Coyote Prairie North Mitigation Bank
2013 Report

and

West Eugene Wetlands Mitigation Bank
2013 Financial and Credit Summary

January 2014

This report was prepared by the Parks and Open Space Division
of the City of Eugene's Public Works Department

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Chapter 1. Introduction

The Coyote Prairie North Wetland Mitigation Bank 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 began in 2008 in the East Phase of the bank. This phase is further divided into two units known as the Walahan[1] Unit (Unit 1) and the Ha-Yaba[2] Unit (Unit 2), both of which have different performance criteria identified in the Mitigation Bank Instrument. This annual report is required as a condition of the Mitigation Bank Instrument and includes management actions and monitoring results from 2013.

This report is organized to provide a management and monitoring summary, management and monitoring detail, and an assessment of progress toward meeting performance criteria for the Coyote Prairie North Wetland Mitigation Bank. Appendix A describes monitoring methodologies in detail and Appendix B is the complete Species List. Results are also being submitted electronically.

In addition, this report contains financial and credit summaries for the West Eugene Wetland Mitigation Bank. The West Eugene Wetland Mitigation Bank enhancement sites have met their performance standards, so annual reports of monitoring results are no longer produced. Therefore, the financial and credit summaries for the West Eugene Wetland Mitigation Bank are included in Chapter 2 of this report.

[1] Walahan is a Kalapuya word meaning “down below a hill or mountain” (E. Stutzman, personal communication).
[2] Ha-Yaba is a Kalapuya term meaning “camas” or “camas digging area” (E. Stutzman, personal communication).

Chapter 2. Credit and Financial Summaries for Coyote Prairie North and West Eugene Wetland Mitigation Banks

All credit sales for the Coyote Prairie North Mitigation Bank are tracked in a ledger separate from the ledger of credit sales for the City's West Eugene Wetlands Mitigation Bank. However capital costs and operations and maintenance costs have been managed in combination with the West Eugene Wetlands Mitigation Bank, since lands at Coyote Prairie in both banks are adjacent to one another and their management needs are similar.

Coyote Prairie North Mitigation Bank Credit Summary

The first release of credits to the bank occurred in 2011 with 5.73 and 6.08 credits generated from the East Phase and the West Phase, respectively, upon approval of the bank instrument. No credits were sold in 2011, which carried the intial balance of 11.81 credits into 2012. A total of 9.55 credits were released in 2012 for work completed in 2011 to achieve performance standards in the East Phase, bringing the total number of credits generated for Coyote Prairie North to 21.36.

In 2012, three separate transactions were completed for a cumulative total of 0.71 mitigation credit sold, leaving a balance of 20.65 credits in the ledger at the beginning of 2013. During 2013, the Springfield School District purchased 4.31 credits and 3.92 credits in two separate transactions, and 3.82 credits were released to the bank leaving a total of 16.24 credits on the ledger at the end of 2013.

A summary of credit transactions for the Coyote Prairie North Mitigation Bank for 2013 is reported in Table 2.1. The anticipated credit release schedule for the active phase of the bank (East Phase) is provided in Table 2.2.

Table 2.1 2013 Credit Transactions, Coyote Prairie North Wetland Mitigation Bank

	Credits in Transaction	Balance
Credit balance on January 1, 2013		20.65
Credits certified during year		
East Phase	3.82	24.47
West Phase		
Credits sold in 2013		
Springfield School District	(4.31)	20.16
Springfield School District	(3.92)	16.24
Credit balance as of December 31, 2013		**16.24**

Table 2.2 Credit Release Schedule for East Phase[3] of the Coyote Prairie North Wetland Mitigation Bank.

Release	Percentage (Cumulative)	Performance Standards to be Met	Credits for East Phase (Cumulative)	Year Expected (Received)
One	15% (15%)	Approval of MBI	5.73 (5.73)	2011 (2011)
Two	5% (20%)	Initial grading, seeding/planting and reporting of as-builts.	1.91 (7.64)	2011 (2012)
Three	Up to 10% (30%)	1st growing season (2010) performance standards	3.82 (11.46)	2011 (2012)
Four	Up to 10 % (40%)	2nd growing season (2011) performance standards	3.82 (15.28)	2012 (2012)
Five	Up to 10% (50%)	3rd growing season (2012) performance standards	3.82 (19.10)	2013 (2013)
Six	Up to 10% (60%)	4th growing season (2013) performance standards	3.82 (22.92)	2014
Seven	15% or up to a cumulative total of 75%	5th growing season (2014) performance standards	5.73 (28.65)	2015
Eight	25% (100%)	Approval of long term management plan and stewardship agreement	9.54 (38.18)	On or before 2015

[3] The credit release schedule for the West Phase is described on Table 12 (page 49) of the Coyote Prairie North Mitigation Bank Instrument (MBI). 6.08 credits (15%) were released in 2011 after approval of the MBI.

West Eugene Wetland Mitigation Bank Credit Summary

Credit sales during 2013

At the beginning of the 2013 calendar year, the Bank had a credit ledger balance of 25.25 credits. No additional credits were certified for sale. During 2013, 7.95 mitigation credits were sold to a combination of private and public entities, leaving a balance at the end of the year of 17.30 credits (Table 2.3).

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A summary of credit transactions for the West Eugene Wetland Mitigation Bank for 2013 is reported in Table 2.3.

Table 2.3 2013 Credit Transactions, West Eugene Wetland Mitigation Bank

	Credits in Transaction	Balance
Credit balance on January 1, 2013		25.25
Credits certified during year	0.00	25.25
Credits sold in 2013		
Eugene Water and Electric Board	(0.10)	
Properties Northwest	(0.52)	
Properties Northwest	(0.09)	
McDougal Bros. Inc/Lost Creek Rock Products	(0.34)	
K and R LLC	(1.56)	
N & L Investments	(5.34)	
Subtotal of credits sold in 2013	**(7.95)**	17.3
Credit balance as of December 31, 2013		**17.3**

Annual Bank credit sales from 1994 - 2013

Since its first credit sale in 1994, the West Eugene Wetland Mitigation Bank has sold a total of 118.22 compensatory mitigation credits. See Table 2.4 for an annual tally of credit sales.

Table 2.4. Summary of Annual Credit Sales, 1994 – 2013

Calendar Year	Total Credits Sold
1994	7.29
1995	1.50
1996	2.71
1997	15.03
1998	9.55
1999	7.85
2000	5.09
2001	7.40
2002	7.73
2003	3.10
2004	12.19
2005	2.20
2006	4.06
2007	4.03
2008	14.11
2009	2.05
2010	4.20
2011	0.18
2012	0.00
2013	7.95
Total	**118.22**

Financial Summary for West Eugene Wetland Mitigation Bank and Coyote Prairie North Mitigation Bank

Table 2.5 summarizes the financial activity during 2013 for both City-managed mitigation banks, the West Eugene Wetland Mitigation Bank and the Coyote Prairie North Mitigation Bank. The Banks started the calendar year with a cash balance of $464,872.74. Revenue from credit sales and other sources of income totaled $1,264,385.00. Operations and maintenance costs totaled $145,593.61, while capital costs totaled $5,048.90. The end of year cash balance was $1,113,742.49 (Table 2.5).

Table 2.5. Financial Summary for 2013

Description of Item	Transaction Amt.	Balance
Cash Balance - January 1, 2013		**464,872.74**
Revenue		
Credits Sold (8.23) at $55,000 per credit - CP North Bank	452,650.00	
Credits Sold (.10) at $55,930 per credit -WEW Bank	5,593.00	
Credits Sold (.52) at $39,000 per credit -WEW Bank	20,280.00	
Credits Sold (.09) at $41,000 per credit -WEW Bank	3,690.00	
Credits Sold (.34) at $41,176 per credit -WEW Bank	14,000.00	
Credits Sold (1.56) at $41,000 per credit -WEW Bank	63,960.00	
Credits Sold (5.34) at $35,000 per credit -WEW Bank	186,900.00	
Mitigation Bid Security Deposits	48,382.00	
Farm Lease Income	775.26	
Interest Income	3,282.00	
Subtotal of Revenues	**799,512.26**	
		1,264,385.00
Operations and Maintenance Costs		
Payroll and Miscellaneous Operational Expenses	145,593.61	
Subtotal of Operations and Maintenance Costs	**145,593.61**	
		1,118,791.39
Capital Costs		
WMB Coyote Prairie North Restoration	5,048.90	
Subtotal of Capital Costs	**5,048.90**	
Cash balance - December 31, 2013		**1,113,742.49**

Chapter 3. Site Description, Management and Monitoring

Site Area: 240 Acres
Coyote Prairie North Mitigation Bank Area: 165 acres
Ownership: City of Eugene
Site Timeline:

Table 3.1 Coyote Prairie Unit site timeline.

