Coyote Prairie North Mitigation Bank
2016 Report

March 2016

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 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 criteria.

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. The City submitted the As-Built Report in November 2015 and documentation of the first fall/winter seeding and planting in spring 2016.

The 2015 earthwork also included conversion of an agricultural ditch to restore site hydrology. The ditch, which flowed through the East Phase and Phase 2, 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 across the southeast part of the site in a northwest direction 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 project, as well as the financial status of the bank, credit summaries, and 2016 monitoring, seeding, and planting information for the West Phase.

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

The first release of credits to the CPNMB occurred in 2011. During the next 3 years, the CPNMB had a series of releases and sales that left 0.00 credits on the ledger at the end of 2014. Performance criteria were met in the East Phase in 2014, and 5.73 credits were released to the bank early in 2015. The final 25% of the credits for the East Phase (9.53 credits), and 25% of the credits expected for the West Phase (9.81 credits) were released in the fall of 2015 following the approval of the Long Term Management Plan. During 2015, the CPNMB sold a total of 6.16 credits in six transactions, leaving a final balance of 18.91 credits at the end of the year. In 2016, the bank sold 5.032 credits in 6 transactions and received the release of 1.79 credits for reporting on the 2015 construction of the West Phase.

A summary of 2016 credit transactions for the CPNMB is reported in Table 2.1. The anticipated credit release schedule for the active phase of the bank (West Phase) is provided in Table 2.3.

Table 2.1 2016 Credit Transactions, Coyote Prairie North Wetland Mitigation Bank

	Purchase Date	Credits in Transaction	Balance
Credit balance on January 1, 2016			18.91
Credits requested for certification during year (5% of Expected West Phase Credits)	June, 2016	1.79	20.70
Credits sold in 2016			
Bonneville Power Administration	February, 2016	(0.780)	19.92
Bonneville Power Administration	March, 2016	(0.210)	19.71
Bonneville Power Administration	March, 2016	(0.690)	19.02
Benton County Public Works	April, 2016	(0.002)	19.018
City of Albany	June, 2016	(2.860)	16.158
Smith Seed Services	December, 2016	(0.49)	15.668
Subtotal of credits sold in 2016		**(5.032)**	
Credit balance as of December 31, 2016			**15.668**

Annual credit sales from 2012 - 2016
Since its first credit sale in 2012, the Coyote Prairie North Mitigation Bank has sold a total of 40.192 mitigation credits. See Table 2.2 for an annual tally of credit sales.

Table 2.2. Summary of Coyote Prairie North Mitigation Bank Annual Credit Sales, 2012 – 2016

Calendar Year	Total Credits Sold
2012	0.71
2013	8.23
2014	20.06
2015	6.16
2016	5.032
Total	**40.192**

Table 2.3 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
	10% (55%)	1st growing season performance standards	3.92 (21.60)	
	10 % (65%)	2nd growing season performance standards	3.92 (25.52)	
	10% (75%)	3rd growing season performance standards	3.92 (29.44)	
	10% (85%)	4th growing season performance standards	3.92 (33.36)	
	15% (100%)	5th growing season performance standard	5.89 (39.25) **	

***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 slightly 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.**

****A final determination of the number of credits for the West Phase will be made after a final delineation has been approved.**

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. 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 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.

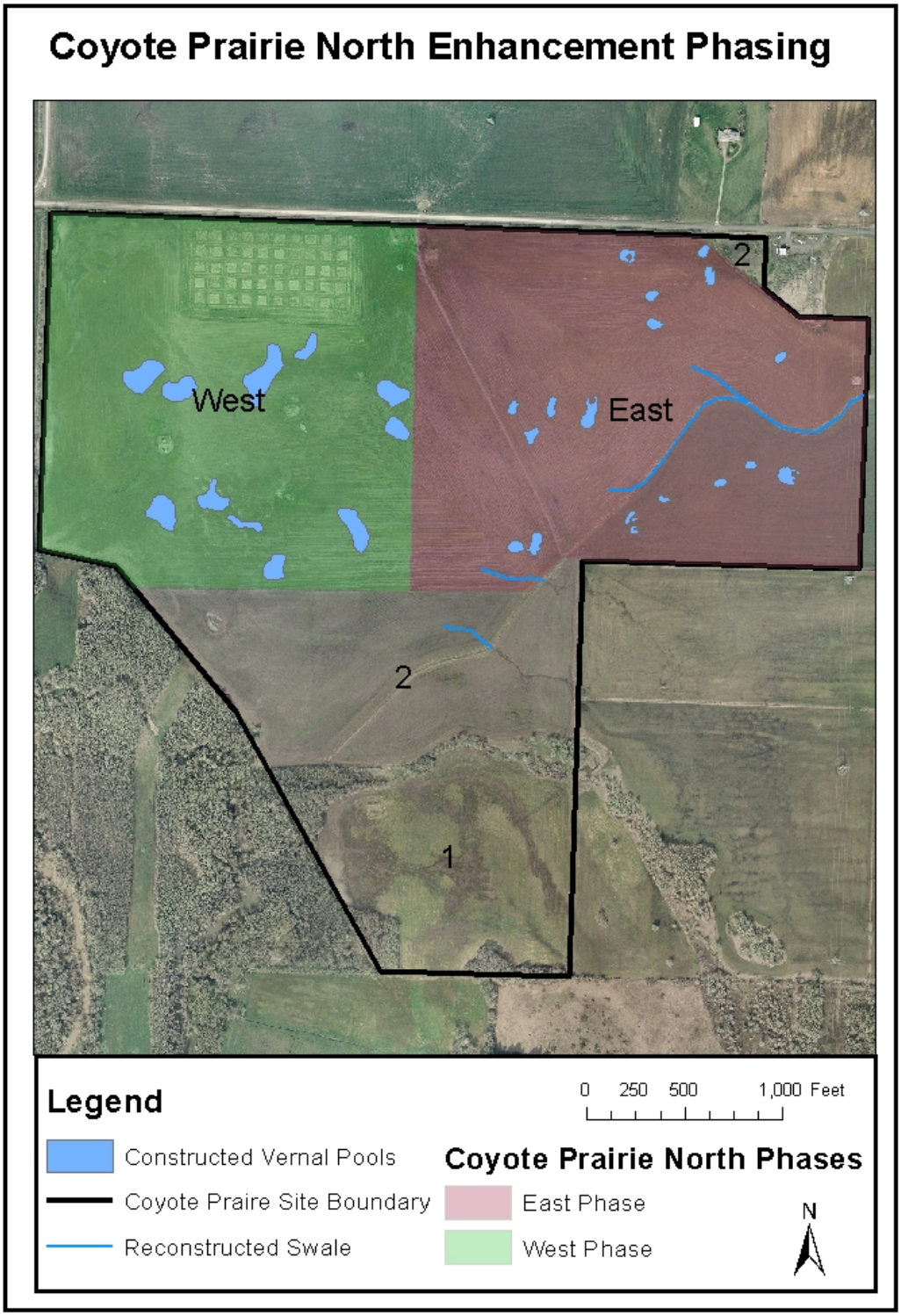

Figure 3.1 Coyote Prairie North Enhancement Phasing Map. The two enhancement phases at Coyote Prairie, East and West, are labeled with their approximate acreages.

