
Native	<i>Danthonia californica</i>	0.2	0.0	0.6
Native	<i>Downingia yina</i>	0.2	0.0	0.6
Native	<i>Juncus bufonius</i>	0.2	0.0	0.6
Native	<i>Juncus nevadensis</i>	0.2	0.0	0.6
Native	<i>Rorippa curvisiliqua</i>	0.2	0.0	0.6
Native	<i>Veronica scuttelata</i>	0.2	0.0	0.6
Non-native (2 categories)				
Invasive ¹	<i>Vulpia myuros</i> and <i>Vulpia bromoides</i>	2.2	1.5	3.2
Invasive	<i>Mentha pulegium</i>	1.1	0.6	1.9
Invasive	<i>Phalaris arundinaceae</i>	0.2	0.0	0.6
Invasive	<i>Ventenata dubia</i>	0.2	0.0	0.6
Non-native ³	<i>Lythrum portula</i>	6.0	4.9	7.4
Non-native	<i>Centaureum erythraea</i>	1.3	0.7	2.1
Non-native	<i>Lythrum hyssopifolium</i>	1.3	0.7	2.1
Non-native	<i>Hypochaeris radicata</i> / <i>Leontodon taraxacoides</i>	0.5	0.2	1.1
Non-native	<i>Alisma lanceolata</i>	0.2	0.0	0.6
Non-native	<i>Senecio vulgaris</i>	0.2	0.0	0.6

¹ In Origin column, invasive is as defined in the Mitigation Bank Instrument for this site.

² Native and nonnative cover data are provided here transformed to allow calculation of binomial confidence intervals appropriate for point guild data. In the transformed data, each of the two guilds (native and nonnative) can only be recorded once at each point (e.g. each point is either native, nonnative, both, or neither). Total native and nonnative cover could therefore each equal 100%.

³ See discussion of the *Lythrum* sp. in text, under Monitoring, Vegetation, Results, regarding why they are not considered invasive.

Recontoured swale and filled ditch vegetation (completed under removal/fill permit):

Recontoured locations in the East Phase and Phase 2 are establishing with native graminoids on the swale sides and bottom and a mix of native and nonnative forbs along the filled ditch. This linear disturbed zone is about 2 acres. It continued to be apparent in 2020 that the decades of invasive species growth in the ditch when the site was farmed, had resulted in a soil seedbank of invasive species that is still being expressed, particularly in the filled swale. Staff continued to have contractors spot apply grass-specific herbicide to kill non-native invasive annual grasses, primarily *Vulpia myuros*, *V. bromoides*, and *Ventanata dubia* in spring 2019. Motorized string or bladed weed cutters were also used to cut annual grasses just after

flowering and prior to seed set, which appears successful. String trimmers were also used to stop seedset of *Mentha pulegium* in the swale in August, for those plants not treated earlier.

Monitoring results show that the native vegetation in this 2-acre linear area is relatively diverse, with 26 native species encountered during point-intercept monitoring. In 2020, three native species, 2 forbs and 1 grass, had at least 5% cover in the filled ditch and swale (Table 3.3). There is no performance criterion for native plant diversity for these areas, since the revegetation focus was on stopping erosion in the swale which City staff determined would be best achieved by native grasses, sedges, and spikerushes.

Non-native species cover during 2020 point-intercept monitoring was high, at 34.6 percent absolute cover (27.5% relative cover). As noted above, the original agricultural ditch appears to have had a buried soil seedbank of non-native species that was disturbed during the recontouring and ditch filling in 2015, resulting in the more diverse non-native species cover currently. In 2020, species meeting the definition of invasive (and the reasoning) were: *Mentha pulegium* (specifically identified in the definition of invasive), *Ventenata dubia* (Oregon noxious weed List B), *Vicia tetrasperma*, *Lathyrus hirsutus*, and *Vulpia myuros/bromoides* (met the definition in past years), *Geranium dissectum*, *Galium divaricatum*, and *Bromus hordeaceus/B. commutatus* increased from past years and were found in a frequency equating to 10% of the swale area at $\geq 15\%$ cover (encountered in at least 3 sampling points).

Lythrum hyssopifolium continued to decline without any treatment, from 10.7% cover (2018) to 6.9% cover (2019), to 0.9% (2020); due to this, and for reasons stated previously, we do not consider it invasive at this site. The cover of all species meeting the definition of invasive in 2019 was 28.2%, which is above the performance criterion of 10% and the total non-native cover of 24.6% exceeds the 15% cover estimate. We are continuing to focus invasive species control actions on non-native annual grasses and *Mentha pulegium*, the species we believe have the greatest potential to adversely affect the surrounding enhanced wet prairie plant community.

Table 3.3. Coyote Prairie North Swale/Fill Area Point-intercept Monitoring Results, 2020.				
Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species intercepted during monitoring.				
	Area Sampled: 2 acres (entire)	Sample Size: 220 points		
		Wet Prairie (in recontoured swale and on filled ditch)		
Origin¹	Species or Guild	% Cover	CI Low	CI High
	Native (absolute cover)	88.6		
	Invasive Nonnative (absolute cover)	28.2		

Table 3.3. Coyote Prairie North Swale/Fill Area Point-intercept Monitoring Results, 2020.

Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species intercepted during monitoring.

	Area Sampled: 2 acres (entire)	Sample Size: 220 points		
		Wet Prairie (in recontoured swale and on filled ditch)		
Origin ¹	Species or Guild	% Cover	CI Low	CI High
	Nonnative, excluding invasives (absolute cover)	6.4		
	Total Plant Cover (absolute cover)	123.2		
	Bare ground or litter (no vascular plants, moss may occur)	14.5		
	Native² (a relative cover value)	73.6	69.4	77.5
	All Nonnative² (a relative cover value)	29.5	25.5	33.8
Native	<i>Deschampsia cespitosa</i>	22.7	19.1	26.8
Native	<i>Grindelia integrifolia</i>	14.1	11.1	17.6
Native	<i>Madia sativa</i>	8.2	5.9	11.1
Native	<i>Agrostis exarata</i>	4.1	2.5	6.4
Native	<i>Carex densa</i>	3.6	2.1	5.8
Native	<i>Eleocharis palustris</i>	3.6	2.1	5.8
Native	<i>Erythranthe guttata</i>	3.6	2.1	5.8
Native	<i>Juncus occidentalis</i>	3.6	2.1	5.8
Native	<i>Sidalcea cusickii</i>	3.6	2.1	5.8
Native	<i>Epilobium brachycarpum</i>	3.2	1.8	5.3
Native	<i>Madia elegans</i>	2.7	1.4	4.7
Native	<i>Madia glomerata</i>	2.3	1.1	4.2
Native	<i>Prunella vulgaris var. lanceolata</i>	2.3	1.1	4.2
Native	<i>Potentilla gracilis</i>	1.8	0.8	3.6
Native	<i>Carex unilateralis</i>	1.4	0.5	3.0
Native	<i>Eleocharis acicularis</i>	1.4	0.5	3.0
Native	<i>Juncus patens</i>	1.4	0.5	3.0
Native	<i>Epilobium densiflorum</i>	0.9	0.2	2.4
Native	<i>Rumex salicifolius</i>	0.9	0.2	2.4
Native	<i>Epilobium ciliatum</i>	0.5	0.0	1.8
Native	<i>Glyceria occidentalis</i>	0.5	0.0	1.8
Native	<i>Gratiola ebracteata</i>	0.5	0.0	1.8
Native	<i>Juncus effusus var. pacificus</i>	0.5	0.0	1.8
Native	<i>Microseris laciniata</i>	0.5	0.0	1.8
Native	<i>Myosotis laxa</i>	0.5	0.0	1.8

Table 3.3. Coyote Prairie North Swale/Fill Area Point-intercept Monitoring Results, 2020.

Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species intercepted during monitoring.

	Area Sampled: 2 acres (entire)	Sample Size: 220 points		
		Wet Prairie (in recontoured swale and on filled ditch)		
Origin ¹	Species or Guild	% Cover	CI Low	CI High
Native	<i>Navarretia intertexta</i> or <i>N. willamettensis</i>	0.5	0.0	1.8
Nonnative (2 categories)				
Invasive	<i>Mentha pulegium</i>	11.4	8.7	14.6
Invasive	<i>Vulpia myuros</i> and <i>V. bromoides</i>	5.9	4.0	8.5
Invasive	<i>Geranium dissectum</i>	5.0	3.2	7.4
Invasive	<i>Galium divaricatum</i>	2.3	1.1	4.2
Invasive	<i>Bromus hordeaceus</i> / <i>B. commutatus</i>	1.8	0.8	3.6
Invasive	<i>Ventenata dubia</i>	1.4	0.5	3.0
Invasive	<i>Lathyrus hirsutus</i>	1.4	0.5	3.0
Invasive	<i>Vicia tetrasperma</i>	1.4	0.5	3.0
Non-native	Annual grass, mowed no flowers	2.3	1.1	4.2
Non-native	<i>Aira elegans</i>	1.4	0.5	3.0
Non-native	<i>Lythrum hyssopifolium</i>	0.9	0.2	2.4
Non-native	<i>Centaureum erythraea</i>	0.5	0.0	1.8
Non-native	<i>Lythrum portula</i>	0.5	0.0	1.8
Non-native	<i>Rumex crispus</i>	0.5	0.0	1.8
Non-native	<i>Sonchus asper</i>	0.5	0.0	1.8

Management Actions for 2021

This Phase has completed its five year monitoring and will be managed by the City of Eugene as an inactive mitigation bank site, according to the approved long-term management plan.

Wildlife Utilization at Coyote Prairie through 2020

Invertebrates:

A variety of caddisfly larvae and other aquatic macroinvertebrates (e.g. ostracods, copepods, daphnia) are present in pooled and flowing water in all phases of Coyote Prairie and terrestrial

invertebrates, such as dragonflies, bumblebees, other native bees, wasps, and non-native (and potentially native) preying mantids, are routinely encountered. Solitary native bees are particularly frequently observed feeding on *Downingia* species in vernal pools. A group of North American Butterfly Association (NABA) volunteers collected butterfly use data from other phases of Coyote Prairie during enhancement and documented over 700 individuals of 14 species using the East Phase enhancement from April through September 2012. The West Phase is likely similar. In July 2019 staff and volunteers searched for great copper butterfly (*Lycaena xanthoides*) in the West Phase, since there are ample *Rumex salicisifolius* and *Grindelia integrifolia x nana* populations established there. No great copper butterflies were found. The East Phase NABA report (2012): <http://www.naba.org/chapters/nabaes/>.

Reptiles and amphibians:

Adult long-toed salamanders and larvae in pools have been observed in both the East and West Phases. Pacific chorus frog larvae are abundant in East and West Phase pools (observed in 8 of 11 West Phase pools in 2017). A northern red-legged frog was found on the east branch of Coyote Creek in Phase 1 during restoration of that phase. Garter snakes and racers have been observed in both enhancements and garter snakes are occasionally found hunting or resting in vernal pools.

Birds:

Raptors (e.g. hawks, kites, owls) and songbirds continue to be sighted regularly foraging in all Coyote Prairie restoration phases and a bald eagle was inadvertently flushed from the ground in the West Phase in summer 2016. Northern harriers nested in the East Phase and hatched at least 4 young in 2017 and were again found nesting in 2019, although staff do not know the outcome of the latter nest. Also of note, western meadowlarks are documented frequently in winter feeding flocks, males are observed singing from stakes and cottonwood logs, and young have been seen on fledgling flights and during the BPA pole removal project. Ground-nesting birds, such as California quail, killdeer, and savannah sparrows have been documented nesting in many restored regions of Coyote Prairie and streaked horned larks have been seen in the West Phase, but not verified to have nested. In 2017 and 2018, grasshopper sparrows were observed singing on territories in the West Phase. The large expanse of water in the northwest corner of the West Phase has attracted flocks of pintails, Canada geese, and other native waterbirds, including greater yellowlegs, least sandpiper and at least one long-billed curlew.

Mammals:

Voies and their trails are commonly seen in the enhanced wet prairie vegetation. Elk use the entire site, as evidenced by tracks and scat and occasional observation of the herd. Coyotes use the site, based on scat, and a bear and bear sign were spotted in the nearby Phase 1 enhancement in the past.

Chapter 4. Progress Toward Meeting Performance Standards

Monitoring and assessment to verify progress toward meeting performance standards in the West Phase, as described in the Coyote Prairie North Mitigation Bank Instrument, are summarized in Tables 4.1 and 4.2, below. Table 4.1 shows progress toward meeting vegetation standards and Table 4.2 shows progress toward meeting hydrologic performance standards. Progress toward meeting vegetation standards in the recontoured swale and filled ditch are shown in Table 4.3.

Table 4.1. Progress of the Coyote Prairie North, West Phase Enhancement, Toward Meeting the Vegetation Performance Standards Identified in the MBI.

The most recent data for the West Phase are compared to their relevant performance standards. The number in the 'Monitoring Year' column indicates the summer growing season in which the data was collected to evaluate the site's success in meeting the associated standard. A corresponding year in the 'West Phase Data' column indicates the calendar year data was collected.

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	West Phase Data (Calendar Yr Collected)	Goal Met?
1	All	Seeding assessment will document initial vegetation establishment	Qualitative seeding assessment	Completed (2016 report)	Y
2	All	Native vascular plant cover > 40%	Point Intercept	Native cover = 113.9% (2017 report)	Y
2	All	Bare ground (bare/litter/moss) < 40%	Point Intercept	Bare = 8.5% (2017 report)	Y
2	All	Nonnative <i>invasive</i> vascular plant cover ≤ 10%	Point Intercept	Nonnative invasive plant cover = 6.6% (2017 report)	Y

Table 4.1. Progress of the Coyote Prairie North, West Phase Enhancement, Toward Meeting the Vegetation Performance Standards Identified in the MBI.

The most recent data for the West Phase are compared to their relevant performance standards. The number in the 'Monitoring Year' column indicates the summer growing season in which the data was collected to evaluate the site's success in meeting the associated standard. A corresponding year in the 'West Phase Data' column indicates the calendar year data was collected.