Section	Year of Construction	Enhancement Acres	Monitoring Period
East Phase	2009	84	2010 - 2014
West Phase	TBD	81	TBD

Location
Coyote Prairie North is located in the Coyote Creek drainage approximately 1.5 miles west of Eugene. The site 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 West Eugene Wetlands Mitigation Bank and the north region of the site comprises the Coyote Prairie North Mitigation Bank. The site 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 Wetland 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.

- Enhance vegetation to provide highly diverse wetland communities that are resistant to invasion and resilient to disturbance that meet the specific criteria outlined in the performance standards. Emphasis includes wetland prairie plant communities with some vernal pool and emergent plant communities. Endangered, rare and uncommon 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 (ODFW).

Management and Monitoring Summary 2013

The East Phase, planted in fall 2009, is the only phase currently under active enhancement and is the focus of this report.

Control of nonnative invasive species continued in 2013 in the East Phase as the native plant community established. The City coordinated manual control and City staff and contract crews applied spot or broadcast applications of herbicide as needed to control patches of nonnative grasses and forbs. Vernal pool stability and site-wide drainage and erosion issues were assessed, and soils around the vernal pools and across the prairie appear to be stable and well-vegetated.

The 2013 growing season monitoring represents the 4th monitoring year for this phase. Monitoring results indicate that the East Phase has met all 4th year performance standards and benchmarks for vegetation. Hydrology monitoring was not conducted in 2013; staff will conduct a modified wetland delineation in 2014 to address the final outstanding hydrologic performance standard.

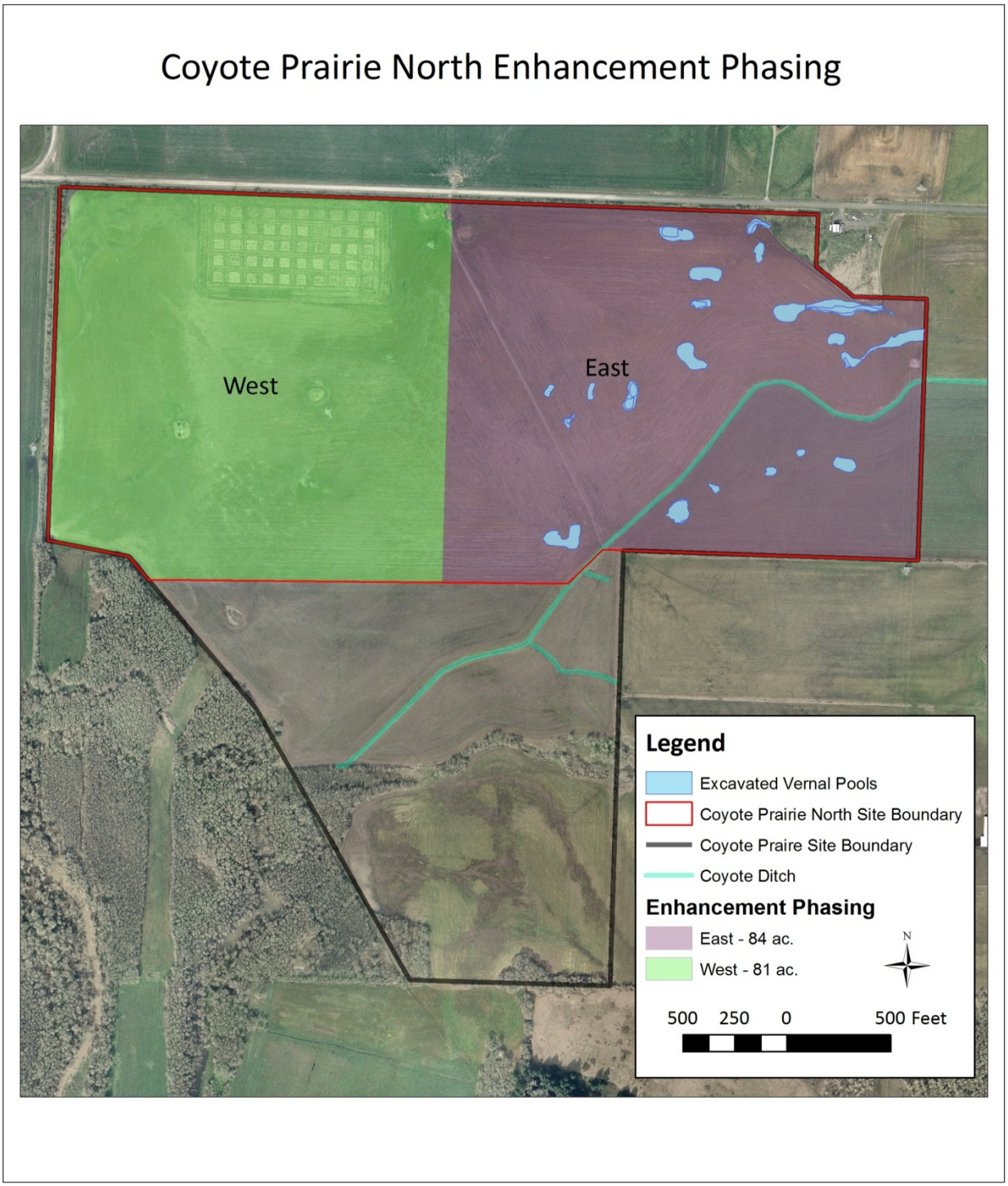

Figure 3.1. Coyote Prairie North Enhancement Phasing Map**.** The two enhancement phases at Coyote Prairie are labeled with their approximate acreages**.**

2013 Management Actions

1. Staff scouted and mapped locations of nonnative invasive plant species and implemented ongoing manual and chemical control throughout 2013. The nonnative annual *Lythrum hyssopifolia* has largely diminished due to previous control efforts and increasing native perennial vegetation. This species is competing with native vegetation in only a few small locations. *Polygonum persicaria* has been largely controlled and *Echinochloa crus-galli* has been reduced and occurrs mainly in patches in the southern region of the site and in one vernal pool. Control of these annual species continued, as well as the control of several perennials and biennials. The handweeding crew removed flowering grasses such as *Holcus lanatus*, *Alopecurus pratensis,* and *Echinochloa crus-galli* and pulled flowering *Daucus carota* and *Rumex crispus* where they occurred. The spot spraying crew made targeted applications to *Rubus bifrons*, *Holcus lanatus, Alopecurus pratensis, Hypericum perforatum, Mentha pulegium*, *Hypochaeris radicata, Rumex crispus*. A broadcast application of grass-specific herbicide was made to control *Holcus lanatus* in an area approximately five acres in size.

2. In 2012, Wetland staff replaced a culvert that introduces water into Coyote ditch from a neighboring property to the east; its functioning was monitored during the 2013 rain year. Replacement of the culvert appears to have reduced overland water flow, as intended, and minmized the erosion of an artificial drainage channel that had been forming to the south. In summer 2014, this east region of Coyote ditch will be recontoured into a broad swale to stabilize the upper end of the drainage, reduce erosion, and improve water filtration across the site.

3. In 2013 the native plant community was enhanced without the need for additional widespread seeding, by continued removal and control of invasive nonnative species. The only species seeded in the East Phase in fall 2013 was *Pyrracoma racemosa* var. *racemosa*, which was again added to plots that were originally placed in 2009 to track establishment of uncommon species.

4. In October wetland staff mowed about 8 acres of the restored prairie in a meandering pattern to reduce graminoid standing thatch and and provide greater sunlight to low-growing forbs.

Management Actions for 2014

1. Conduct spring and summer weed assessments. Use integrated pest management strategies to remove non-native invasive plants, focusing on perennial species and grasses, as needed.
2. Consider conducting an ecological controlled burn in 2014.
3. Mow a portion of the site in fall 2014 in a meandering pattern to reduce graminoid standing thatch and and provide greater sunlight to low-growing forbs.