- 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. 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).

Activity Summary 2016

The West Phase was in its first precipitation year and growing season in 2016, following summer 2015 earthwork and fall 2015 seeding. Staff tracked hydrology and the functioning of newly created vernal pools and the northwest water control structure in the West Phase throughout the wet season, as well as the functioning of the recontoured swale and filled ditch in the East Phase and Phase 2. The first year vegetation performance criteria require broad qualitative assessments of establishment which was completed May through July. Observations and monitoring indicate the development of this phase is proceeding as planned, with growth of diverse native wet prairie vegetation, high water holding capacity in the West Phase, including its vernal pools, and good structural integrity and function of the berms and water control structure. Staff adjusted pool outlets and potential erosion points and will track and adjust as needed in the next few years until the site is fully vegetated.

Control of nonnative invasive nonnative species occurred primarily April through July, with a focus on the site's prior grass crop (annual ryegrass, *Lolium mulitflorum*), pennyroyal (*Mentha pulegium*), and non-native invasive grasses. Staff installed a one-acre grid system throughout the West Phase to facilitate invasive species control and vegetation monitoring in future years. Staff also conducted the second year of seeding and planting of forbs, rushes, and sedges, in fall 2016.

West Phase Management Actions

1. Monitoring of the functioning of vernal pools, the swale, berms, and controlled NW outlet took place in winter. Two pools had water exiting at sites other than the cobbled anticipated outlet, initiating downcutting of the pool edge which staff stabilized in winter using coir logs. At the swale weirs, rock was moved to extend up the side slope to reduce erosion occurrring as water flowed around the weir sides during storm events.

2. City staff oversaw the work of contract crews to control nonnative invasive species in the West Phase, and in the filled ditch and swale, using spot spraying and hand removal. The most frequent non-native species needing treatment in the West Phase were the site's prior grass crop (annual ryegrass, *Lolium mulitflorum;* treated with a broadcast application of a grass-specific herbicide in April), other nonnative grasses ((rattail fescue (*Vulpia myuros*), brome fescue (*Vulpia bromoides*), barnyard grass (*Echinochloa crus-galli*)), pennyroyal (*Mentha pulegium*), curly dock (*Rumex crispus*) and false dandelion (*Hypochaeris radicata*). On the filled ditch and in the recontoured swale, staff treated

primarily the nonnative grasses *Vulpia* sp., North African grass (*Ventenata dubia),* and velvet grass (*Holcus lanatus*).

3. Staff installed a grid system of wooden posts across the West Phase, with a small diameter post at the corner of every acre. The grid system is beneficial for directing contractors and seasonal staff working on the site and for site-wide annual vegetation monitoring.

4. Installation of four gravel "lark pads" to encourage nesting by federally threatened streaked horned larks was included in the West Phase design. Some invasive species control was needed for the lark pads in 2016 and staff mowed native volunteer *Bidens frondosa*, in late summer to reduce its high densities in the area of the lark pads The West Phase restoration also was relatively sparsely vegetated in spring 2016, so the bare ground that larks prefer for nesting was abundant. Sunrise surveys for larks occurred on April 23, June 3 and 20, and July 22, and scans were made on visits doing other work, but no larks were observed in the West Phase. A small population of 3 to 5 pairs of streaked horned larks nest regularly about 0.75 miles to the north on private property.

5. Staff conducted the second year of forb, sedge, and rush seeding in the West Phase in fall 2016, distributing 8 wet prairie seed mixes across 70 acres (Appendix Table A-3). More than 20 species were also hand-distributed in patches throughout the site and additional seed was added to vernal pools, based on the prior year's emergence and availability (Appendix Table A-3). A second year seed mix was also added to the swale (Table A-4).

6. In fall 2016 plugs of the following species were installed near West Phase vernal pools (quantities in parens): oval broom sedge (*Carex leporina*) (400), Nevada rush (*Juncus nevadensis*) (75), pointed rush (*Juncus oxymeris*) (700).

Hydrologic and Vegetation Monitoring

Hydrology. In 2016, staff conducted periodic assessments of West Phase vernal pools, the water control structure, the East Phase swale, and water movement across the site. Water flows across the site in winter and spring occurred as expected, with water in the swale moving in a west-northwest direction out of the two newly contoured 'outlets' into well established wet prairie vegetation, filling constructed vernal pools in the East and West Phases as it moved west, and eventually inundating an approximately 15-acre area in the northwest region of the site. Prior to the project, these flows, which enter the site via a culvert on the east property boundary from a neighboring ryegrass field, continued down a narrow, eroding agricultural channel (Coyote ditch) and off-site, carrying sediment with it.

Precipitation was sparse in fall 2015 and vernal pools didn't fill until mid-December. All 11 pools in the West Phase then held water through most of April 2016 (greater than 16 weeks). By May 10 two pools had dried, by June 23 six pools had dried, and the final pool (#3) had dried by July 6.

The swale functioned as expected other than the rock weirs needing adjustment. Vegetation was slow to establish on the slopes of the swale's upper reaches, where the channel was originally deepest, due to the exposed dense clay subsoil. Staff will assess swale function

during the next few winters and make adjustments to minimize erosion on slopes and the swale bottom.

The berms and water control structure functioned as expected, although the depth and large extent of water behind the berm (up to 15 acres) in winter 2016 was somewhat suprising.

Fig. 1. Dec 18 2015 water levels in northwest corner of West Phase. Photo taken near parking pad looking west at berm's east end.

Fig. 2. From the water control structure looking south along west boundary berm. Northwest corner still has several inches of water when photo taken April 15, 2016.