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	West Phase Data (Calendar Yr Collected)	Goal Met?
3	All	Native vascular plant cover > 40%	Point Intercept	Native cover = 93.6% (2018 report)	Y
3	All	Bare (bare/litter/moss) < 40%	Point Intercept	Bare = 17.6% (2018 report)	Y
3	All	Nonnative <i>invasive</i> vascular plant cover ≤ 10%	Point Intercept	Nonnative invasive plant cover = 25.2% (2018 report); however 24.9% of that is two annual <i>Lythrums</i> (<i>L. hyssopifolium</i> and <i>L. portula</i>)	N (but see note)
3	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	6 native species have ≥ 5% cover site-wide (2018 report)	Y
4	All	Native vascular plant cover > 60%	Point Intercept	Native cover = 94.3% (2019 report)	Y
4	All	Bare (bare/litter/moss) < 40%	Point Intercept	Bare ground = 17.3% (2019 report)	Y
4	All	Nonnative invasive vascular plant cover ≤ 10%	Point Intercept	Nonnative invasive plant cover = 2.6% (2019 report);	Y

Table 4.1. Progress of the Coyote Prairie North, West Phase Enhancement, Toward Meeting the Vegetation Performance Standards Identified in the MBI.

The most recent data for the West Phase are compared to their relevant performance standards. The number in the 'Monitoring Year' column indicates the summer growing season in which the data was collected to evaluate the site's success in meeting the associated standard. A corresponding year in the 'West Phase Data' column indicates the calendar year data was collected.

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	West Phase Data (Calendar Yr Collected)	Goal Met?
4	All	6 native species have $\geq 5\%$ cover in 10% of area sampled	Point Intercept	6 native species have $\geq 5\%$ cover in 10% of area (2019 report)	Y
5	All	Native vascular plant cover > 75%	Point Intercept	Native cover = 80.3% (this report)	Y
5	All	Bare (bare/litter/moss) < 20%	Point Intercept	Bare (includes litter, moss) = 22.6% (this report)	N
5	All	6 native species have $\geq 5\%$ cover in 10% of area sampled	Point Intercept	6 native species have <u>> 5% cover in 10% area</u> (this report)	Y
5	All	Nonnative invasive vascular plant cover is $\leq 10\%$	Point Intercept	Non-native invasive plant cover = 3.7% (this report);	Y
5	All	Nonnative plant cover is less than 15% of total plant cover	Point Intercept	Total non-native cover = 12.7% relative cover (this report)	Y
5	All	At least 50 native vascular plant species are present	Walking surveys	76 native vascular plant species (this report)	Y

Table 4.2. Progress of the Coyote Prairie North, West Phase Enhancement, Toward Meeting the Hydrologic Performance Standards Identified in the MBI.

The most recent data for the West Phase are compared to their relevant performance standards. The number in the ‘Monitoring Year’ column indicates the potential years in which data can be collected to evaluate the site’s success in meeting the associated standard. Year “0” is the site preparation stage, before the initial seeding. A corresponding year in the ‘West Phase Data’ column indicates the calendar year data was actually collected.

Monitoring Year	Hydrologic Performance Standards	Monitoring and Reporting Method	West Phase Data (Calendar Yr Collected)	Goal Met?
0	PSH3: fill west length of Coyote Ditch	2015 as-built report	Ditch filled summer 2015	Y
0	PSH4: recontour east region of Coyote Ditch	2015 as-built report	Swale recontoured summer 2015	Y
0	PSH6: flows leaving the NW corner of the site are regulated by a berm and culvert	2015 as-built report and 2016 annual report	Culvert and berm installed summer 2015 and functioning (photos 2016 report)	Y
3, 4, or 5	PSH1 (in-part): 81 acres exhibit wetland hydrology	Modified wetland delineation addendum	78.8 acres of wetland (wetland delineation addendum; this report)	78.8 creditable acres
3, 4, or 5	PSH3: surface flows from Coyote South (Coyote Prairie Phase 2) not intercepted by Coyote Ditch	UAV Photos, observation	UAV photo Figures 3.3, 3.4 (this report)	Y
3, 4, or 5	PSH4: water flows released from Coyote Ditch across East Phase	UAV Photos, observation	UAV photo Figure 3.5 (this report)	Y
3, 4, or 5	PSH4: >5% of the entire site’s acreage (East and West Phases) are in vernal pools that are inundated for at least 8 weeks from January through April.	November – May fill dates and depths	Pool acreage = 8 to 12%; East Phase (1.6 ac), West Phase (11-20 ac)	Y

Table 4.3. Progress of the Coyote Prairie North, Swale Hydrologic Enhancements, Toward Meeting the Vegetation Performance Standards Identified in the Removal-Fill Permit.

The most recent data for the Swale/Ditch Enhancements quantitative vegetation monitoring are compared to their relevant performance standards. The number in the 'Monitoring Year' column indicates the summer growing season in which the data was collected to evaluate the site's success in meeting the associated standard. A corresponding year in the 'Data' column indicates the calendar year data was collected.

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	Swale Data (Calendar Yr Collected)	Goal Met?
1	All	Seeding assessment will document initial vegetation establishment	Qualitative seeding assessment	Completed (2016 report)	Y
2	All	Native vascular plant cover > 40%	Point Intercept	Native cover = 108% (2017 report)	Y
2	All	Bare ground < 40%	Point Intercept	Bare ground = 18% (2017 report)	Y
2	All	Nonnative <i>invasive</i> vascular plant cover ≤ 10%	Point Intercept	Invasive cover = 2.8% (2017 report)	Y
3	All	Native vascular plant cover > 40%	Point Intercept	Native cover = 61% (2018 report)	Y
3	All	Bare ground < 40%	Point Intercept	Bare ground = 32% (2018 report)	Y
3	All	Nonnative <i>invasive</i> vascular plant cover ≤ 10%	Point Intercept	Nonnative invasive cover (primarily <i>Lythrum hyssopifolium</i>) = 13.1% (2018 report)	N

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4	All	Native vascular plant cover > 60%	Point Intercept	Native Cover = 88% (2019 report)	Y
4	All	Bare ground < 40%	Point Intercept	Bare ground = 20.8% (2019 report)	Y
4	All	Nonnative invasive vascular plant cover \leq 10%	Point Intercept	Nonnative invasive cover = 19% (2019 report)	N
5	All	Native vascular plant cover > 75%	Point Intercept	Native Cover = 88.6% (this report)	Y
5	All	Bare ground < 20%	Point Intercept	Bare ground = 14.5% (this report)	Y
5	All	Nonnative invasive vascular plant cover is \leq 10%	Point Intercept	Nonnative invasive cover = 28.2% (this report)	N
5	All	Nonnative plant cover is less than 15% of total plant cover	Point Intercept	Nonnative plant cover = 34.6% (this report)	N

Appendix A. Monitoring Methods

Overview

Monitoring methods for the Coyote Prairie North Mitigation Bank are based on methods developed for the West Eugene Wetland Mitigation Bank that were revised and expanded to provide a more complete assessment of performance for Coyote Prairie North enhancements.

The Coyote Prairie North Mitigation Bank is divided into the West Phase (current active phase) and the East Phase (complete). The monitoring is designed to document development of the enhancements for this Bank and determine if performance criteria area being met. Monitoring types are conducted for each Phase, depending on the Performance Criteria or Monitoring Benchmarks developed for the Phase.