Monitoring

Hydrology
Modified wetland deleation: As indicated in the Mitigation Bank Instrument, the single remaining hydrologic performance standard for the East Phase (Table 4.3) can be completed in either the third, fourth, or fifth monitoring year, due to the potential for below-normal rainfall in any single year. Monitoring staff chose not to conduct the post-project modified wetland delineation in 2013 due to very low spring rainfall. The modified wetland delineation will be conducted in spring 2014.

Vernal pools: Constructed vernal pools had met the hydrologic performance standards and monitoring benchmarks by year 3 (2012), so will not receive continued formal monitoring in years 4 and 5.

Vegetation
Methods: Species lists were created for the 84 acres of the East Phase during meandering surveys in spring and summer 2013.

Site-wide quantitative vegetation monitoring for the fourth growing season after planting was conducted from June 10 through 14, 2013. Quantitative sampling involved measuring plant cover using the point-intercept method, where each point was an independent sample. In 2013, 342 sample points were collected systematically (with a random start) across the entire enhancement phase. Methods are described in detail in Appendix A. We continued to use the sample size from the year 3 monitoring (a discussion of sample size is found in the 2012 report). The monitoring grid of 1-acre squares, marked with wooden stakes in the field at intersections, is used to keep monitoring lines straight and consistent across the site from north to south (Figure 3.2 and in diagram in Appendix A).

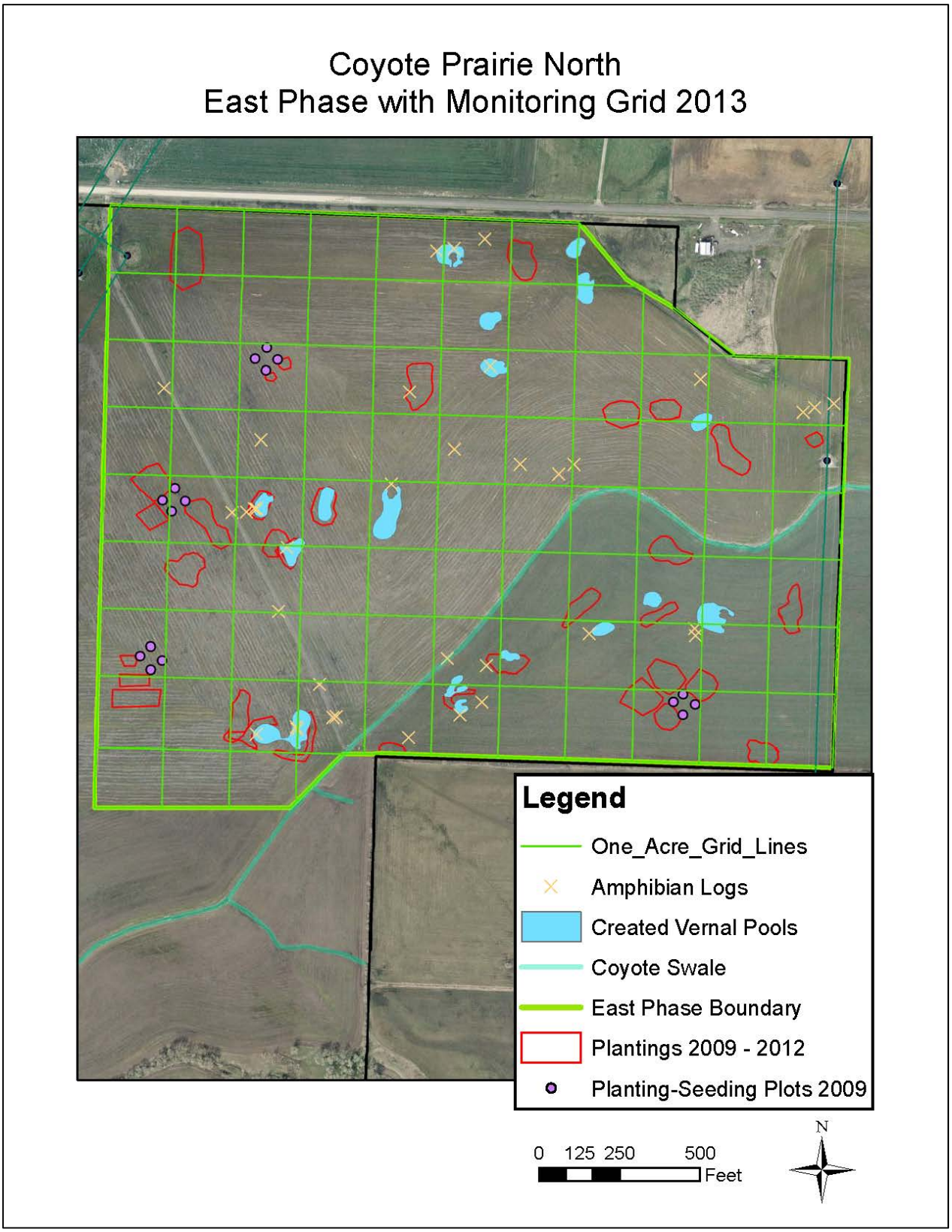

Figure 3.2. East Phase planting areas, amphibian logs, and monitoring grid.

Results

Quantitative vegetation monitoring

Results of the site-wide point-intercept vegetation monitoring are presented in Table 3.2. Plant cover in the East Phase continues to be high and overwhelmingly native. Total native plant cover (absolute) was 125% and nonnative plant cover (absolute; all nonnative species) was just over 7% (Table 3.2). Bare ground was under 11%.

Site-wide, five native species had cover values greater than 5%. Three of these were graminoids (1 *Juncus*, 1 *Carex*, 1 grass) and 2 were forbs. *Juncus occidentalis* continues to be the dominant native species across the site, at 56% cover. This species does not appear to be increasing further, providing 55% cover in 2011 and 60% cover in 2012.

Site-wide, nonnative species cover was 6 – 7 % (absolute and relative measures; Table 3.2). The nonnative grass, *Holcus lanatus,* was the only invasive species as defined using the DSL invasives list and USDA noxious weed lists. *Holcus lanatus* had cover less than 1% site-wide. Further analysis of invasiveness at the Coyote Prairie East restoration site occurs later in this chapter.

Table 3.2 Coyote Prairie East Phase Site-wide Point-intercept Monitoring Results, 2013.

Point-intercept percent cover monitoring results are presented for the entire phase (both units combined). Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species detected during monitoring.

	Area Sampled	**East Phase, 84 acres**		
	Sample Size	**342**		
	Plant Community	**Wet Prairie**		
Origin[1]	**Species or Guild (all herbaceous)**	**% Cover**	**CI Low**	**CI High**
	Native (absolute cover)	**124.6**		
	All Nonnative (absolute cover; includes invasives)	**7.3**		
	Invasive Nonnative (absolute cover)	**0.6**		
	Total Plant Cover (absolute cover)	**131.9**		
	Bare ground (no vascular plants, moss may occur)	**10.5**		
	Native[2] (a relative cover value)	**88**	**84.9**	**90.7**
	All Nonnative[2] (a relative cover value)	**6.7**	**4.6**	**9.2**
Native	*Juncus occidentalis (J. tenuis* var. *congestus)*	55.6	51.9	59.1
Native	*Grindelia integrifolia x. Grindelia nana*	14.3	11.9	17.1
Native	*Epilobium brachycarpum*	8.5	6.6	10.7
Native	*Agrostis exarata*	5.0	3.5	6.8

Table 3.2 Coyote Prairie East Phase Site-wide Point-intercept Monitoring Results, 2013.

Point-intercept percent cover monitoring results are presented for the entire phase (both units combined). Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species detected during monitoring.