Vegetation. Vegetation monitoring consisted of an estimate, by seed mix area, of the amount of cover provided by each species present (in relation to all vegetation cover in the mix area) and placement in a cover class. Other than in vernal pools, where *Downingia* was dominant, the greatest cover in this first growing year was provided by unseeded species, both native and nonnative. Table A-1 shows the cover estimates by species for each of the wet prairie seed mixes and one vernal pool mix. Table A-2 shows these data for the swale seed mixes.

The seeded native species with the greatest cover were Downingia (*Downingia yina*), popcorn flower (*Plagiobothrys figuratus*), Willamette hybrid gumplant (*Grindelia integrifolia* x *nana*), and dense sedge (*Carex densa*). Those unseeded natives with the greatest cover were water foxtail (*Alopecurus geniculatus*), lowland cudweed (*Gnaphalium palustre*), Scouler's popcorn flower (*Plagiobothrys scouleri*), leafy beggars-tick (*Bidens frondosa*), and willow herb (*Epilobium brachycarpum).* The non-native species with the greatest cover were ryegrass (*Lolium multiflorum*), the annual hyssop loosestrife (*Lythrum hyssopifolium*), and rattail and brome fescue (*Vulpia myuros and V. bromoides*). The filled swale had the greatest cover of nonnative species, probably because the soil used to fill it came from the upper swale where a variety of nonnatives had persisted through the site's decades of agricultural production. Rates of establishment were considered in creating seed mix rates for fall 2016.

Management Actions for 2017

1. Control nonnative plant species in the West Phase, the swale (East Phase), and the filled location in Phase 2.
2. Assess and adjust, as needed, the functioning of vernal pools, the swale and the water control structure. Adjust the water crossings in the Phase 2 fill area, as needed.
3. Identify and treat erosion on swale slopes, berm edges, and drainage features.
4. Adjust the locations of logs that redistributed during inundation in the northwest emergent area.
5. Monitor vegetation establishment.
6. Seed grasses in fall 2017 and additional forbs, if establishment warrants.

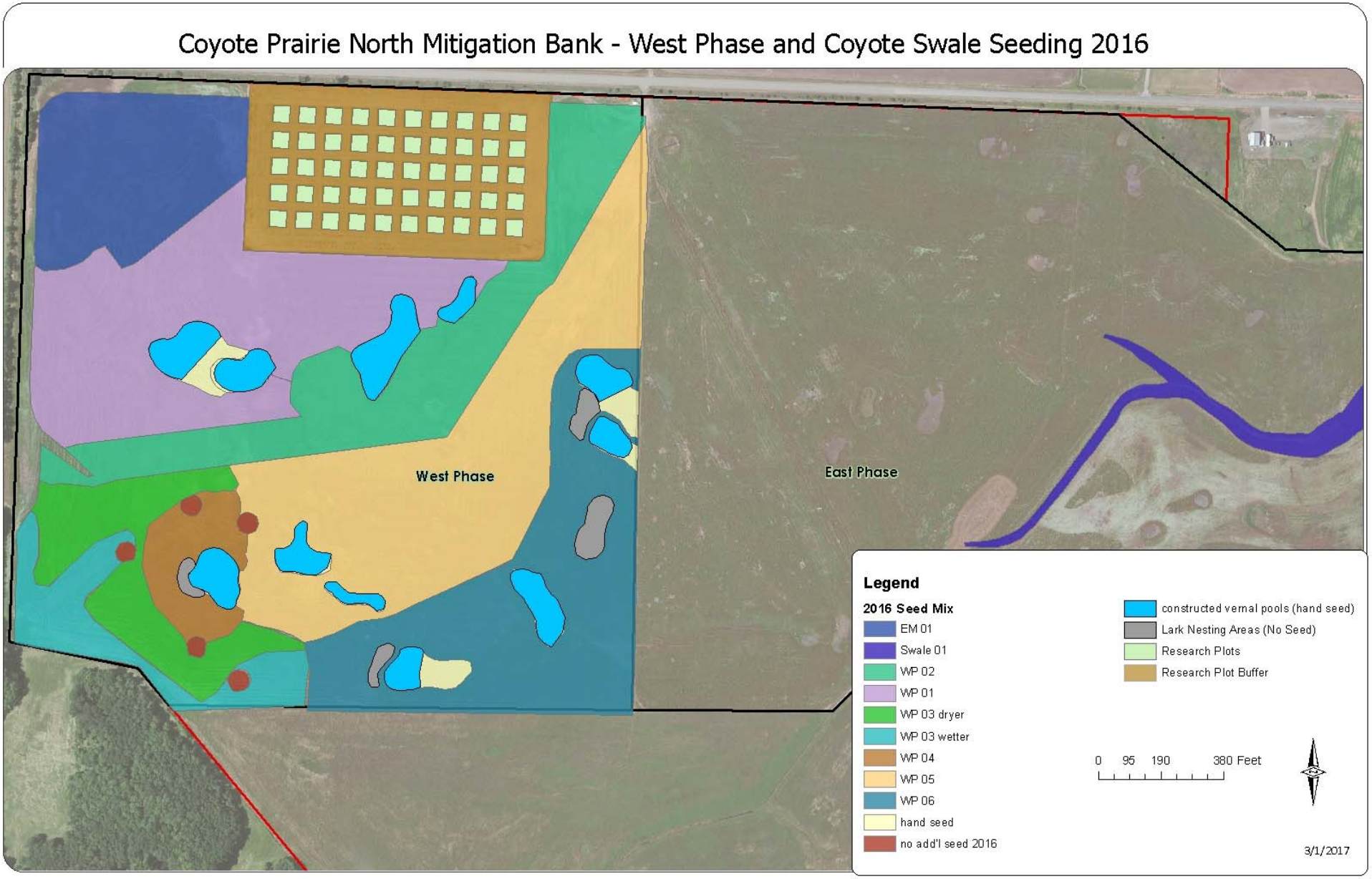

Figure 3.2. Coyote Prairie North Seeding Map. Seed mix composition is in Appendix Tables A-3 and A-4.

Wildlife Utilization at Coyote Prairie through 2016

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, praying mantids, and wasps are routinely encountered. Solitary native bees have been observed feeding on *Downingia* species in vernal pools. A group of North American Butterfly Association 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 will likely be similar. See their report at http://www.naba.org/chapters/nabaes/.

Reptiles and amphibians:
Adult long-toed salamanders and larvae in pools have been observed in the East and West Phases. Pacific chorus frogs continue to use the East Phase pools for breeding and were observed in four of the West Phase pools in the first spring after construction. Garter snakes and have been observed in the East Phase enhancement.