Photopoints

Purpose: Photo document surface hydrology. Photos are taken pre- and post- treatment to show landscape level changes. Photos are also used to document specific actions and site conditions.

Method:

1. Permanent photo stations are established with metal stakes or GPSed in the field in sufficient number to provide photo coverage of the enhanced area.
2. Photographs are taken pre- and post-project and documented by photopoint number and compass bearing and/or landmarks.
3. For the NW Phase hydrologic enhancements, photos from regular point-and-shoot cameras were discontinued as UAV photography will be available to better document hydrologic changes and function.

Hydrology

Purpose: Assess whether wetland hydrology is established within the enhancement site. The extent of soil saturation during the growing season is an important factor in determining jurisdictional wetlands.

Method:

1. Site visits during the winter and spring include a brief description of the location, extent, and depth of standing water at each site.
2. Water depth is recorded at maximum height in pools and emergent areas (typically during January), and again as pools start to dry April – June. Depth is typically recorded from staff gauges installed in vernal pool and emergent areas in a given phase. Depths and duration of inundation in other pools is collected based on specific needs.

3. A modified wetland delineation is conducted in year 3, 4, or 5, when precipitation is near normal (see DSL's Delineation "Lite" for Mitigation Monitoring in: Oregon Dept State Lands. 2009. Removal-Fill Guidelines, Compensatory Mitigation for Non-Tidal Wetlands and Tidal Waters and Compensatory Non-wetland Mitigation. Interim Review draft, October 14).

Vegetation Monitoring

The standard protocol for quantitative vegetation monitoring at the Coyote Prairie North Mitigation Bank sites was developed in 1994 for the West Eugene Wetland Mitigation Bank and further expanded and revised in 1997/1998, and 2010. It relies on the point-intercept method to assess plant cover by species, combined with full site surveys to identify species occurring in the mitigation site, but not encountered during point-intercept monitoring. The vegetation monitoring method for Coyote Prairie North builds on past monitoring experience and continues the use of point-intercept sampling and site-wide plant surveys to provide an objective method of measuring plant cover and assessing plant species richness.

Overall Goal

Monitor the establishment and development of hydrophytic and other vegetation within enhancement sites.

Species Lists

Purpose: Annually assess the status of each phase in meeting the City of Eugene's intent to enhance and restore wetland prairies with a high diversity of native wetland prairie plant species that encompass many spatial, temporal, and functional groups (e.g. species that are early-germinating, late-flowering, or nitrogen-fixing).

Method:

1. The species list should be collected annually; once early in the growing season (late May to mid-June), and once late in the growing season (August/Sept).
2. Compile the list by thoroughly walking through a site while filling out the species checklist.
3. Cross check and add to the list from other monitoring efforts including the Point-Intercept Sampling and Planting Establishment Assessments to ensure all species observed are represented.

Plant Establishment Assessments

Purpose: To provide an early qualitative assessment of plant establishment that will help guide future seeding and planting plans.

Method:

1. The assessment usually takes place in the first growing season, when the maximum number of species are identifiable and flowering (June to mid-July).

2. Each native species encountered during meandering surveys through the site is noted and its presence across the enhancement site (or target area if within a region covered by a specific seed mix) is assigned to one of 4 broad cover classes. Although the classes may be defined based on comparison with one another, they typically equate to the following cover classes in the first growing season: Dominant = 40+% of vegetation cover, Common = 10% – 39% of vegetation cover, Occasional = 2% -9% of vegetation cover, Trace = present, but less than 2% of vegetation cover.

Point-intercept Sampling

Purpose: To assess whether the enhancement or restoration site is meeting performance criteria addressing native and non-native plant cover, bare ground, and diversity, identified in the Coyote Prairie North Mitigation Bank Instrument.

Methods:

1. The entire restoration or enhancement site is sampled annually in years 2, 3, 4, and 5. This is a variation of methods used in the West Eugene Wetlands Mitigation Bank where representative, randomly chosen macroplots were sampled, rather than the entire enhancement area.
2. The sampling method is a systematic sampling with a random start, with each point being one sampling unit. These are not repeated sampling of the same points each year.
3. Sample points are dispersed systematically throughout the sampled area. Locations of sample points are determined by pacing and use of an on-site grid system that covers the entire site, rather than use of measuring tape. In non-mitigation bank locations where no grid systems exist, a visual grid system can be overlaid using the Collector App and monitoring staff can use GPS locations to align themselves.
4. The number of samples collected is at least 200 per enhancement phase, unless prior monitoring in an enhancement phase has identified that smaller sample sizes would still meet monitoring objectives identified in the Mitigation Bank Instrument and in the Oregon Department of State Lands Routine Performance Standards. At Coyote Prairie we collect 8 samples per acre (~640 samples) for an 80-acre site.
5. The sampling method uses the grid system that the City installed which divides the phase into equally sized 1-acre squares. The corner of each grid square is marked with a wooden pole about 6 ft tall. Therefore, poles occur about every 64 meters throughout the site.
 - a. For monitoring purposes, the x-axis of the site is east-west, parallel to Cantrell Road, and the y-axis is north-south (Fig. A-1). The start location for the first point on the x-axis is identified using a randomly chosen number (chosen via generator app or table) between 1 and 5 and this is the number of meters added to the first 13 meters

- off the start line. So for example, if the random number was 3, then the first point would be at 16 (13+3) and then 29 (adds 13), 42, and 55 east of the start point.
- b. To locate the start point of the transects we also use 2 random numbers that will place the first transect in the northern half of the grid square and the second in the southern half. For example, with randomly chosen start points of 9 meters and 45 meters and the desire for at least 600 sampled points, the sampling locations would be as follows: 4 points are sampled in the north half of the each grid square at 16 m, 29 m, 42 m, and 55 m east of each grid line (Fig. B-1). This is repeated, using the same x-coordinates along a second transect in the south half of each grid.
 - c. Thus in this example, within each of the one-acre squares, sampling occurred at the following x-y coordinates: 16-9, 29-9, 42-9, 55-9, and 16-45, 29-45, 42-45, and 55-45 (Fig. B-1).
 - d. All distances were paced by the monitoring crew after calibrating their paces to actual distances measured with a measuring tape. The grid pole line at the boundary of each grid square was used to readjust position at each acre.
 - e. The West site is slightly larger than 81 acres and partial grid squares exist at the site's boundaries, so with 8 sample points collected in each of the 1-acre grid squares, 620 - 640 total samples are collected.
 - f. To reduce bias when arriving at the exact sample location, the monitoring crew member positioning the tripod watches the level on the top of the tripod. Adjusting the tripod to level determines the trajectory of the pin.
6. Each sample (or point) is obtained by lowering a vertical cylindrical metal rod with a sharp pin at the tip and noting each vascular plant species the tip intersects ("hits") on its route to the ground at that location. The pole is dropped through a tube affixed to a specially modified camera tripod with a built-in level, to ensure it stays vertical.
 7. Ground cover is identified at each sample point as either bare, litter, or moss, where no plant cover is "hit". All locations with no plant cover are identified as "bare ground" in the summary of cover (that is, moss/litter/bare aren't distinguished in the summary).
 8. The percentage of ground covered by each species is calculated by dividing the total number of "hits" of each plant by the total number of sample points. Cover estimates are given with 80% binomial confidence intervals, unless otherwise indicated.