	Area Sampled	**East Phase, 84 acres**		
	Sample Size	**342**		
	Plant Community	**Wet Prairie**		
Origin[1]	**Species or Guild (all herbaceous)**	**% Cover**	**CI Low**	**CI High**
Native	*Carex densa*	5.0	3.5	6.8
Native	*Lotus purshianus* var. *purshianus (L. unifoliolatus var. unifoliolatus)*	4.7	3.3	6.5
Native	*Bidens frondosa*	4.4	3.0	6.2
Native	*Potentilla gracilis* var. *gracilis*	4.1	2.8	5.8
Native	*Prunella vulgaris* var. *lanceolata*	2.6	1.6	4.1
Native	*Carex unilateralis*	2.0	1.1	3.4
Native	*Rumex salicifolius* var. *salicifolius*	2.0	1.1	3.4
Native	*Galium trifidum* var. *pacificum*	1.8	0.9	3.1
Native	*Epilobium ciliatum*	1.5	0.7	2.7
Native	*Deschampsia cespitosa*	1.2	0.5	2.3
Native	*Eriophyllum lanatum var. lanatum*	1.2	0.5	2.3
Native	*Madia elegans*	1.2	0.5	2.3
Native	*Madia glomerata*	1.2	0.5	2.3
Native	*Achillea millefolium*	0.9	0.3	1.9
Native	*Madia sativa*	0.9	0.3	1.9
Native	*Plagiobothrys figuratus*	0.9	0.3	1.9
Native	*Plagiobothrys scouleri* var. *scouleri*	0.9	0.3	1.9
Native	*Alopecurus geniculatus*	0.6	0.2	1.5
Native	*Gnaphalium palustre*	0.6	0.2	1.5
Native	*Gratiola ebracteacta*	0.6	0.2	1.5
Native	*Hordeum brachyantherum*	0.6	0.2	1.5
Native	*Bromus carinatus var. carinatus*	0.3	0.0	1.1
Native	*Carex feta*	0.3	0.0	1.1
Native	*Carex leporina*	0.3	0.0	1.1
Native	*Downingia yina*	0.3	0.0	1.1
Native	*Epilobium densiflorum*	0.3	0.0	1.1
Native	*Juncus effusis* var. *pacificus*	0.3	0.0	1.1
Native	*Panicum capillare ssp. capillare*	0.3	0.0	1.1
Native	*Rorippa curvisiliqua*	0.3	0.0	1.1

Table 3.2 Coyote Prairie East Phase Site-wide Point-intercept Monitoring Results, 2013.

Point-intercept percent cover monitoring results are presented for the entire phase (both units combined). Percent cover results are shown (with 80% binomial confidence intervals (CI)) for several guild types as well as each species detected during monitoring.

	Area Sampled	**East Phase, 84 acres**		
	Sample Size	**342**		
	Plant Community	**Wet Prairie**		
Origin[1]	**Species or Guild (all herbaceous)**	**% Cover**	**CI Low**	**CI High**
Native	*Sidalcia cusickii*	0.3	0.0	1.1
Invasive	*Holcus lanatus*	0.6	0.2	1.5
Nonnative	*Centaurium erythraea*	1.2	0.5	2.3
Nonnative	*Vicia tetrasperma*	1.2	0.5	2.3
Nonnative	*Vulpia myuros*	1.2	0.5	2.3
Nonnative	*Galium divaricatum*	0.9	0.3	1.9
Nonnative	*Briza minor*	0.3	0.0	1.1
Nonnative	*Daucus carota*	0.3	0.0	1.1
Nonnative	*Hypochaeris radicata*	0.3	0.0	1.1
Nonnative	*Leontodon taraxacoides*	0.3	0.0	1.1
Nonnative	*Lythrum hyssopifolium*	0.3	0.0	1.1
Nonnative	*Parentucellia viscosa*	0.3	0.0	1.1
Nonnative	*Poa pratensis*	0.3	0.0	1.1
Nonnative	*Vulpia bromoides*	0.3	0.0	1.1

1 In Origin column, invasive is as defined by DSL for mitigation monitoring (Oregon Dept of State Lands. 2009. Routine Monitoring Guidance for Vegetation. Interim review draft version 1.0).

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%.

Native species richness across the 84 acre East Phase was fairly high, as measured by the 72 native species observed during walking surveys. Walking surveys also identified 32 nonnative species. As is typically the case, many fewer species were detected by the point-intercept method during quantitative monitoring than were identified by walking surveys. Point-intercept monitoring encountered 33 native species and 13 nonnative species.

The evenness of plant diversity across the site appears to have declined slightly, by this fourth growing season after site-wide seeding. Clustered distributions have likely occured as species

have reproduced well in those regions of the site that have the hydrology and other environmental conditions that best meet their needs. Consequently, only 5 native species recorded during point-intercept monitoring had ≥5% cover across all 84 acres. To assess whether or not the site achieved the vegetation performance goal of at least 6 species having ≥5% cover in at least 10% of the site, we analyzed the first 10% of sample points taken and the last 10% of sample points taken, corresponding to the northernmost and southernmost portions of the site. These locations were also used in both 2012 and 2013 to assess whether any other species should be classified as invasive. The locations were chosen due to the higher level of nonnative species that occurred there in the first two growing seasons of the project.

The results from these two 10% subsamples are shown in Table 3.3. Six native species had ≥ 5% cover in the north plots and 7 native species had ≥ 5% cover in the south plots. Clustered distributions are apparent, in that the southernmost sample contained many fewer species than the northernmost sample (10 species in south vs. 22 in north) and contained 4 species not found in the more diverse northern region (*Bidens frondosa*, *Carex densa*, *Galium trifidum* var. *pacificum*, and *Gnaphalium palustre*).

Based on these subsamples and the site-wide data, no species met the additional DSL criteria for invasiveness of having at least 15% cover in at least 10% of the site and increasing from the previous year. The East Phase enhancement exceeded performance criteria in having only 0.6% cover of invasive nonnative species and 7.3% absolute cover of all nonnative species combined.

In conclusion, the East Phase enhancement continues to support diverse, dense, native vegetation, has low cover by nonnative plant species, and has few and sparse nonnative species that are considered invasive under the DSL definitions for wet prairie. The site has met or exceeded its fourth year vegetation performance standards (see Chapter 4).

Table 3.3 Coyote Prairie East Phase 10% Subsamples, Point-intercept Monitoring Cover Results, 2013.

Point-intercept percent cover monitoring results are presented for the the north and south regions, each representing a contiguous 10% of the samples taken. Percent cover results are shown for each species detected during monitoring.

	Area Sampled	**East Phase, 84 acres**
	Plant Community	**Wet Prairie**
Origin[1]	**Sample size**	**35 points (north region)**
Native	*Juncus occidentalis (J. tenuis var. congestus)*	31.4
Native	*Grindelia integrifolia x. Grindelia nana*	14.3
Native	*Agrostis exarata*	14.3
Native	*Prunella vulgaris* var. *lanceolata*	8.6
Native	*Carex unilateralis*	8.6

Table 3.3 Coyote Prairie East Phase 10% Subsamples, Point-intercept Monitoring Cover Results, 2013.

Point-intercept percent cover monitoring results are presented for the the north and south regions, each representing a contiguous 10% of the samples taken. Percent cover results are shown for each species detected during monitoring.

	Area Sampled	**East Phase, 84 acres**
	Plant Community	**Wet Prairie**
Origin[1]	**Sample size**	**35 points (north region)**
Native	*Plagiobothrys figuratus*	8.6
Native	*Epilobium brachycarpum*	2.9
Native	*Lotus purshianus* var. *purshianus (L. unifoliolatus* var. *unifoliolatus)*	2.9
Native	*Potentilla gracilis* var. *gracilis*	2.9
Native	*Rumex salicifolius* var. *salicifolius*	2.9
Native	*Epilobium ciliatum*	2.9
Native	*Deschampsia cespitosa*	2.9
Native	*Plagiobothrys scouleri* var. *scouleri*	2.9
Native	*Hordeum brachyantherum*	2.9
Native	*Bromus carinatus* var. *carinatus*	2.9
Native	*Carex feta*	2.9
Native	*Rorippa curvisiliqua*	2.9
Nonnative	*Vulpia myuros*	2.9
Nonnative	*Galium divaricatum*	2.9
Nonnative	*Holcus lanatus*	2.9
Nonnative	*Poa pratensis*	2.9
Nonnative	*Vulpia bromoides*	2.9
		35 points (south region)[3]
Native	*Juncus occidentalis (J. tenuis* var. *congestus)*	54.3
Native	*Epilobium brachycarpum*	17.1
Native	*Carex densa*	14.3
Native	*Grindelia integrifolia x. Grindelia nana*	11.4
Native	*Bidens frondosa*	8.6
Native	*Galium trifidum* var. *pacificum*	8.6
Native	*Agrostis exarata*	5.7
Native	*Potentilla gracilis* var. *gracilis*	2.9
Native	*Deschampsia cespitosa*	2.9
Native	*Gnaphalium palustre*	2.9

[3]No nonnative species were encountered during point-intercept monitoring of this region.