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. 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. Ground-nesting birds, such as California quail, killdeer, and savannah sparrows have been documented nesting in the East phase and streaked horned larks have been seen there, but not verified to have nested. 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:
Voles and their trails are commonly seen in the enhanced wet prairie vegetation. Elk use the entire site, as evidenced by tracks and scat and occassional 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 of Coyote Prairie several years ago.

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 4.1and 4.2, below. Table 4.1 shows progress toward meeting vegetation standards and Table 4.2 shows progress toward meeting hydrologic performance standards.

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 (this 2016 report)	Y
2	All	Native vascular plant cover > 40%	Point Intercept	Anticipated 2017	TBD
2	All	Bare ground < 40%	Point Intercept	Anticipated 2017	TBD
2	All	Nonnative *invasive* vascular plant cover is less than 10%	Point Intercept	Anticipated 2017	TBD

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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	Anticipated 2018	TBD
3	All	Bare ground < 40%	Point Intercept	Anticipated 2018	TBD
3	All	Nonnative *invasive* vascular plant cover is less than 10%	Point Intercept	Anticipated 2018	TBD
3	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	Anticipated 2018	TBD
4	All	Native vascular plant cover > 60%	Point Intercept	Anticipated 2019	TBD
4	All	Bare ground < 40%	Point Intercept	Anticipated 2019	TBD
4	All	Nonnative invasive vascular plant cover is less than 10%	Point Intercept	Anticipated 2019	TBD
4	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	Anticipated 2019	TBD
5	All	Native vascular plant cover > 75%	Point Intercept	Anticipated 2020	TBD

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?
5	All	Bare ground < 20%	Point Intercept	Anticipated 2020	TBD
5	All	6 native species have ≥ 5% cover in 10% of area sampled	Point Intercept	Anticipated 2020	TBD
5	All	Nonnative invasive vascular plant cover is less than 10%	Point Intercept	Anticipated 2020	TBD
5	All	Nonnative plant cover is less than 15% of total plant cover	Point Intercept	Anticipated 2020	TBD
5	All	At least 50 native vascular plant species are present	Walking surveys	Anticipated 2020	TBD

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 this 2016 annual report	Culvert and berm installed summer 2015 and functioning to date (see photos, this 2016 report)	Y
3, 4, or 5	PSH1: 84 acres exhibit wetland hydrology	Modified wetland delineation addendum	Anticipated 2018, 2019, or 2020	TBD
3, 4, or 5	PSH3: surface flows from Coyote South (Coyote Prairie Phase 2) not intercepted by Coyote Ditch	Photos, hydrologic mapping in year with "normal" rainfall	Anticipated 2018, 2019, 2020	TBD
3, 4, or 5	PSH4: water flows released from Coyote Ditch across East Phase	Photos, hydrologic mapping in year with "normal" rainfall	Anticipated 2018, 2019, 2020	TBD
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	Anticipated 2018, 2019, 2020	TBD

Appendix A. 2016 Monitoring Data and Seed Mixes

Table A-1. Coyote Prairie North Mitigation Bank, West Phase, First Year Establishment Assessment. Table includes native seed mix information and a qualitative Establishment Class that equates to broad visual estimates of vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volunteer Natives, or Non-native (NN)	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
Mix WP 01 (12 Acres)	S	*Plagiobothrys figuratus*	1221	102	D
Purpose/Location: no thatch N region	S	*Downingia yina*	640	53	C
	S	*Epilobium densiflorum*	120	10	O
	S	*Veronica peregrina var. xalapensis*	1116	93	O
	S	*Castilleja tenuis (hand distrib., not with mix)*			T
	S	*Galium trifidum*	31	3	T
	S	*Grindelia integrifolia × G. nana var. nana*	960	80	T
	S	*Microseris laciniata*	960	80	T
	S	*Montia linearis*	464	39	T
	S	*Orthocarpus bracteosus (not with mix)*			T
	S	*Prunella vulgaris var. lanceolata*	960	80	T
	S	*Ranunculus orthorhynchus*	704	59	T
	S	*Downingia elegans*	48	4	-
	S	*Lomatium nudicaule*	3600	300	-
	S	*Lotus unifoliolatus var. unifoliolatus*	240	20	-
	S	*Perideridia oregana*	719	60	-
	S	*Rumex salicifolius var. salicifolius*	1440	120	-
	S	*Sidalcea cusickii*	1790	149	-
	S	*Carex feta*	120	10	-
	S	*Galium trifidum*	675	56	-
non-seeded species	V	*Alopecurus geniculatus*			D
	V	*Gnaphalium palustre*			C
	NN	*Lythrum portula*			C
	NN	*Lolium multiflorum*			O
	NN	*Lythrum hyssopifolium*			O
	NN	*Mentha pulegium*			O
	V	*Bidens frondosa*			T
	V	*Eleocharis obtusa*			T
	V	*Epilobium brachycarpum*			T

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Seed Mix Name	Seeded or Volunteer Natives, or Non-native (NN)	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
	V	*Juncus bufonius*			T
	NN	*Polygonum sp.*			T
	V	*Rorippa curvisiliqua*			T
	V	*Vulpia myuros*			T
Mix WP 02 (8.0 acres)	S	*Carex densa*	108	14	O
Purpose/Location: central area and powerline easement; thatch present	S	*Epilobium densiflorum*	720	90	O
	S	*Grindelia integrifolia × G. nana var. nana*	1040	130	O
	S	*Lotus unifoliolatus var. unifoliolatus*	508	64	T
	S	*Plagiobothrys figuratus*	4000	500	T
	S	*Potentilla gracilis var. gracilis*	720	90	-
non-seeded species	V	*Alopecurus geniculatus*	dead		D
	V	*Gnaphalium palustre*			C
	NN	*Lolium multiflorum*	dead		C
	V	*Juncus bufonius*			O
	V	*Rorippa curvisiliqua*			O
	V	*Bidens frondosa*			T
	V	*Downingia yina*			T
	V	*Mimulus guttatus*			T
	V	*Plagiobothrys scouleri*			T
	V	*Veronica peregrine var. xalapensis*			T
Mix WP 03 (8.0 acres)	S	*Plagiobothrys figuratus*	2000	250	C
Purpose/Location: no thatch, SW region	S	*Grindelia integrifolia × G. nana var. nana*	480	60	O
	S	*Microseris laciniata*	1200	150	O
	S	*Phlox gracilis*	258	32	O
	S	*Camassia quamash var. maxima*	135	17	T
	S	*Downingia yina*	240	30	T
	S	*Galium trifidum*	91	11	T
	S	*Lotus unifoliolatus var. unifoliolatus*	80	10	T
	S	*Prunella vulgaris var. lanceolata*	640	80	T