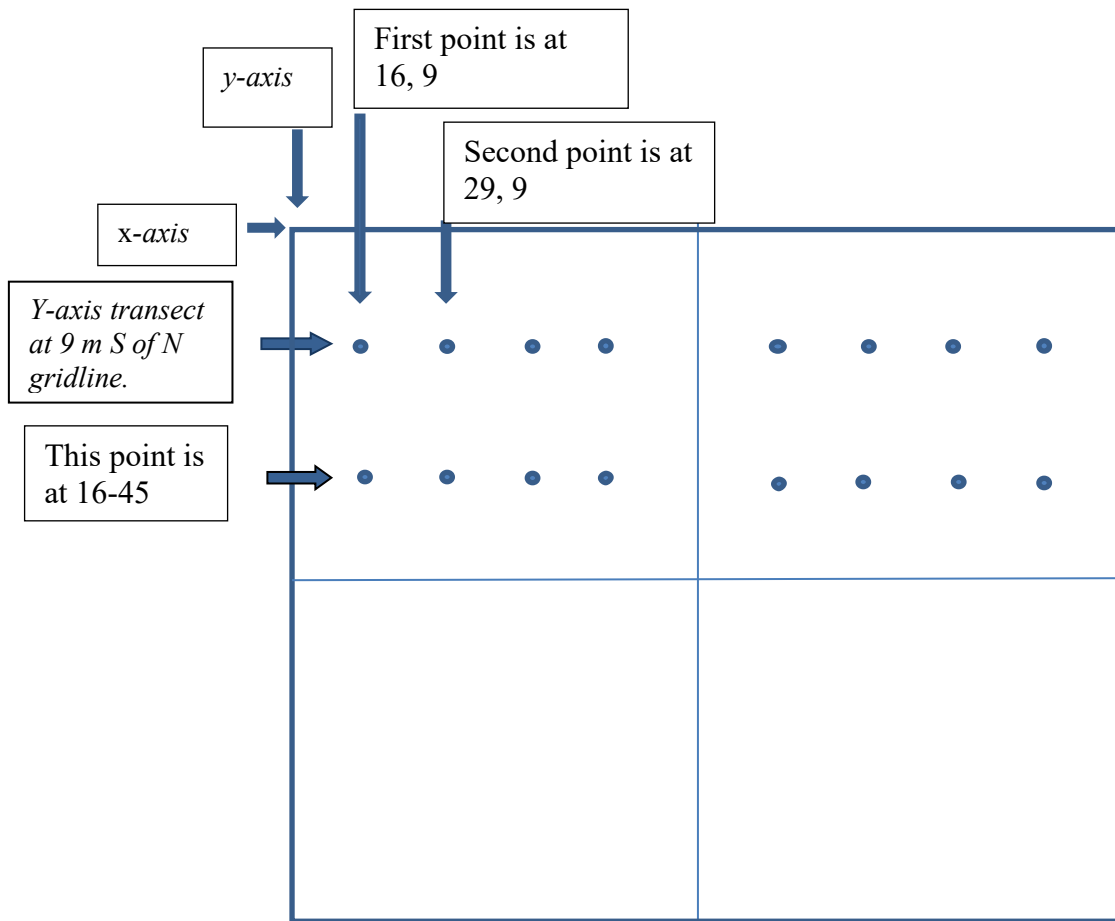


Figure B-1. **Coyote Prairie North grid-based monitoring strategy.** Four example one-acre grid squares are shown (points shown only in two). Dots represent sampled points, based on sample size needs and random start number. In each grid square 8 sample points were collected in 2019 (4 on each of two transects).

9. The data is summarized and reported using the following definitions:

<p>Native Cover: <i>the sum of all individual native vascular plant species cover values (individual cover values are the sum of all 'hits' for a species divided by the total pin drops); an absolute value that can exceed 100%</i></p>
<p>Nonnative Cover: <i>the sum of all individual nonnative vascular plant species cover values; an absolute value that can exceed 100%</i></p>
<p>Invasive Nonnative Cover: <i>computed the same as Nonnative Cover, but with only those species identified as invasive according to the definition accepted by the Oregon Department of State Lands and included in the Mitigation Bank Instrument.</i></p>

Total Plant Cover: *the sum of all vascular plants species cover values; an absolute value that can exceed 100%;*

Total Native and Nonnative Plant Cover (a relative cover value): *the number of pin drops out of the total pin drops that hit a vascular plant in one of those guilds (native, nonnative). For example, the hit is recorded as 'native' if at least one native species is hit with that pin drop and does not change if the pin drop hits more than 1 native species. Total native and nonnative cover could each equal 100%.*

Bare ground: *the sum of all pin drops that do not hit a vascular plant, divided by the total pin drops; combines scores for bare ground, litter, and moss (cryptogams), where no vascular plant cover occurs.*

Appendix B. Species List

This list include species recorded in all enhancement phases at Coyote Prairie, including Phase 1 and 2 completed under the *West Eugene Wetland Mitigation Bank*, the East Phase, and the West Phase, being completed under the *Coyote Prairie Wetland Mitigation Bank*. Under Origin, N refers to Native and I to introduced (non-native). A symbol (X), means the species was documented in the years after first seeding, but not seen this year.

		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
Scientific Name	Common Name	Origin					
<i>Achillea millefolium</i>	Yarrow	N	X	X	X	X	X
<i>Acmispon americanus</i> (syn. <i>Lotus unifoliolatus</i>)	Spanish clover	N	X	X	X	X	X
<i>Agrostis exarata</i>	spike bentgrass	N	X	X	X	X	X
<i>Agrostis stolonifera/capillaris</i>	Creeping bentgrass	I				X	
<i>Aira elegans</i> (syn <i>A. caryophyllea</i>)	silver hairgrass	I		X		X	X
<i>Alisma lanceolatum</i>	narrowleaf waterplantain	I					X
<i>Alisma triviale</i>	northern waterplantain	N	X	X		X	X
<i>Allium amplexans</i>	Slim leaf onion	N	X	X	X	X	X
<i>Allium ursinum</i>	Wild garlic	I				X	
<i>Alopecurus geniculatus</i>	water foxtail	N	X	X		X	X
<i>Alopecurus pratensis</i>	meadow foxtail	I	X		X	X	X
<i>Amelanchier alnifolia</i> var. <i>semiintegrifolia</i>	western serviceberry	N			X		
<i>Anagallis arvensis</i>	scarlet pimpernel	I	X	X			
<i>Anaphalis margaritacea</i>	pearly everlasting	N					
<i>Anthemis cotula</i>	mayweed chamomile	I					
<i>Anthoxanthum odoratum</i>	sweet vernalgrass	I			X	X	
<i>Anthriscus caucalis</i>	bur chervil	I			X		
<i>Asclepias speciosa</i>	showy milkweed	N				X	X
<i>Beckmannia syzigachne</i>	American sloughgrass	N	X	X	X	X	X
<i>Bellis perenne</i>	Lawn daisy	I					X
<i>Bidens frondosa</i>	leafy beggars-tick	N				X	X
<i>Bidens sp.</i>							