Shrub islands. In spring 2012, City staff coordinated planting of shrub islands in the East Phase to meet the 2012 and 2014 benchmarks for the Ha-Yaba Unit (Table 4.2). The final monitoring of shrub survival will occur in spring or summer 2014.

Pyrracoma racemosa var. *racemosa*. This taxon is considered a sensitive species in the West Eugene Wetlands and is included in the West Eugene Wetland seed increase program. Staff distributed seed from production beds in 4 plots in fall 2009 during the initial seeding of this site and additional seed has been added as available in succeeding years to those plots where the species became established (plots A and B). Monitoring occurs during flowering and involves counting all flowering plants in and adjacent to the plot. A total of 155 plants were found among the 4 plots in 2013.

Table 3.4 *Pyrracoma racemosa* var. *racemosa* Establishment in the East Phase.

The number of flowering *P. racemosa* var. *racemosa* plants recorded in 4 seeding plots, 2010-2013.

Plot	**# of plants**			
Year	**2010**	**2011**	**2012**	**2013**
A	0	Present	16	16
B	Present	18	118	139
C	0	0	No further monitoring (no seeding since 2009)	-
D	Present	<5 plants	<5 plants	0

Wildlife Utilization at Coyote Prairie, 2010 - 2013

Invertebrates:
A variety of caddisfly larvae and other aquatic macroinvertebrates (e.g. ostracods, copepods, daphnia) continue to be present in pooled and flowing water in the East Phase of Coyote Prairie. A group of North American Butterfly Association volunteers collected butterfly use data from Coyote Prairie in 2011 and 2012. The surveyors documented over 700 individuals of 14 species using the East phase enhancement from April through September 2012. See their report at http://www.naba.org/chapters/nabaes/.

Reptiles and amphibians:
Adult long-toed salamanders have been observed in the north part of the East Phase of Coyote Prairie and salamander larvae (probably long-toed salamanders, although identification was not confirmed) were documented in Pool 2 on April 26, 2012. Garter snakes were observed in the East Phase enhancement in 2011. Pacific chorus frogs continue to use the East Phase pools for breeding. Frog larvae were present in 12 of the vernal pools created in the East Phase in April 2012 and adult frogs are often seen in wet prairie vegetation in spring.

Birds:
Raptors (e.g. hawks, kites, owls) and songbirds continue to be sighted foraging in all Coyote Prairie restoration phases. In particular, in the East Phase, raptors continue perching on the wooden grid stakes to feed, as evidenced by rodent remains and raptor pellets around stakes throughout the site. Bald eagles were spotted by volunteers conducting aquatic monitoring in 2010. In winter 2010-11, three short-eared owls were observed repeatedly in the East Phase; they were observed again in January and November 2012. Western meadowlarks have been documented frequently in winter foraging flocks of 10 to 20 and in spring 2012 males were again observed singing from stakes and cottonwood logs. Ground-nesting birds, such as California quail, killdeer, and savannah sparrows were documented to nest in the East phase in 2009 -2013. Waterbirds are occasionally seen feeding in the vernal pools in winter and a female duck was inadvertently flushed off 11 eggs in mid-April 2013.

Mammals:
Voles are present throughout the East Phase enhancement. Herds of elk occasionally cross the enhancement areas, as evidenced by tracks and scat found across the site and observations of herds on the adjacent ODFW property. Bear and bear sign have been spotted in nearby enhancement Phase 1 of the Coyote Prairie site.

Chapter 4. Progress Toward Meeting Performance Standards

Monitoring and assessment to verify progress toward meeting performance standards in the East Phase, as described in the Coyote Prairie North Mitigation Bank Instrument, are summarized in Tables 4.1, 4.2 and 4.3 below. Table 4.1 shows progress toward meeting vegetation standards for both units, Table 4.2 shows progress toward meeting benchmarks in the Ha-Yaba Unit (Unit 1), and Table 4.3 shows progress toward meeting hydrologic performance standards in the Walahan Unit (Unit 2).

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

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

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	East Phase Data (Calendar Yr Collected)	Goal Met?
1	All	Seeding assessment will document initial vegetation establishment	Qualitative seeding assessment	Completed (2010 report)	Y
2	All	Native vascular plant cover > 40%	Point Intercept	Native cover = 143% (2011 report)	Y
2	All	Bare ground < 40%	Point Intercept	Bare ground = 6% (2011 report)	Y
2	All	Nonnative *invasive* vascular plant cover is less than 10%	Point Intercept	Nonnative invasive cover = 0.2% (2011 report)	Y

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

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

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	East Phase Data (Calendar Yr Collected)	Goal Met?
3	All	Native vascular plant cover > 40%	Point Intercept	Native cover = 163% (2012 report)	Y
3	All	Bare ground < 40%	Point Intercept	Bare ground = 5.2% (2012 report)	Y
3	All	Nonnative *invasive* vascular plant cover is less than 10%	Point Intercept	Nonnative invasive cover = 1.5% (2012 report)	Y
3	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	8 native species have ≥5% cover over entire phase (2012 report)	Y
4	All	Native vascular plant cover > 60%	Point Intercept	Native cover = 125% (this 2013 report)	Y
4	All	Bare ground < 40%	Point Intercept	Bare ground = 11% (this 2013 report)	Y
4	All	Nonnative invasive vascular plant cover is less than 10%	Point Intercept	Nonnative invasive cover = 0.6% (this 2013 report)	Y
4	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	6 native species have ≥5% cover in at least 10% of the site (this 2013 report)	Y

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

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

Monitoring Year	Phase/ Unit	Vegetation Performance Standards	Monitoring method	East Phase Data (Calendar Yr Collected)	Goal Met?
5	All	Native vascular plant cover > 75%	Point Intercept	2014	TBD
5	All	Bare ground < 20%	Point Intercept	2014	TBD
5	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	2014	TBD
5	All	Nonnative invasive vascular plant cover is less than 10%	Point Intercept	2014	TBD
5	All	Nonnative plant cover is less than 15% of total plant cover	Point Intercept	2014	TBD
5	All	At least 50 native vascular plant species are present	Walking surveys	2014	TBD

Table 4.2. Progress of the Coyote Prairie North, East Phase Enhancement, Ha-Yaba Unit (Unit 1), Toward Meeting Monitoring Benchmarks Identified in the MBI.

The performance of the Ha-Yaba Unit will be measured by conducting an HGM-based functional wetland assessment by the completion of year 5 to determine if the unit has achieved the level of ecological enhancement anticipated and described in the Mitigation Bank Instrument. Although the actions below are not performance criteria, the City is documenting them to ensure the unit is on track to meet anticipated enhancement levels by year 5.

Monitoring Yr	Monitoring Benchmark	Monitoring and Reporting Method	East Phase Data	Benchmark Met?
3	Plant at least 0.5 acre of shrub patches, with at least 3 native wetland shrub species.	Planting date, species, and mapped locations of shrub patches.	Planted 1.5 acres of 5 species (2012 report)	Y
5	Majority of plants in the shrub patches have new stems emerging, indicating that they are established and expanding.	Shrub survival and area occupied (all shrubs within 15 m of one another are considered to be part of the same patch).	2014 reporting	TBD
5	Place multiple logs over 6 ft in length in the Ha-Yaba Unit to provide sheltering locations for wildlife.	Location and number of logs.	Completed placement of 8 cottonwood logs in the Ha Yaba Unit (2012 report)	Y
3, 4, or 5	At least 2 vernal pools, with a combined area of least 10,000 sq feet (0.23 acre), are inundated to no more than 6 inches for at least two weeks continuously during December through March. At least one pool is inundated into May.	Duration, depth, and size of vernal pools between January and May.	Vernal pool data (2012 report)	Y

Table 4.3. Progress of the Coyote Prairie North, East Phase Enhancement, Walahan Unit (Unit 2), Toward Meeting the Hydrologic Performance Standards Identified in the MBI.

The most recent data for the East Phase are compared to their relevant performance standards. The number in the 'Monitoring Yr' column indicates the potential years in which data can be collected to evaluate the site's success in meeting the associated standard. A corresponding year in the 'East Phase Data' column indicates the calendar year data will be collected.