Table A-1. Coyote Prairie North Mitigation Bank, West Phase, First Year Establishment Assessment. Table includes native seed mix information and a qualitative Establishment Class that equates to broad visual estimates of vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volunteer Natives, or Non-native (NN)	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
	S	*Ranunculus orthorhynchus*	214	27	T
	S	*Sidalcea cusickii*	640	80	T
	S	*Juncus patens*	40	5	-
	S	*Lomatium nudicaule*	420	53	-
	S	*Madia glomerata*	240	30	-
	S	*Perideridia gairdneri*	5	1	-
	S	*Perideridia oregana*	400	50	-
	S	*Rumex salicifolius var. salicifolius*	1040	130	-
non-seeded species	V	*Gnaphalium palustre*			D
	NN	*Lolium multiflorum*	dead		C
	V	*Plagiobothrys scouleri*			C
	V	*Juncus bufonius*			O
	NN	*Lythrum hyssopifolium*			O
	V	*Veronica peregrine var. xalapensis*			O
	NN	*Hypericum perforatum*			T
	V	*Juncus occidentalis*			T
	V	*Madia sp. (not glomerata)*			T
Mix WP 04 (2.5 acres)	S	*Plagiobothrys figuratus*	625	250	C
Purpose/Location: short-statured emphasis; no thatch	S	*Microseris laciniata*	750	300	O
	S	*Prunella vulgaris var. lanceolata*	625	250	T
	S	*Ranunculus orthorhynchus*	350	140	T
	S	*Veronica peregrina var. xalapensis*	225	90	T
	S	*Camassia quamash var. maxima*	5705	2282	-
	S	*Lomatium nudicaule*	500	200	-
	S	*Potentilla gracilis var. gracilis*	50	20	-
	S	*Saxifraga oregana*	13	5	-
	S	*Wyethia angustifolia*	985	394	-
	S	*Saxifraga oregana*	248	99	
non-seeded species	V	*Gnaphalium palustre*			D
	V	*Plagiobothrys scouleri*			C
	V	*Carex sp.*			T

Table A-1. Coyote Prairie North Mitigation Bank, West Phase, First Year Establishment Assessment. Table includes native seed mix information and a qualitative Establishment Class that equates to broad visual estimates of vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volunteer Natives, or Non-native (NN)	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
	V	*Epilobium brachycarpum*			T
	V	*Fraxinus latifolia*			T
	V	*Juncus bufonius*			T
	V	*Juncus patens*			T
	NN	*Lythrum hyssopifolium*			T
	NN	*Polygonum sp.*			T
	V	*Rorippa curvisiliqua*			T
Mix WP 05 (14 acres)	S	*Grindelia integrifolia × G. nana var. nana*	3080	220	C
Purpose/Location: south-central; thatch present	S	*Microseris laciniata*	4302	307	O
	S	*Carex unilateralis*	140	10	T
	S	*Epilobium densiflorum*	560	40	T
	S	*Plagiobothrys figuratus*	6300	450	T
	S	*Rumex salicifolius var. salicifolius*	2800	200	-
non-seeded species	V	*Alopecurus geniculatus*	dead		C
	V	*Bidens frondosa*			C
	V	*Gnaphalium palustre*			C
	NN	*Lolium multiflorum*			O
	V	*Plagiobothrys scouleri*			O
	V	*Rorippa curvisiliqua*			O
	NN	*Vulpia myuros*			O
	V	*Downingia yina*			T
	V	*Epilobium brachycarpum*			T
	V	*Galium trifidum*			T
	V	*Juncus bufonius*			T
	NN	*Lythrum hyssopifolium*			T
	V	*Madia sp. (not glomerata)*			T
	V	*Mimulus guttatus var. depauperatus*			T
Mix WP 06 (11 acres)	S	*Microseris laciniata*	3850	350	O
Purpose/Location: short-statured species; thatch present	S	*Plagiobothrys figuratus*	6600	600	T

Table A-1. Coyote Prairie North Mitigation Bank, West Phase, First Year Establishment Assessment. Table includes native seed mix information and a qualitative Establishment Class that equates to broad visual estimates of vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volunteer Natives, or Non-native (NN)	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
	S	*Potentilla gracilis var. gracilis*	2200	200	T
non-seeded species	V	*Alopecurus geniculatus*	dead		D
	V	*Gnaphalium palustre*			C
	V	*Epilobium brachycarpum*			O
	V	*Plagiobothrys scouleri*			O
	NN	*Vulpia myuros*			O
	V	*Bidens frondosa*			T
	V	*Carex sp.*			T
	V	*Deschampsia cespitosa*			T
	V	*Downingia yina*			T
	V	*Epilobium ciliatum*			T
	V	*Galium trifidum*			T
	V	*Grindelia integrifolia × G. nana var. nana*			T
	NN	*Hypochaeris radicata*			T
	V	*Juncus bufonius*			T
	NN	*Kickxia elatine*			T
	NN	*Lolium multiflorum*			T
	NN	*Lythrum hyssopifolium*			T
	NN	*Lythrum portula*			T
	V	*Madia sp. (not glomerata)*			T
	V	*Rorippa curvisiliqua*			T
Mix EM 01 (4.8 acres)	S	*Plagiobothrys figuratus*	487	100	C
Purpose/Location: NW emergent area	S	*Alisma triviale*	864	180	O
	S	*Downingia yina*	622	130	O
	S	*Eleocharis palustris*	120	25	T
	S	*Grindelia integrifolia*	384	80	T
	S	*Rorippa curvisiliqua*	19	4	T
	S	*Veronica peregrina var. xalapensis*	72	15	T
	S	*Carex densa*	144	30	T (Carex sp)
	S	*Carex feta*	246	51	T (Carex sp)
	S	*Carex obnupta*	144	30	T (Carex sp)
	S	*Carex unilateralis*	48	10	T (Carex sp)
	S	*Downingia elegans*	316	66	-