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Briza minor</i>	little quaking-grass	I			X	X	X
<i>Brodiaea coronaria</i>	harvest brodiaea	N					
<i>Brodiaea elegans</i>	harvest brodiaea	N		X	X	X	
<i>Bromus carinatus</i>	California brome	N					
<i>Bromus commutatus</i>	Meadow brome	I				X	X
<i>Bromus hordeaceus</i>	soft brome	I		X	X		X
<i>Bromus sp.</i>	Brome sp (no flr)	-					
<i>Calandrinia ciliata</i>	red maids	N					
<i>Camassia leichtlinii</i> ssp. <i>suksdorfii</i>	tall camas	N		X	X	X	X
<i>Camassia quamash</i> ssp. <i>maxima</i>	common camas	N		X	X	X	X
<i>Cardamine hirsuta</i>	hairy bittercress	I		X			
<i>Cardamine penduliflora</i>	Willamette V. bittercress	N					
<i>Carex exsiccata</i>	Western inflated sedge	N				X	
<i>Carex densa</i>	dense sedge	N	X	X	X	X	X
<i>Carex feta</i>	green-sheath sedge	N	X			X	X
<i>Carex leporina</i>	oval broom sedge	N	X		X	X	X
<i>Carex obnupta</i>	slough sedge	N	X			X	X
<i>Carex stipata</i> var. <i>stipata</i>	awl-fruit sedge	N					
<i>Carex tumulicola</i>	foothill sedge	N			X		
<i>Carex unilateralis</i>	one-sided sedge	N	X	X	X	X	X
<i>Carex vesicaria</i>	inflated sedge	N					
<i>Castilleja tenuis</i>	hairy owl-clover	N	X	X	X	X	X
<i>Centaureum erythraeae</i>	common centaury	I	X	X	X	X	X
<i>Centunculus minimus</i>	chaffweed	N	X				
<i>Cerastium glomeratum</i>	sticky chickweed	I	X	X	X	X	X
<i>Chamaenerion angustifolium</i> var. <i>canescens</i>	perennial fireweed	N		X			X
<i>Chenopodium album</i>	Lamb's quarter	I					(X)
<i>Cicendia quadrangularis</i>	Timwort	N					
<i>Cirsium arvense</i>	Canada thistle	I			X		
<i>Cirsium vulgare</i>	bull thistle	I		X	X		X

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Clarkia amoena</i> ssp. <i>lindleyi</i>	farewell-to-spring	N	X	X		X	
<i>Clarkia purpurea</i> ssp. <i>quadrivulnera</i>	winecup clarkia	N		X	X	X	(X)
<i>Collinsia grandiflora</i>	Large flowered blue-eyed Mary	N					
<i>Collomia grandiflora</i>	grand collomia	N		X		X	
<i>Convolvulus arvensis</i>	bindweed	I					
<i>Conyza canadensis</i>	Canadian horseweed	I					
<i>Crassula aquatica</i>	water pygmy weed	N	X				
<i>Crataegus monogyna</i>	English hawthorn	I					
<i>Crataegus suksdorfii</i>	black hawthorn	N			X	X	
<i>Crataegus suksdorfii</i> X <i>monogyna</i>	hybrid hawthorn	I				X	
<i>Crepis capillaries</i>	smooth hawksbeard	I		X			
<i>Crepis setosa</i>	bristly hawksbeard	I				X	X
<i>Cusucta</i> sp.	Dodder	?					X
<i>Cynosurus echinatus</i>	hedgehog dogtail	I	X			X	
<i>Cyperus eragrostis</i>	tall flatsedge	I			X		(X)
<i>Danthonia californica</i>	California oatgrass	N		X		X	X
<i>Daucus carota</i>	Queen Anne's lace	I		X	X	X	X
<i>Deschampsia cespitosa</i>	tufted hairgrass	N	X	X	X	X	X
<i>Deschampsia danthonioides</i>	annual hairgrass	N					
<i>Deschampsia elongata</i>	Slender hairgrass	N					
<i>Dianthus armeria</i>	Deptford pink	I		X	X	X	
<i>Dichanthelium acuminatum</i> var. <i>fasciculatum</i>	western witchgrass	N		X	X		
<i>Dichelostemma congestum</i>	ookow	N		X			
<i>Dipsacus fullonum</i>	teasel	I		X	X		
<i>Drymocallis glandulosa</i>	Sticky cinquefoil	N					
<i>Downingia elegans</i>	showy downingia	N		X		X	X

Coyote Prairie North Mitigation Bank Report

		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Downingia yina</i>	Willamette downingia	N	X	X	X	X	X
<i>Echinochloa crus-galli</i>	large barnyard-grass	I		X		X	X
<i>Eleocharis acicularis</i>	needle spike-rush	N	X				X
<i>Eleocharis obtusa</i>	common spike-rush	N	X	X		X	X
<i>Eleocharis palustris</i>	common spikerush	N	X	X		X	X
<i>Elymus glaucus</i> ssp. <i>glaucus</i>	Blue wild rye	N					(X)
<i>Epilobium brachycarpum</i>	autumn willowherb	N	X	X	X	X	X
<i>Epilobium campestre</i>	smooth willowherb	N					
<i>Epilobium ciliatum</i>	hairy willowherb	N	X	X	X	X	X
<i>Epilobium densiflorum</i>	dense spike-primrose	N		X	X	X	X
<i>Equisetum</i> sp.	horsetail	N					
<i>Eriophyllum lanatum</i> var. <i>lanatum</i>	wooly sunflower	N	X	X	X	X	X
<i>Eryngium petiolatum</i>	coyote thistle	N		X		X	X
<i>Erythranthe guttata</i> (syn. <i>Mimulus guttatus</i> var. <i>guttatus</i>)	Common monkeyflower	N					
<i>Erythranthe microphylla</i> (syn. <i>Mimulus guttatus</i> var. <i>depauperatus</i>)	depauperate monkeyflower	N		X	X	X	(X)
<i>Euchiton sphaericus</i>	Star cudweed	I					
<i>Festuca roemerii</i>	Roemer's fescue	N					
<i>Fragaria virginiana</i> ssp. <i>platypetala</i>	mountain strawberry	N	X	X			
<i>Fraxinus latifolia</i>	Oregon ash	N		X	X	X	X
<i>Galium aparine</i>	catchweed	N		X			(X)
<i>Galium divaricatum</i>	wall bedstraw	I	X	X		X	(X)
<i>Galium</i> sp.	bedstraw sp.	N/I			X		
<i>Galium trifidum</i>	small bedstraw	N	X	X		X	X
<i>Galium triflorum</i>	fragrant bedstraw	N					
<i>Gentiana sceptrum</i>	king's gentian	N					(X)
<i>Geranium dissectum</i>	cut-leaved geranium	I	X	X	X	X	X