Monitoring Yr	Hydrologic Performance Standards	Monitoring and Reporting Method	East Phase Data	Goal Met?
0, 1	PSH2, PSH5: excavate vernal pools and swales and remove Cantrell ditch	As-built report	Excavation occurred summer 2009; as-built report submitted November 2009	Y
1, 2	PSH5: $\geq$ 10 vernal pools are holding water for at least 8 weeks between January and April. At least 10 pools are in Unit 2.	November – May pool fill dates and depths	14 pools inundated for at least 8 weeks (2011 report)	Y
3, 4, or 5	PSH2: released flows from Cantrell Ditch cross site.	Photo documentation of released Cantrell Ditch flows and hydrologic mapping	Surface water flows diverted from ditch by constructed swales (Feb 2012 report)	Y
3, 4, or 5	PSH1: 84 acres exhibit wetland hydrology	Modified wetland delineation	2014 during year of near normal rainfall	TBD

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 (not started) and the East Phase (currently active phase). The East Phase is further divided into two units: the Ha-Yaba Unit (Unit 1) and the Walahan Unit (Unit 2), which have different performance criteria. The monitoring is designed to document development of the enhancements and determine if performance criteria area being met.

Photo documentation, hydrologic monitoring, and vegetation monitoring are conducted in both of the east units, although because the performance standards for the units vary, the type of monitoring conducted at each Unit is not identical.

Photopoints
Purpose: Photo document surface hydrology and vegetation structure. 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 landmarks).
3. A complete set of photos are stored with the City of Eugene, Parks and Open Space Division and are available upon request.

Hydrology
Purpose: Assess whether wetland hydrology is established within the enhancement site. The extent of soil saturation during the growing season (March 3 – November 21; NRCS data for Lane County) 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. The timing of the spring visit should extend at least 2 weeks into the beginning of the growing season.
3. Water depth is recorded in November, December, or January and again in April or May from the 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.
4. A modified wetland delineation (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). is conducted in year 3, 4, or 5, when precipitation is near normal.

Vegetation Monitoring

The standard protocol for quantitative vegetation monitoring at West Eugene Wetlands Mitigation Bank sites was developed in 1994 and further expanded and revised in 1997 and 1998. 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 vegetation within enhancement sites.

Species Lists

Purpose: Annually assess the status of each site 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 (early to mid-August).
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.

Planting 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 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+% cover, Common = 10 – 39% cover, Occasional = 2 -9% cover, Trace = present, but less than 2% 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 are 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.

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.

4. The number of samples collected should be at least 200 in the first monitoring year of an 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.

5. In 2011, at Coyote Prairie North, East Phase, a large number of sample points (679) were collected, so that the effects of future changes in sample size could be evaluated. Based on an analysis of the 2011 data, in 2012 and 2013 the sample size was halved (see 2012 report for a discussion of sample size). The detail in the following discussion of sample points (number per grid square, total number) is for the 2011 sample size (8 points per grid square). The change in 2012 and 2013 reduced the number of points per grid square from 8 to 4. Location of sample points were identified in the following way:

    a. The sampling method uses the grid system that the City installed in the East Phase and which divides the 84-acre site 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.

    b. 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 transect on the x-axis is identified to be a random number between 1 and 10 (assigned via random number table). Based on the 2011 randomly chosen start point of 9 meters and the desire for at least 600 sampled points, the 2011 sampling locations were as follows: 4 points were sampled in the north half of the each grid square at 9 m, 27 m, 45 m, and 63 m east of each grid line (Fig. A-1). This was repeated, using the same x-coordinates along a second transect in the south half of each grid.

    c. The start point for the two east-west transects, described above, were established for each grid using two random numbers (one in the north and one in the south half of the square) chosen along the north-south axis (y-axis). On the y-axis, two transects were run within each 1-acre grid square at points 17 m and 47 m south of the north grid lines. Thus, within each of the 84 one-acre squares, sampling occurred at the following x-y coordinates: 9-17, 27-17, 45-17, 63-17, 9-47, 27-47, 45-47, and 63-47,

except within partial squares. (Fig. A-1).

d. All distances were paced by the monitoring crew after equating their paces to actual distances measured with a measuring tape.

e. The site is slightly larger than 84 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, 679 total samples were collected.

f. To reduce bias in arriving at the exact sample location, the monitoring crew uses a meter stick and measures off the tip of their boot to locate it, once they have paced to within 1-meter of their sample location.

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 on its route to the ground at that location. The pole is held vertical during lowering by assessment and adjustment of a level on a specially modified camera tripod.

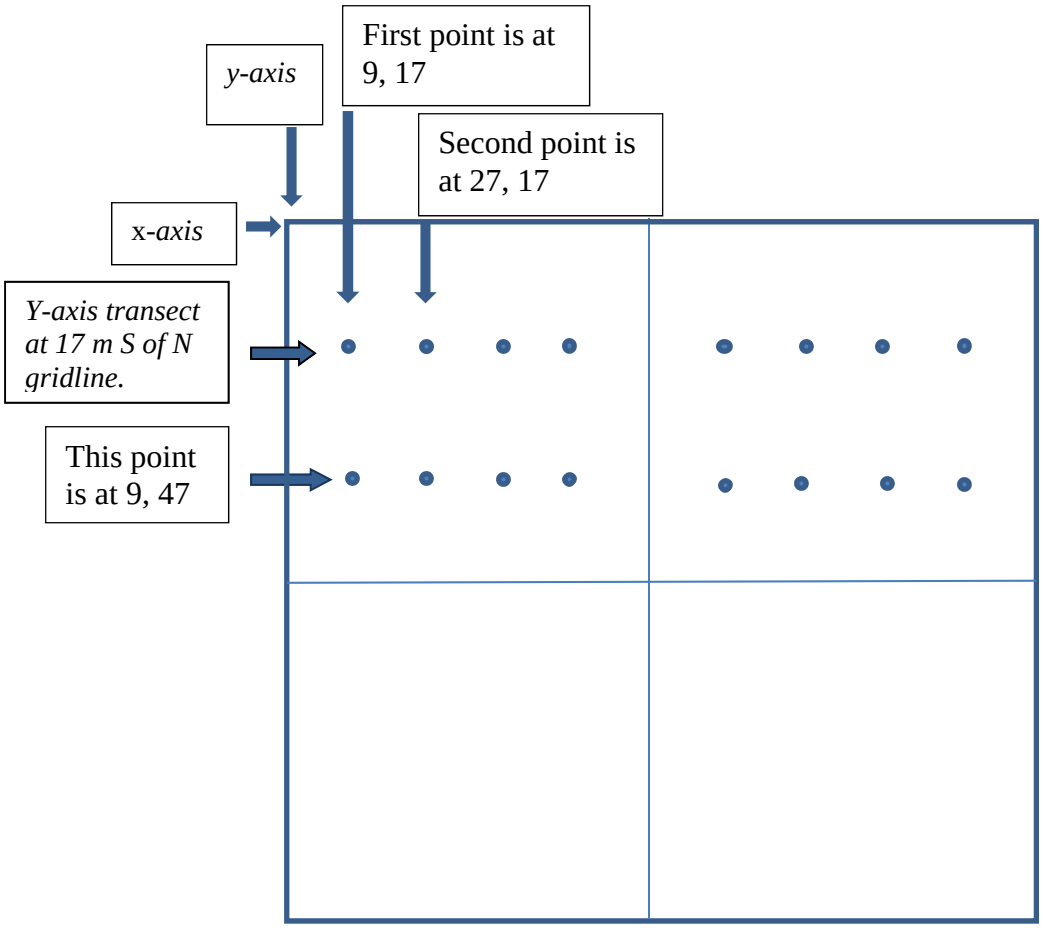

Figure A-1. Coyote Prairie, East Phase grid-based monitoring strategy. Four example one-acre grid squares are shown (points shown only in two). Dots represent sampled points, based on 2011 sample size needs and random start number. In each grid square 8 sample points were collected (4 on each of two transects).

7. Ground cover is identified at each sample point as either bare, moss, or litter. Although this data is collected at each point, only samples that record no plant cover are included in the calculation of percent bare ground. The data collected on litter may be used in future years in determining how rapidly thatch build-up occurs in newly enhanced wetland prairies.

8. The habitat type of each point is also noted (emergent, vernal pool, wet prairie).

9. The percentage of ground covered by each species is calculated by dividing the total number of observations of each plant by the total number of sample points. Cover estimates are given with 80% binomial confidence intervals, unless otherwise indicated.