Table A-1. Coyote Prairie North Mitigation Bank, West Phase, First Year Establishment Assessment. Table includes native seed mix information and a qualitative Establishment Class that equates to broad visual estimates of vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volunteer Natives, or Non-native (NN)	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
	S	*Eryngium petiolatum*	144	30	-
	S	*Ludwigia palustris var. pacifica*	144	30	-
non-seeded species	V	*Alopecurus geniculatus*			D
	NN	*Lythrum hyssopifoium*			C
	NN	*Lythrum portula*			C
	V	*Gnaphalium palustre*			C
Mix VP1 (0.77 acres)	S	*Downingia yina*	424	551	D
One example VP assessment provided	S	*Alisma triviale*	262	340	T
	S	*Eryngium petiolatum*	231	300	T
	S	*Gratiola ebracteata*	62	81	T
	S	*Lasthenia glaberrima*	285	370	T
	S	*Navarretia intertexta ssp. intertexta*	293	381	T
	S	*Plagiobothrys figuratus*	62	81	T
	S	*Veronica peregrina var. xalapensis*	48	62	T
	S	*Ranunculus alismaefolius*	85	110	-
non-seeded species	V	*Plagiobothrys scouleri*			O
	V	*Alopecurus geniculatus*			T
	V	*Eleocharis palustris*			T
	V	*Juncus bufonius*			T
	NN	*Lythrum hyssopifolium*			T

Table A-2. Coyote Prairie Mitigation Bank, Swale and Filled Ditch, First Year Establishment Assessment. Table includes Native Seed Mix information and a Qualitative Establishment Class that equates to vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volun-teer	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
Mix Swale 01 (2.2 acres)	S	*Grindelia integrifolia*	1320	600	O
Purpose/Location: swale primary seed	S	*Epilobium densiflorum*	220	100	T
	S	*Microseris laciniata*	880	400	T
	S	*Plagiobothrys figuratus*	1320	600	T
	S	*Potentilla gracilis var. gracilis*	220	100	T
Non-seeded combined with Swale 02 in assessment, since 02 is an overseed across subset of 01 area.	S	*Rumex salicifolius var. salicifolius*	1163	529	T
Mix Swale 02 (1.0 acre)	S	*Agrostis exarata*	1300	1300	C
Purpose/Location: swale overseed	S	*Carex densa*	50	50	T (Carex sp)
	S	*Carex obnupta*	473	473	T (Carex sp)
	S	*Carex obnupta*	330	330	T (Carex sp)
	S	*Carex unilateralis*	200	200	T (Carex sp)
	S	*Deschampsia cespitosa*	2600	2600	T
	S	*Juncus effusus var. pacificus*	10	10	T
non-seeded species	NN	*Lythrum hyssopifolium*			C
	NN	*Ventanata dubia*	Dead		C
	NN	*Vulpia myuros*	Dead		C
	V	*Beckmannia syzigachne*			O
	V	*Juncus bufonius*			O
	V	*Alisma triviale*			T
	V	*Camassia leichtlinii*			T
	V	*Carex densa*			T
	V	*Eleocharis palustris*			T
	NN	*Holcus lanatus*			T
	V	*Juncus bolanderi*			T
	NN	*Lolium multiflorum*			T
	V	*Madia glomerata*			T
	NN	*Mentha pulegium*			T
	V	*Mimulus guttatus*			T
	V	*Navarretia intertexta*			T

Table A-2. Coyote Prairie Mitigation Bank, Swale and Filled Ditch, First Year Establishment Assessment. Table includes Native Seed Mix information and a Qualitative Establishment Class that equates to vegetation cover. Key: Dominant (≥ 40% of veg cover); Common (10 - 39% of veg cover); Occassional (2 - 9% of veg cover); Trace (<2% of veg cover); " – " indicates no indivduals of a species were obseverd in the area where the mix was distributed. Species in the mix are identified first, ordered from high to low cover, followed by unseeded 'volunteers'.

Seed Mix Name	Seeded or Volun-teer	Scientific Name	Total Gms	Grams per Acre	Establish-ment Class
	V	*Navarretia squarrosa*			T
	NN	*Parentucellia viscosa*			T
	V	*Plagiobothrys scouleri*			T
Mix WP 07 (1.6 acres)	S	*Epilobium densiflorum*	96	60	O
Purpose/Location: filled drainage	S	*Grindelia integrifolia × G. nana var. nana*	969	606	O
	S	*Plagiobothrys figuratus*	1120	700	T
	S	*Rumex salicifolius var. salicifolius*	320	200	T
	S	*Sidalcea cusickii*	480	300	T
	S	*Veronica peregrina var. xalapensis*	32	20	T
	S	*Lomatium nudicaule*	640	400	-
	S	*Carex densa*	32	20	T (Carex sp)
	S	*Carex feta*	64	40	T (Carex sp)
	S	*Carex unilateralis*	48	30	T (Carex sp)
non-seeded species	V	*Epilobium brachycarpum*			C
	NN	*Ventanata dubia*	Dead		C
	NN	*Vulpia myuros*	Dead		C
	V	*Juncus bufonius*			O
	NN	*Lathyrus hirsutus*			O
	V	*Potentilla gracilis var. gracilis*			O
	NN	*Vicia tetrasperma*			O
	NN	*Aira caryophyllea*			T
	NN	*Anagalis arvensis*			T
	NN	*Bromus japonicus*			T
	V	*Castilleja tenuis*			T
	V	*Clarkia purpurea ssp. quadrivulnera*			T
	NN	*Daucus carota*			T
	V	*Downingia yina*			T
	NN	*Geranium dissectum*			T
	V	*Gnaphalium palustre*			T
	NN	*Lolium multiflorum*			T
	NN	*Lythrum hyssopifolium*			T
	V	*Madia elegans*			T
	NN	*Mentha pulegium*			T

Table A-3. Coyote Prairie North Mitigation Bank, Native Seed Mixes Distributed Fall 2016. Approximately 70 acres were seeded with native forbs, sedges, and rushes. This table includes the species seeded, total grams and grams per acre used in each mix.