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Geranium lucidum</i>	shining geranium	I		X			X
<i>Geum macrophyllum</i>	large-leaf avens	N					
<i>Gilia capitata</i> ssp. <i>capitata</i>	bluehead gilia	N		X			
<i>Glyceria occidentalis</i>	western mannagrass	N					(X)
<i>Glyceria declinata</i>	Waxy mannagrass	I					
<i>Gnaphalium palustre</i>	lowland cudweed	N	X	X		X	X
<i>Gnaphalium purpureum</i>	purple cudweed	N	X				
<i>Gnaphalium stramineum</i>	cotton batting plant	N	X				
<i>Gnaphalium uliginosum</i>	marsh cudweed	I	X				
<i>Gratiola ebracteata</i>	bractless hedge-hyssop	N	X	X		X	X
<i>Grindelia integrifolia</i> × <i>Grindelia nana</i> var. <i>nana</i>	Willamette V. gumweed	N	X	X	X	X	X
<i>Heracleum maximum</i>	cow parsnip	N		X			
<i>Holcus lanatus</i>	velvet grass	I			X	X	X
<i>Hordeum brachyantherum</i>	meadow barley	N		X		X	X
<i>Hordeum marinum</i>	Mediterranean barley	I					
<i>Hypericum perforatum</i>	St. John's-wort	I		X	X	X	
<i>Hypochaeris radicata</i>	false dandelion	I	X	X	X		X
<i>Isoetes</i> sp.	quillwort	N	X				
<i>Juncus acuminatus</i>	tapered rush	N	X			X	(X)
<i>Juncus articulatus</i>	jointed rush	N			X		
<i>Juncus bolanderi</i>	Bolander's rush	N	X	X		X	
<i>Juncus bufonius</i>	toad rush	N	X	X	X	X	X
<i>Juncus effusus</i> var. <i>effuses</i>	common rush	I				X	X
<i>Juncus effusus</i> var. <i>pacificus</i>	soft rush	N	X			X	X
<i>Juncus ensifolius</i>	Swordleaf rush	N	X				X
<i>Juncus marginatus</i>	grass-leaf rush	I	X				
<i>Juncus nevadensis</i>	Nevada rush	N			X		X
<i>Juncus occidentalis</i>	slender rush	N	X	X	X	X	X
<i>Juncus oxymeris</i>	pointed rush	N	X			X	(X)
<i>Juncus patens</i>	Spreading rush	N	X		X	X	X
<i>Kickxia elatine</i>	cancerwort	I				X	

		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Lactuca saligna</i>	willow lettuce	I		X		X	
<i>Lactuca serriola</i>	prickly lettuce	I		X	X	X	X
<i>Lasthenia glaberrima</i>	smooth lasthenia	N	X	X		X	X
<i>Lathyrus aphaca</i>	yellow vetch	I		X			
<i>Lathyrus hirsutus</i>	rough pea	I				X	
<i>Lathyrus sphaericus</i>	grass pea	I					
<i>Leontodon taraxacoides</i>	hairy hawkbit	I	X	X	X	X	X
<i>Leucanthemum vulgare</i>	oxeye daisy	I	X		X	X	X
<i>Linum bienne</i>	pale flax	I	X		X	X	X
<i>Lolium multiflorum</i>	Italian ryegrass	I		X	X	X	X
<i>Lomatium bradshawii</i>	Bradshaw's desert parsley	N			X		
<i>Lomatium nudicaule</i>	barestem desert-parsley	N		X	X	X	X
<i>Lotus corniculatus</i>	bird'sfoot trefoil	I	X				
<i>Lotus formosissimus</i>	seaside lotus	N	X	X		X	X
<i>Lotus micranthus</i>	small-flowered deervetch	N					
<i>Ludwigia palustris</i>	marsh speedbox						X
<i>Lupinus affinis</i>	fleshy lupine	N					
<i>Lupinus polycarpus</i>	smallflower lupine	N		X			
<i>Lupinus oregonus</i>	Kincaid's lupine	N					
<i>Lupinus polyphyllus</i> var. <i>polyphyllus</i>	bigleaf lupine	N		X			X
<i>Lupinus rivularis</i>	stream lupine	N	X	X			
<i>Luzula comosa</i> var. <i>comosa</i>	field woodrush	N	X	X	X		
<i>Lythrum hyssopifolium</i>	hyssop loosestrife	I	X	X	X	X	X
<i>Lythrum portula</i>	water-purslane	I	X	X		X	X
<i>Madia elegans</i>	showy tarweed	N	X	X	X	X	X
<i>Madia glomerata</i>	cluster tarweed	N	X	X	X	X	X
<i>Madia sativa</i>	coast tarweed	N	X	X	X	X	X
<i>Malus fusca</i>	western crab-apple	N					
<i>Matricaria discoidea</i>	pineapple weed	N					
<i>Medicago</i> sp.	Medick	I					X
<i>Melilotus alba</i>	white sweetclover	I					
<i>Mentha pulegium</i>	pennyroyal	I	X	X	X	X	X

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Micranthes integrifolia</i>	swamp saxifrage	N					
<i>Micranthes oregana</i>	bog saxifrage	N	X	X			
<i>Microseris laciniata</i> ssp. <i>laciniata</i>	cut-leaved microseris	N		X	X	X	X
<i>Microsteris gracilis</i>	pink microsteris	N	X	X		X	X
<i>Moenchia erecta</i> ssp. <i>erecta</i>	moenchia	I			X		
<i>Montia linearis</i>	narrow-leaved montia	N	X	X			X
<i>Myosotis discolor</i>	yellow & blue forget me not	I	X	X	X	X	X
<i>Myosotis laxa</i>	small-flowered forget me not	N	X	X			
<i>Navarretia intertexta</i> ssp. <i>intertexta</i>	needle-leaved navarretia	N	X	X	X	X	X
<i>Navarretia squarrosa</i>	skunkweed	N		X	X	X	
<i>Navarretia willamettensis</i>	Willamette navarretia	N				X	X
<i>Nemophila menziesii</i>	baby blue eyes	N		X			
<i>Orobanche californica</i> ssp. <i>californica</i>	California broomrape	N					X
<i>Orthocarpus bracteosus</i>	rosy owl-clover	N		X			X
<i>Panicum capillare</i> ssp. <i>capillare</i>	common witchgrass	N	X			X	X
<i>Panicum dichotomiflorum</i>	Fall panicum	I					
<i>Parentucellia viscosa</i>	yellow parentucellia	I	X	X	X	X	X
<i>Perideridia montana</i>	Gairdner's yampah	N		X			
<i>Perideridia oregana</i>	Oregon yampah	N			X	X	
<i>Persicaria hydropiperoides</i>	marshpepper smartweed	N	X				(X)
<i>Persicaria maculosa</i>	heartweed	I	X	X			X
<i>Persicaria lapathifolia</i>	Curltop ladythumb	N					
<i>Phalaris aquatica</i>	Harding grass	I					
<i>Phalaris arundinacea</i>	reed canarygrass	I					X
<i>Phleum pratense</i>	Timothy	I					
<i>Plagiobothrys figuratus</i> var. <i>figuratus</i>	fragrant popcorn-flower	N	X	X	X	X	X