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

Native Cover: *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%*
Nonnative Cover: *the sum of all individual nonnative vascular plant species cover values; an absolute value that can exceed 100%*
Invasive Nonnative Cover: *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.*
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 plant, divided by the total pin drops; combines scores for bare ground, litter, and moss.*

Appendix B. Species Lists

These lists include species recorded in all enhancement phases at Coyote Prairie, including Phase 1 and 2 completed under the *West Eugene Wetland Mitigation Bank* and the East Phase, being completed under the *Coyote Prairie Wetland Mitigation Bank*.

		Site	**Coyote Prairie**			
		Phase	**1**	**2**	**2**	**North East**
		Section			**Remnant**	
Scientific Name	**Common Name**	**Origin**				
Achillea millefolium	Yarrow	N	X	X	X	X
Agrostis exarata	spike bentgrass	N	X	X	X	X
Agrostis stolonifera/capillaris	fiorin (bentgrass)	I				
Aira caryophyllea	silver hairgrass	I				
Alisma lanceolatum	narrowleaf waterplantain	I				
Alisma trivale	northern waterplantain	N	X	X		X
Allium amplectens	Slim leaf onion	N	X	X	X	X
Alopecurus geniculatus	water foxtail	N	X	X		X
Alopecurus pratensis	meadow foxtail	I	X		X	X
Amelanchier alnifolia var. semiintegrifolia	western serviceberry	N			X	
Anagallis arvensis	scarlet pimpernel	I	X	X		X
Anaphalis margaritacea	pearly everlasting	N				
Anthemis cotula	mayweed chamomile	I				
Anthoxanthum odoratum	sweet vernalgrass	I			X	X
Anthriscus caucalis	bur chervil	I			X	
Asclepias speciosa	showy milkweed	N				
Beckmannia syzigachne	American sloughgrass	N	X	X	X	X
Bidens frondosa	leafy beggars-tick	N				X
Bidens sp.						
Briza minor	little quaking-grass	I			X	X
Brodiaea coronaria	harvest brodiaea	N				
Brodiaea elegans	harvest brodiaea	N		X	X	

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Bromus carinatus	California brome	N				X
Bromus hordeaceus	soft brome	I		X	X	X
Calandrinia ciliata	red maids	N				
Camassia leichtlinii ssp. suksdorfii	tall camas	N		X	X	X
Camassia quamash ssp. maxima	common camas	N		X	X	
Cardamine hirsuta	hairy bittercress	I		X		
Cardamine penduliflora	Willamette V. bittercress	N				
Carex densa	dense sedge	N	X	X	X	X
Carex feta	green-sheath sedge	N	X			X
Carex leporina	oval broom sedge	N	X		X	X
Carex obnupta	slough sedge	N	X			
Carex stipata var. stipata	awl-fruit sedge	N				X
Carex tumulicola	foothill sedge	N			X	
Carex unilateralis	one-sided sedge	N	X	X	X	X
Carex vesicaria	inflated sedge	N				
Castilleja tenuis	hairy owl-clover	N	X	X	X	
Centaurium erythraeae	common centaury	I	X	X	X	X
Centunculus minimus	Chaffweed	N	X			
Cerastium glomeratum	sticky chickweed	I	X	X	X	X
Chamerion angustifolium var. canescens	perennial fireweed	N		X		X
Cicendia quadrangularis	Timwort	N				
Cirsium arvense	Canada thistle	I			X	
Cirsium vulgare	bull thistle	I		X	X	
Clarkia amoena ssp. lindleyi	farewell-to-spring	N	X	X		
Clarkia purpurea ssp. quadrivulnera	winecup clarkia	N		X	X	X
Collomia grandiflora	grand collomia	N		X		X
Convolvulus arvensis	bindweed	I				
Conyza canadensis	Canadian horseweed	I				

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Crassula aquatica	water pygmy weed	N	X			
Crataegus monogyna	English hawthorn	I				
Crataegus suksdorfii	black hawthorn	N			X	
Crataegus suksdorfii X monogyna	Hybrid hawthorn	I				
Crepis capillaries	smooth hawksbeard	I		X		
Crepis setosa	bristly hawksbeard	I				
Cynosurus echinatus	hedgehog dogtail	I	X			
Cyperus eragrostis	tall flatsedge	I			X	
Danthonia californica	California oatgrass	N		X		X
Daucus carota	Queen Anne's lace	I		X	X	X
Deschampsia cespitosa	tufted hairgrass	N	X	X	X	X
Deschampsia danthonioides	annual hairgrass	N				X
Dianthus armeria	Deptford pink	I		X	X	
Dichanthelium acuminatum var. fasciculatum	western witchgrass	N		X	X	
Dichelostemma congestum	ookow	N		X		
Dipsacus fullonum	Teasel	I		X	X	X
Downingia elegans	showy downingia	N		X		X
Downingia yina	Willamette downingia	N	X	X	X	X
Echinochloa crus-galli	large barnyard-grass	I		X		X
Eleocharis acicularis	needle spike-rush	N	X			
Eleocharis obtusa	common spike-rush	N	X	X		X
Eleocharis palustris	common spikerush	N	X	X		X
Elymus glaucus ssp. glaucus	western ryegrass	N				
Epilobium brachycarpum	autumn willowherb	N	X	X	X	X
Epilobium campestre	smooth willowherb	N				
Epilobium ciliatum	hairy willowherb	N	X	X	X	X
Epilobium densiflorum	dense spike-primrose	N		X	X	X
Equisetum sp.	Horsetail	N				

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Eriophyllum lanatum var. lanatum	wooly sunflower	N	X	X	X	X
Eryngium petiolatum	coyote thistle	N		X		X
Festuca roemeri	Roemer's fescue	N				
Fragaria virginiana ssp. platypetala	mountain strawberry	N	X	X		
Fraxinus latifolia	Oregon ash	N		X	X	
Galium aparine	catchweed	N		X		
Galium divaricatum	wall bedstraw	I	X	X		X
Galium sp.	bedstraw sp.	N/I			X	
Galium trifidum	small bedstraw	N	X	X		X
Galium triflorum	Fragrant bedstraw	N				
Gentiana sceptrum	King’s gentian	N				
Geranium dissectum	cut-leaved geranium	I	X	X	X	
Geranium lucidum	Shining Geranium	I		X		
Geum macrophyllum	large-leaf avens	N				
Gilia capitata ssp. capitata	bluehead gilia	N		X		
Glyceria occidentalis	western mannagrass	N				
Gnaphalium palustre	lowland cudweed	N	X	X		X
Gnaphalium purpureum	purple cudweed	N	X			
Gnaphalium stramineum	cotton batting plant	N	X			
Gnaphalium uliginosum	marsh cudweed	I	X			
Gratiola ebracteata	bractless hedge-hyssop	N	X	X		X
Grindelia integrifolia × Grindelia nana var. nana	Willamette V. gumweed	N	X	X	X	X
Heracleum maximum	cow parsnip	N		X		
Holcus lanatus	velvet grass	I			X	X
Hordeum brachyantherum	meadow barley	N		X		X
Hordeum marinum	Mediterranean barley	I				
Hypericum perforatum	St. John's-wort	I		X	X	X

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Hypochaeris radicata	false dandelion	I	X	X	X	X
Isoetes sp.	Quillwort	N	X			
Juncus acuminatus	tapered rush	N	X			
Juncus articulatus	jointed rush	N			X	
Juncus bolanderi	Bolander's rush	N	X	X		X
Juncus bufonius	toad rush	N	X	X	X	X
Juncus effusus var. effuses	common rush	I				X
Juncus effusus var. pacificus	soft rush	N	X			X
Juncus ensifolius	Swordleaf rush	N	X			
Juncus marginatus	grass-leaf rush	I	X			
Juncus nevadensis	Nevada rush	N			X	X
Juncus occidentalis	slender rush	N	X	X	X	X
Juncus oxymeris	pointed rush	N	X			X
Juncus patens	Spreading rush	N	X		X	X
Kickxia elatine	cancerwort	I				
Lactuca saligna	willow lettuce	I		X		
Lactuca serriola	prickly lettuce	I		X	X	X
Lasthenia glaberrima	smooth lasthenia	N	X	X		X
Lathyrus aphaca	yellow vetch	I		X		
Lathyrus hirsutus	rough pea	I				
Lathyrus sphaericus	grass pea	I				
Leontodon taraxacoides	hairy hawkbit	I	X	X	X	X
Leucanthemum vulgare	oxeye daisy	I	X		X	X
Linum bienne	pale flax	I	X		X	
Lolium multiflorum	Italian ryegrass	I		X	X	X
Lomatium bradshawii	Bradshaw's desert parsley	N			X	
Lomatium nudicaule	barestem desert-parsley	N		X	X	X
Lotus corniculatus	bird'sfoot trefoil	I	X			
Lotus formosissimus	seaside lotus	N	X	X		
Lotus micranthus	small-flowered deervetch	N				
Lotus unifoliolatus	Spanish-clover	N	X	X	X	X
Lupinus affinis	fleshy lupine	N				