Seed Mix Name	Acres	Scientific Name	Total Gms	Grams /Acre
CPNW WP 01	11.00	*Carex densa*	33	3
Purpose/Location: no thatch N region		*Carex obnupta*	500	45
		Carex unilateralis	550	50
		Epilobium densiflorum	1,650	150
		Grindelia integrifolia	7,045	640
		Microseris laciniata	2,750	250
		Plagiobothrys figuratus	3,300	300
		Rumex salicifolius var. salicifolius	2,200	200
		Total	18,028	1,639
CPNW WP 02	8.00	*Carex unilateralis*	240	30
Purpose/Location: central area and powerline easement; thatch present		*Epilobium densiflorum*	720	90
		Luzula comosa	480	60
		Microseris laciniata	2,000	250
		Plagiobothrys figuratus	2,800	350
		Potentilla gracilis var. gracilis	960	120
		Total:	7,200	900
CPNW WP 03 dryer	4.60	*Camassia quamash var. maxima*	1,904	414
Purpose/Location: slightly higher elevation; SW region		*Lomatium nudicaule*	2,760	600
		Microseris laciniata	736	160
		Perideridia oregana	828	180
		Plagiobothrys figuratus	1,748	380
		Prunella vulgaris var. lanceolata	3,039	661
		Ranunculus orthorhynchus	1,790	389
		Rumex salicifolius var. salicifolius	368	80
		Sisyrinchium idahoense var. idahoense	2,933	638
		Total:	16,106	3,501
CPNW WP 03 wetter	3.10	*Carex unilateralis*	195	63
Purpose/Location: slightly lower elevation; SW region		*Downingia yina*	310	100
		Grindelia integrifolia	1,364	440
		Juncus occidentalis	31	10
		Plagiobothrys figuratus	2,480	800
		Rumex salicifolius var. salicifolius	1,488	480
		Total:	5,868	1,893

Table A-3. Coyote Prairie North Mitigation Bank, Native Seed Mixes Distributed Fall 2016. Approximately 70 acres were seeded with native forbs, sedges, and rushes. This table includes the species seeded, total grams and grams per acre used in each mix.

Seed Mix Name	Acres	Scientific Name	Total Gms	Grams /Acre
CPNW WP 04	2.50	*Camassia leichtlinii var. suksdorfii*	875	350
Purpose/Location: short-statured emphasis		*Camassia quamash var. maxima*	1,485	594
		Downingia yina	592	237
		Microseris laciniata	750	300
		Montia linearis	75	30
		Navarretia intertexta ssp. intertexta	75	30
		Plagiobothrys figuratus	750	300
		Ranunculus orthorhynchus	1,250	500
		Veronica peregrina var. xalapensis	400	160
		Wyethia angustifolia	450	180
		Total:	6,702	2,681
CPNW WP 05	14.00	*Carex ovalis*	24	2
Purpose/Location: south-central		*Epilobium densiflorum*	560	40
		Luzula comosa	840	60
		Madia glomerata	210	15
		Microseris laciniata	2,800	200
		Plagiobothrys figuratus	5,320	380
		Potentilla gracilis var. gracilis	1,120	80
		Prunella vulgaris var. lanceolata	1,120	80
		Rumex salicifolius var. salicifolius	1,960	140
		Veronica peregrina var. xalapensis	597	43
		Total:	14,551	1,039
CPNW WP 06	11.00	*Camassia quamash var. maxima*	3,448	313
Purpose/Location: short-statured species		*Camassia quamash var. maxima*	565	51
		Galium trifidum	938	85
		Navarretia intertexta ssp. intertexta	430	39
		Plagiobothrys figuratus	6,600	600
		Potentilla gracilis var. gracilis	1,320	120
		Prunella vulgaris var. lanceolata	2,420	220
		Veronica peregrina var. xalapensis	378	34
		Total:	16,099	1,464
CPNW WP Hand Seed 2016		*Asclepias speciosa*	115	
Purpose/Location: not a mix; added throughout 70 acres in patches of appropriate habitat.		*Camassia leichtlinii var. suksdorfii*	387	
		Carex feta	202	

Table A-3. Coyote Prairie North Mitigation Bank, Native Seed Mixes Distributed Fall 2016. Approximately 70 acres were seeded with native forbs, sedges, and rushes. This table includes the species seeded, total grams and grams per acre used in each mix.

Seed Mix Name	Acres	Scientific Name	Total Gms	Grams /Acre
		Carex obnupta	482	
		Carex ovalis	3	
		Carex tumulicola	95	
		Carex unilateralis	34	
		Dichanthelium acuminatum var. fasciculatum	2,144	
		Gentiana sceptrum	43	
		Grindelia integrifolia	3,630	
		Juncus effusus var. pacificus	40	
		Juncus occidentalis	80	
		Juncus patens	758	
		Linanthus bicolor	1,400	
		Lomatium nudicaule	9,251	
		Lupinus polyphyllus	2,513	
		Lupinus rivularis	1,482	
		Luzula comosa	1,915	
		Madia glomerata	2,557	
		Madia sativa	112	
		Myosotis laxa	922	
		Prunella vulgaris var. lanceolata	1,820	
		Ranunculus alismaefolius var. alismifolius	431	
		Ranunculus orthorhynchus	658	
		Saxifraga oreganum	95	
		Sidalcea cusickii	4,126	
		Sisyrinchium idahoense var. idahoense	1,036	
		Symphyotrichum hallii	836	
		Veronica scutellata	15	
		Wyethia angustifolia	577	
		Total:	37,759	
CPNW WP Addition to HandSeed 1 2016		*Asclepias speciosa*	42	
Purpose/Location: small amts of seed from prior years unused mixes		*Castilleja tenuis*	56	
		Deschampsia danthonioides w/MOLI	588	
		Downingia elegans	747	
		Eleocharis obtusa	134	
		Galium trifidum	91	
		Lasthenia glaberrima	495	
		Lotus formosissimus	178	
		Navarretia intertexta w/ NEIN/WI	520	
		Total:	2,851	

Table A-3. Coyote Prairie North Mitigation Bank, Native Seed Mixes Distributed Fall 2016. Approximately 70 acres were seeded with native forbs, sedges, and rushes. This table includes the species seeded, total grams and grams per acre used in each mix.

