SITE CONSERVATION PLAN

Penstemon Prairie Natural Area



March 2014



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INTRODUCTION

Penstemon Prairie totals 276 acres, with about 36 acres under agriculture leases. It is located in Washington County, south of Forest Grove and north of Gaston. Most of Penstemon Prairie is in the Tualatin River floodplain. Penstemon Prairie's name reflects the recent discovery of a rare wildflower on the site, Penstemon hesperius, which is known from only two other locations.

PLANNING AREA

This site conservation plan area includes parts of two tax lots purchased with funds from the 1995 open spaces bond measure. Fern Hill Road separates both tax lots into north and south parcels; the north parcels comprise Penstemon Prairie and the south parcels are part of the Fern Hill Forest site. The acreage provided below includes all of Penstemon Prairie and part of Fern Hill Forest, so it totals more than 276 acres.

Property name (previous owner)	Acres	Bond year	Date acquired	Management
Lovejoy Center (09.019)	147.00	1995	04/16/1999	Metro
Lovejoy Center (09.022)	198.00	1995	03/24/2000	Metro

KEY STAFF

Elaine Stewart, senior regional scientist Adam Stellmacher, lead natural resource specialist Ryan Jones, natural resource specialist Nathaniel Marquiss, Ariel Whitacre, Justin Takkunen, natural resource technicians Laurie Wulf, property services coordinator (rentals/leases) Katy Weil, wildlife monitoring coordinator Marsha Holt-Kingsley, native seed collection coordinator Robert Spurlock, parks and natural areas planner Tom Heinicke, negotiator

KEY CONTACTS

NAME	CONTACT INFORMATION	NOTES
Manuel Sosa		Ag lease holder; grows vegetables
Hally Haworth	503-348-4644	Ag lease holder; grows nursery stock
John and Thelma Knox Ken and Sandra Knox	Knox Farms; 503-357-6526 5095 SW Fernhill Road	Neighbor to east
Luke Lahey	503-568-4667	Neighbor to southwest
Dean Moberg	USDA-NRCS 1080 SW Baseline, #B2, Hillsboro, OR 503-648-3174 x113	NRCS district conservationist, funded under WRP
Lacey Townsend	503-648-3174 x102	Tualatin SWCD District Manager, partner in VEGBACC funding for riparian plantings
Rob Emanuel	2550 SW Hillsboro Hwy, Hillsboro, OR (503) 681-3652	Clean Water Services project manager, partner in collaborative restoration work; holds a Grant of Rights for entry and work (see recent management history, below)

EXISTING PLANNING DOCUMENTS

Penstemon Prairie has been actively managed for many years. Some of the relevant documents are listed below, with file paths as of this report date.

- Summary report prepared by Angie Kimpo, previous scientist on the site, describing restoration work conducted and lessons learned in the mid-2000s: *M:\suscntr\Natural Areas and Parks\Regional Properties\Wapato Lake TA\Stewardship-Property Management\Penstemon_Pr_Lovejoy\Lovejoy restoration summary 1-09.doc*
- Monitoring report prepared by Ash Creek Forest Management, the primary contractor on the revegetation work summarized in Angie Kimpo's report: M:\suscntr\Natural Areas and Parks\Regional Properties\Wapato Lake TA\Stewardship-Property Management\Penstemon_Pr_Lovejoy\reports\Ash_Creek_2008.pdf
- Water management plan prepared by Elaine Stewart for Oregon Department of Fish and Wildlife as part of fish passage review for the water control structure: *M:\suscntr\Natural Areas and Parks\Regional Properties\Wapato Lake TA\Stewardship-Property Management\Penstemon_Pr_Lovejoy\Water Control Structure\Lovejoy Operation Plan 2.doc*
- Implementation plan prepared by Elaine Stewart for more recent habitat restoration work on the prairie complex (2013): *M:\suscntr\Natural Areas and Parks\Regional Properties\Wapato Lake TA\2013 Levy\Penstemon_Prairie*
- Collaborative ecological enhancement plan prepared by Clean Water Services in 2013: *M:\suscntr\Natural Areas and Parks\Teams\Science & Stewardship\Partners and Partner Programs\CWS\Upper_Tualatin (see Recent Management History)*

SITE DESCRIPTION

Penstemon Prairie is bordered to the north and west by the Tualatin River. The site is bordered to the south by Southwest Fern Hill Road and to the east by agricultural land. Metro has disrupted drain tiles, planted riparian and wetland plants, protected rare plants and planted upland and prairie species at higher elevations.

The Tualatin River winds nearly 8,000 feet along the western and northern borders of the site. The channel likely experienced scouring of bed and banks due to historical land use and log drives, and is currently lined by fine sediment. Banks are frequently steep and extend 6 to 8 feet high.

Eighty percent of the site is in the floodplain. Wet and mesic prairie habitats cover slightly more than 100 acres. The remainder is shown below.