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Plagiobothrys scouleri</i>	Scouler's popcorn-flower	N	X	X		X	X
<i>Plantago lanceolata</i>	English plantain	I			X		
<i>Plectritis congesta</i>	rosy plectritis	N	X	X	X		
<i>Poa annua</i>	annual bluegrass	I		X			X
<i>Poa compressa</i>	Canada bluegrass	I					
<i>Poa pratensis</i>	Kentucky blugrass	I					X
<i>Poa sp.</i>	bluegrass sp	I		X			
<i>Polygonum aviculare</i> ssp. <i>aviculare</i>	doorweed	I					
<i>Polygonum douglasii</i>	douglas knotweed	N					
<i>Populus trichocarpa</i>	black cottonwood	N	X				X
<i>Portulaca oleracea</i>	little hogweed	I					
<i>Potentilla gracilis</i> var. <i>gracilis</i>	slender cinquefoil	N	X	X	X	X	X
<i>Prunella vulgaris</i> var. <i>lanceolata</i>	Native heal all	N	X	X	X	X	X
<i>Prunus sp.</i>	plum	I					
<i>Pseudognaphalium stramineum</i>	Cotton batting cudweed	N					
<i>Psilocarphus spp.</i>	wooly heads	N					
<i>Pyrrocoma racemosa</i> var. <i>racemosa</i>	racemed goldenweed	N				X	
<i>Pyrus communis</i>	pear	I			X		
<i>Pyrus malus</i>	apple	I					
<i>Ranunculus alismifolius</i>	water-plantain buttercup	N					X
<i>Ranunculus aquatilis</i>	white water buttercup	N					
<i>Ranunculus flammula</i>	creeping buttercup	N					
<i>Ranunculus occidentalis</i>	western buttercup	N	X	X	X		(X)
<i>Ranunculus orthorhynchus</i>	straight beaked buttercup	N		X	X	X	X
<i>Ranunculus sceleratus</i>	celery-leaf buttercup	N					
<i>Rhamnus purshiana</i>	casacara	N					
<i>Rorippa curvisiliqua</i>	western yellowcress	N	X	X		X	X

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Rorippa palustris</i>							
<i>Rosa multiflora</i>	many flowered rose	I					X
<i>Rosa nutkana</i>	Nootka rose	N			X	X	
<i>Rosa pisocarpa</i>	peafruit rose	I					
<i>Rosa sp.</i>	rose sp.	N/I	X				
<i>Rubus bifrons</i>	Himalayan blackberry	I	X	X	X	X	X
<i>Rubus laciniatus</i>	evergreen blackberry	I					
<i>Rumex acetocella</i>	sheep sorrel	I	X				
<i>Rumex conglomeratus</i>	clustered dock	I	X			X	X
<i>Rumex crispus</i>	curly dock	I	X	X	X	X	X
<i>Rumex salicifolius</i> var. <i>salicifolius</i>	willow dock	N	X	X		X	X
<i>Saxifraga oregana</i> (see <i>Micranthes oregana</i>)							
<i>Salix sp.</i>	willow	N	X			X	X
<i>Schedonorus arundinaceus</i>	tall fescue	I		X	X		
<i>Schoenoplectus tabernaemontani</i>	softstem bulrush	N					(X)
<i>Senecio jacobea</i>	tansy ragwort	I		X	X		X
<i>Senecio sylvaticus</i>	wood groundsel	I		X			
<i>Senecio vulgaris</i>	old-man-in-the-spring	I		X			X
<i>Sericocarpus rigidus</i>	rigid white topped aster	N					
<i>Sherardia arvensis</i>	blue field-madder	I					
<i>Sidalcea campestris</i>	Meadow sidalcea	N					(X)
<i>Sidalcea cusickii</i>	Cusick's checker-mallow	N		X		X	X
<i>Sidalcea malviflora</i> ssp. <i>virgata</i>	dwarf checker-mallow	N	X				
<i>Sisyrinchium bellum</i>	Western blue-eyed grass	N					
<i>Sisyrinchium hitchcockii</i>	Hitchcock's blue-eyed grass	N					X
<i>Sisyrinchium idahoense</i>	Idaho blue-eyed grass	N	X	X	X	X	X
<i>Solanum dulcamara</i>	bitter nightshade	I		X			

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Solanum nigrum</i>	black nightshade	I					
<i>Solidago elongata</i> (syn. <i>Solidago canadensis</i> var. <i>salebrosa</i>)	West coast goldenrod	N	X				
<i>Sonchus asper</i>	prickly sow-thistle	I		X	X	X	X
<i>Sparganium emersum</i>	simplestem bur-reed	N					
<i>Spergula arvensis</i>	stickwort	I					
<i>Spergula rubra</i>	red sandspurry	I		X			
<i>Spiraea douglasii</i>	Douglas spirea	N	X			X	
<i>Spiranthes romanzoffiana</i>	hooded ladies tresses	N					
<i>Stellaria media</i>	chickweed	I					
<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	snowberry	N					
<i>Symphyotrichum hallii</i>	Hall's aster	N		X	X	X	X
<i>Tanacetum vulgare</i>	common tansy	I					
<i>Taraxicum officinale</i>	dandelion	I		X			
<i>Torilis arvensis</i>	Spreading hedgeparsley	I				X	
<i>Toxicodendron diversiloba</i>	poison oak	N					
<i>Toxicoscordion venenosum</i>	meadow death camas	N		X	X		
<i>Trifolium arvense</i>	rabbitfoot clover	I					
<i>Trifolium dubium</i>	least hop clover	I			X	X	
<i>Trifolium pratense</i>	red clover	I					
<i>Trifolium repens</i>	white clover	I					
<i>Trifolium subterraneum</i>	subterranean clover	I					
<i>Trifolium vesiculosum</i>	arrowleaf clover	I					
<i>Triphysaria versicolor</i> ssp. <i>versicolor</i>	johnnytuck	N					
<i>Triteleia hyacinthina</i>	hyacinth brodiaea	N		X	X	X	(X)
<i>Typha latifolia</i>	cat-tail	N		X		X	X
<i>Ventanata dubia</i>	Ventanata grass	I		X		X	X
<i>Verbascum blattaria</i>	moth mullein	I					
<i>Verbascum thapsus</i>	common mullein	I					
<i>Veronica americana</i>	American speedwell	N				X	

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		Site	Coyote Prairie				
		Phase	1	2	2	N East	N West
		Section			Rem-nant		
<i>Veronica peregrina</i> var. <i>xalapensis</i>	purslane speedwell	N	X	X	X	X	X
<i>Veronica scutellata</i>	marsh speedwell	N	X			X	X
<i>Vicia cracca</i>	bird vetch	I			X		
<i>Vicia hirsuta</i>	hairy vetch	I				X	X
<i>Vicia sativa</i>	common vetch	I			X		
<i>Vicia tetrasperma</i>	slender vetch	I	X	X	X	X	X
<i>Vulpia bromoides</i>	barren fescue	I	X	X	X	X	
<i>Vulpia myuros</i>	rat-tail fescue	I	X	X		X	X
<i>Wyethia angustifolia</i>	narrow-leaf mule's ears	N	X	X	X	X	X
<i>Xanthium strumarium</i>	Rough cocklebur	N					X
<i>Zeltnera muehlenbergii</i>	monterey centauray	N					

Appendix C. Wetland Delineation (Addendum)
(next page)