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Lupinus bicolor	field lupine	N		X		
Lupinus oreganus	Kincaid'slupine	N				
Lupinus polyphyllus var. polyphyllus	bigleaf lupine	N		X		X
Lupinus rivularis	stream lupine	N	X	X		
Luzula comosa var. comosa	field woodrush	N	X	X	X	
Lythrum hyssopifolium	hyssop loosestrife	I	X	X	X	X
Lythrum portula	water-purslane	I	X	X		
Madia elegans	showy tarweed	N	X	X	X	X
Madia glomerata	cluster tarweed	N	X	X	X	X
Madia sativa	coast tarweed	N	X	X	X	X
Malus fusca	western crab-apple	N				
Matricaria discoidea	pineapple weed	N				
Melilotus alba	white sweetclover	I				
Mentha pulegium	pennyroyal	I	X	X	X	X
Micranthes integrifolia	swamp saxifrage	N				
Micranthes oregana	bog saxifrage	N	X	X		X
Microseris laciniata ssp. laciniata	cut-leaved microseris	N		X	X	X
Microsteris gracilis	pink microsteris	N	X	X		X
Mimulus guttatus var. depauperatus	depauperate monkeyflower	N		X	X	X
Moenchia erecta ssp. erecta	Moenchia	I			X	
Montia linearis	narrow-leaved montia	N	X	X		
Myosotis discolor	yellow & blue forget me not	I	X	X	X	
Myosotis laxa	small-flowered forget me not	N	X	X		
Navarretia intertexta ssp. intertexta	needle-leaved navarrertia	N	X	X	X	X
Navarretia squarrosa	skunkweed	N		X	X	
Navarretia willamettensus	Willamette navarretia	N				X
Nemophila menziesii	baby blue eyes	N		X		
Orobanche californica ssp. califonica	California broomrape	N				

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Orthocarpus bracteosus	rosy owl-clover	N		X		X
Panicum capillare ssp. capillare	common witchgrass	N	X			X
Parentucellia viscosa	yellow parentucellia	I	X	X	X	X
Perideridia montana	Gairdner's yampah	N		X		
Perideridia oregana	Oregon yampah	N			X	X
Persicaria hydropiperoides	marshpepper smartweed	N	X			
Persicaria maculosa	heartweed	I	X	X		X
Phalaris aquatica	Harding grass	I				
Phalaris arundinacea	reed canarygrass	I				
Phleum pratense	Timothy	I				
Plagiobothrys figuratus var. figuratus	fragrant popcorn-flower	N	X	X	X	X
Plagiobothrys scouleri	Scouler's popcorn-flower	N	X	X		X
Plantago lanceolata	English plantain	I			X	
Plectritis congesta	rosy plectritis	N	X	X	X	X
Poa annua	annual bluegrass	I		X		
Poa compressa	Canada bluegrass	I				
Poa pratensis	Kentucky Blugrass	I				X
Poa sp.	bluegrass sp	I		X		
Polygonum aviculare ssp. aviculare	doorweed	I				
Polygonum douglasii	douglas knotweed	N				
Populus trichocarpa	black cottonwood	N	X			
Portulaca oleracea	little hogweed	I				X
Potentilla gracilis var. gracilis	slender cinquefoil	N	X	X	X	X
Prunella vulgaris var. *lanceolata*	self-heal	N	X	X	X	X
Prunus sp.	plum	I				
Psilocarphus spp.	wooly heads	N				
Pyrrocoma racemosa var. racemosa	racemed goldenweed	N				X
Pyrus communis	pear	I			X	
Pyrus malus	apple	I				
Ranunculus alismifolius	water-plantain buttercup	N				X

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Ranunculus aquatilis	white water buttercup	N				
Ranunculus flammula	creeping buttercup	N				
Ranunculus occidentalis	western buttercup	N	X	X	X	
Ranunculus orthorhynchus	straight beaked buttercup	N		X	X	X
Ranunculus sceleratus	celery-leaf butter-cup	N				
Rhamnus purshiana	cascara	N				
Rorippa curvisiliqua	western yellowcress	N	X	X		X
Rorippa palustris						
Rosa multiflora	many flowered rose	I				
Rosa nutkana	Nootka rose	N			X	X
Rosa pisocarpa	peafruit rose	I				
Rosa sp.	rose sp.	N/I	X			
Rubus bifrons	Himalayan blackberry	I	X	X	X	X
Rubus laciniatus	evergreen blackberry	I				
Rumex acetocella	sheep sorrel	I	X			
Rumex conglomeratus	clustered dock	I	X			
Rumex crispus	curly dock	I	X	X	X	X
Rumex salicifolius var. salicifolius	willow dock	N	X	X		X
Saxifraga oregana (see Micranthes oregana)						
Salix sp.	willow	N	X			X
Schedonorus arundinaceus	tall fescue	I		X	X	
Schoenoplectus tabernaemontani	softstem bulrush	N				
Senecio jacobea	tansy ragwort	I		X	X	X
Senecio sylvaticus	wood groundsel	I		X		
Senecio vulgaris	old-man-in-the-spring	I		X		
Sericocarpus rigidus	rigid white topped aster	N				
Sherardia arvensis	blue field-madder	I				

		Site	Coyote Prairie			
		Phase	1	2	2	North East
		Section			Remnant	
Sidalcea cusickii	Cusick's checker-mallow	N		X		X
Sidalcea malviflora ssp. virgata	dwarf checker-mallow	N	X			
Sisyrinchium bellum	Western blue-eyed grass	N				
Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass	N				X
Sisyrinchium idahoense	Idaho blue-eyed grass	N	X	X	X	X
Solanum dulcamara	bitter nightshade	I		X		
Solanum nigrum	black nightshade	I				
Sonchus asper	prickly sow-thistle	I		X	X	X
Sparganium emersum	simplestem bur-reed	N				
Spergula arvensis	stickwort	I				
Spergula rubra	red sandspurry	I		X		
Spiraea douglasii	Douglas spirea	N	X			X
Spiranthes romanzoffiana	hooded ladies tresses	N				
Stellaria media	chickweed	I				
Symphoricarpos albus var. laevigatus	snowberry	N				
Symphyotrichum hallii	Hall's aster	N		X	X	X
Tanecetum vulgare	common tansy	I				
Taraxicum officinale	dandelion	I		X		
Toxicodendron diversiloba	poison oak	N				
Toxicoscordion venenosum	meadow death camas	N		X	X	
Trifolium arvense	rabbitfoot clover	I				
Trifolium dubium	least hop clover	I			X	
Trifolium pratense	red clover	I				
Trifolium repens	white clover	I				
Trifolium subterraneum	subterranean clover	I				
Trifolium vesiculosum	arrowleaf clover	I				
Triphysaria versicolor ssp. versicolor	johnnytuck	N				
Triteleia hyacinthina	hyacinth brodiaea	N		X	X	X

		Site	Coyote Prairie			
		Phase	**1**	**2**	**2**	**North East**
		Section			**Remnant**	
Typha latifolia	cat-tail	N		X		
Verbascum blattaria	moth mullein	I				
Verbascum thapsus	common mullein	I				
Veronica americana	American speedwell	N				
Veronica peregrine var. xalapensis	purslane speedwell	N	X	X	X	X
Veronica scutellata	marsh speedwell	N	X			X
Vicia cracca	bird vetch	I			X	
Vicia hirsuta	hairy vetch	I				
Vicia sativa	common vetch	I			X	
Vicia tetrasperma	slender vetch	I	X	X	X	X
Vulpia bromoides	barren fescue	I	X	X	X	X
Vulpia myuros	rat-tail fescue	I	X	X		X
Wyethia angustifolia	narrow-leaf mule's ears	N	X	X	X	X
Zeltnera muehlenbergii	monterey centaury	N				