Seed Mix Name	Acres	Scientific Name	Total Gms	Grams /Acre
CPNW Em 01	4.80	*Carex densa*	144	30
Purpose/Location: NW emergent area		*Carex obnupta*	288	60
		Downingia yina	476	99
		Eleocharis palustris	129	27
		Epilobium densiflorum	1,248	260
		Grindelia integrifolia	2,548	531
		Juncus oxymeris	10	2
		Plagiobothrys figuratus	1,680	350
		Rorippa curvisiliqua	72	15
		Total:	6,595	1,374
CPNW VP 1	0.70	*Lasthenia glaberrima*	28	40
Vernal pool additions		*Navarretia intertexta ssp. intertexta*	56	80
		Plagiobothrys figuratus	84	120
		Total:	168	240
CPNW VP2	1.30	*Eleocharis obtusa*	65	50
Vernal pool additions		*Gratiola ebracteata*	52	40
		Navarretia intertexta ssp. intertexta	260	200
		Total:	377	290
CPNW VP3	0.50	*Downingia elegans*	110	220
Vernal pool additions		*Lasthenia glaberrima*	60	120
		Total:	170	340
CPNW VP 4	0.60	*Alisma triviale*	24	40
Vernal pool additions		*Gratiola ebracteata*	21	35
		Lasthenia glaberrima	84	140
		Plagiobothrys figuratus	72	120
		Total:	201	335
CPNW VP 6	0.50	*Eryngium petiolatum*	140	280
Vernal pool additions		*Lasthenia glaberrima*	45	90
		Navarretia intertexta ssp. intertexta	200	400
		Total:	385	770
CPNW VP 7	0.70	*Lasthenia glaberrima*	84	120
Vernal pool additions		*Navarretia intertexta ssp. intertexta*	140	200
		Plagiobothrys figuratus	91	130
		Total:	315	450

Table A-3. Coyote Prairie North Mitigation Bank, Native Seed Mixes Distributed Fall 2016. Approximately 70 acres were seeded with native forbs, sedges, and rushes. This table includes the species seeded, total grams and grams per acre used in each mix.

Seed Mix Name	Acres	Scientific Name	Total Gms	Grams /Acre
CPNW VP 8	1.30	*Alisma triviale*	39	30
Vernal pool additions		*Downingia yina*	260	200
		Navarretia intertexta ssp. intertexta	169	130
		Plagiobothrys figuratus	182	140
		Total:	650	500
CPNW VP 9	0.30	*Lasthenia glaberrima*	102	340
Vernal pool additions		*Navarretia intertexta ssp. intertexta*	66	220
		Plagiobothrys figuratus	60	200
		Total:	228	760

Table A-4 Coyote Prairie North, Coyote Ditch Earthwork-associated Seeding, Fall 2016. Seed was distribued over only 2 acres disturbed by 2015 earthwork, in the broad swale created in the East Phase, where native *Agrostis exerata* is establishing well, but forbs are sparse and stunted. This table includes the species seeded, total grams and grams per acre used in the mix.

Seed Mix Name	Acres	Scientific Name	Total Gms	Grams /Acre
CPNE New Swale WP 2.0 2016	2	Grindelia integrifolia	360	180
		Microseris laciniata	606	303
		Plagiobothrys figuratus	1,200	600
		Rumex salicifolius var. salicifolius	360	180
		Total	2,526	1,263

Appendix B. 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 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/or landmarks.
3. 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 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 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 (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.

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). In 2014, because it was the final year of monitoring and the monitoring crew was experienced and could rapidly monitor the site, the sample size was increased to ¾ the 2011 number of samples. 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 (6 in 2014). 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 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 is cautioned to avoid looking at the location where they place the tripod, once they have paced to within 1-meter of their sample location.

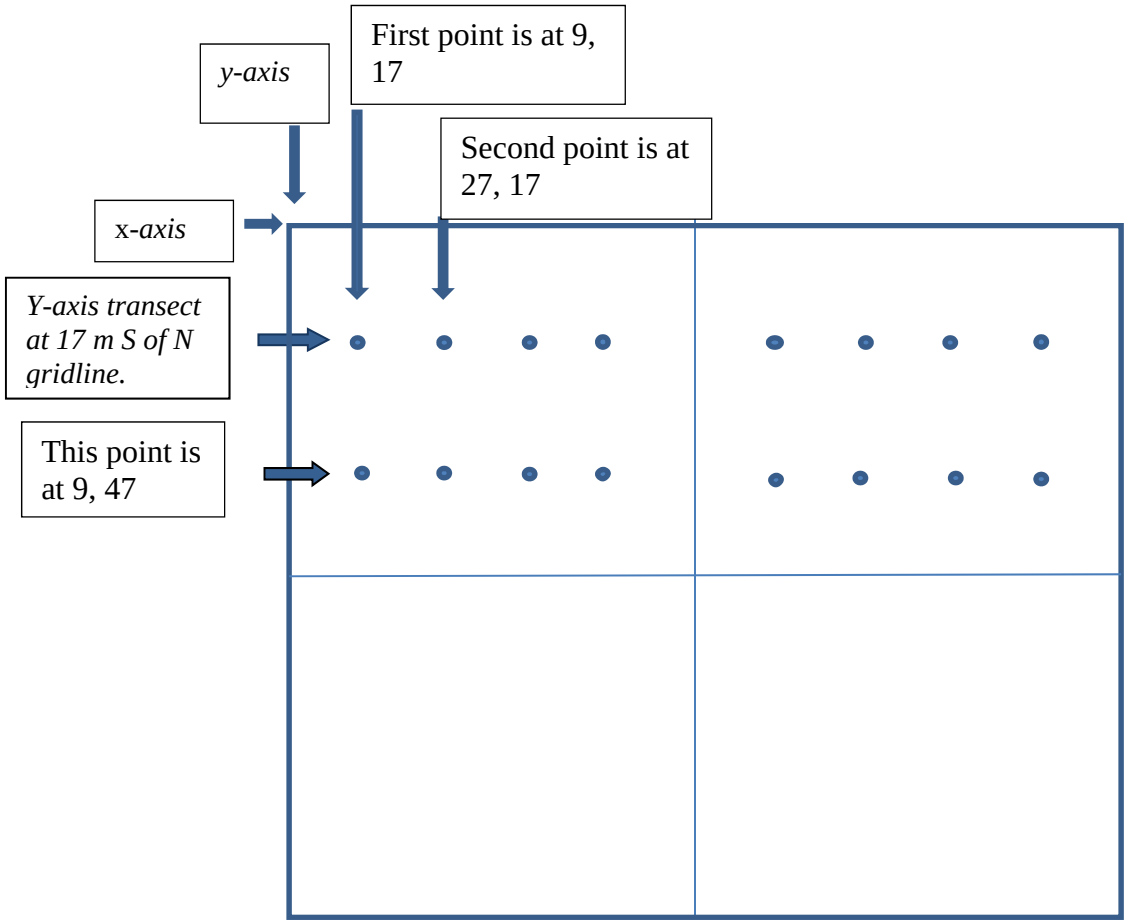

Figure B-1. **Coyote Prairie North grid-based monitoring strategy**. Four example one-acre grid squares are shown (points shown only in two). Dots represent sampled points, based on sample size needs and random start number. In each grid square 4 to 8 sample points will be collected (2 to 4 on each of two transects).

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.

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 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.

9. 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, where no vascular plant cover occurs.*