ΗΑΒΙΤΑΤ ΤΥΡΕ	ACREAGE
Emergent wetland	47
Wet prairie	25
Mesic prairie	78
Shrub wetland	12
Riparian forest	78
Agriculture	36
Total	276

RECENT MANAGEMENT HISTORY

Multiple projects have been conducted at Penstemon Prairie. Many of the relevant funding agreements are stored in Terramet. The first large restoration project, a partnership among Ducks Unlimited, Metro, Natural Resources Conservation Service and Tualatin Soil and Water Conservation District, began in the early 2000s. Ducks Unlimited received a grant from Oregon Watershed Enhancement Board to remove a culvert, regrade parts of the floodplain and install a water control structure to allow water management and two-way passage for native fish. Metro brought project match in the form of a Wetland Reserve Program grant from NRCS. The NRCS grant funded installation of woody plants and grassland plants at various elevations. When Metro went out to bid for the project, we discovered the NRCS funding was not sufficient; we then entered into an agreement with TSWCD under the VEGBACC program to make up the shortage. The VEGBACC boundary extends 150 feet from the top of bank along the Tualatin River; the NRCS-funded plantings extend farther into the floodplain. Agreements pertaining to these projects are stored in Terramet.

In early 2011, Metro and Clean Water Services began collaborating on restoration work at Metro sites in the Tualatin basin. Penstemon Prairie is one of the sites for which Metro issued a Grant of Rights enabling CWS to control weeds, install woody plants and conduct other habitat restoration work on Metro property. The Grant of Rights allows CWS to capitalize its investment in the Metro property and enables CWS to carry out its temperature management program, offsetting increased stream temperatures downstream at the Durham wastewater treatment plant with decreased stream temperatures upstream due to shading by trees installed by CWS. Prior to conducting work on Metro property, CWS and Metro develop and agree upon an ecological enhancement plan. The Grants of Rights are for 20 years and they obligate CWS to care for its investments over that full term.

The following paragraphs describe work accomplished and lessons learned for several habitats of interest.

EMERGENT WETLAND

The first site preparation occurred in fall 2004 when the northeast corner of the site was deeply disked (18"). Due to heavy rains and flooding, equipment was called off after completion of that corner. The following spring, this area, which had previously been dominated by reed canarygrass (*Phalaris arundinacea*), emerged as 99 percente native cover including wapato (*Sagittaria latifolia*), American sloughgrass (*Beckmannia syzigachne*), spike bentgrass (*Agrostis exarata*), blue calico flower (*Downingia yina*), Scouler's popcornflower (*Plagiobothrys scouleri*), and others. This was an early indication that restoration of emergent wetland units could be boosted by persistent native seed banks.

The water control structure was not used to manage flooding after the first few years, because it was inaccessible at critical periods during flood events. The upper Tualatin River has a "flashy" flooding pattern, with rapid rise and fall of water in the floodplain. We are unable to reach the water control structure and pull flash boards as flooding recedes and we risk entrapping native fish in the site where poor conditions can develop and cause mortality. Water management is further

complicated by beaver activity, building on and over the flash boards in the structure. In the early 2010s, the neighbor downstream was unable to plant a field because beaver activity at the structure affected soil moisture below it and rendered the field too wet to plant. Metro and the neighbor demolished the dam on multiple occasions, and Metro has not installed the flashboards to retain water since that time.

RIPARIAN FOREST

Initial weed treatments in 2005 were only partially effective in controlling reed canarygrass and blackberry on the perimeter, and weed control efforts continued to focus on these weeds throughout 2006 and 2007. The farmed fields were left in very poor shape in 2005, precluding the possibility of successful seeding that fall as planned. Areas planted in beets were very clean and contained little weed seed bank; however, areas planted in clover were poorly maintained and contained copious quantities of Queen Anne's lace (*Daucus carota*), sow thistle (*Sonchus* spp.) and fluvel (*Kickxia elatine*).

Crews planted trees and shrubs in March 2006. They maintained woody plantings by mowing, spraying and disking between rows of plants and spot spraying within rows throughout the growing season. These habitat areas were all seeded with native herbaceous plants. In the existing riparian area, some girdling and spraying of young ash trees was done around mature oak trees that were beginning to suffer from encroachment. These ash trees did not die, and in fall 2013 they were cut to complete the oak release.

Ongoing partnerships with Clean Water Services, Tualatin Soil and Water Conservation District and Natural Resources Conservation Service will provide maintenance on the riparian forest established along the Tualatin River and installation of additional trees and shrubs in some other areas. As described above, Clean Water Services has an obligation to maintain the shade credit area for 20 years.

WET AND MESIC PRAIRIE

Due to poor initial conditions in the former clover field, Metro farmed future prairie units for another year to clean out weeds and provide a better seed bed for native seeding and oak establishment. A local farmer cultivated the ground, sprayed out weeds and sowed with oats in May 2006. The farmer applied broadleaf-specific herbicides over the oat crop and harvested the oats as hay in late July. Following oat harvest, the farmer planned a final site-preparation broadcast spray to prepare for final seeding. In October, the farmer did in fact spray weeds in the lowest and wettest emergent areas, and then drilled these areas with an emergent seed mix. In the higher wet and mesic prairie units, however, dry soils and a lack of rain through September and October prevented weed seeds from sprouting. When rain finally arrived in November, the site flooded and soils rapidly became too wet to allow any further spraying or seeding.

In summer 2007, the unseeded and unplanted portions of the prairie were once again seeded with oats. A broadcast spray of glyphosate was applied before seeding and after oat harvest. Native seed mixes for prairie and oak units were drilled with a no-till drill. A 50-foot buffer edge of the woody planting units was seeded with grasses in order to intercept broadleaf weed seeds dispersing from the riparian forest unit and to allow broadleaf sprays in that buffer.

Habitat restoration in this prairie portion of the site remains especially complex and challenging. The seeding done in 2007 failed to establish diverse species and resulted in dominance by *Deschampsia cespitosa* and *Hordeum brachyantherum*. These vigorous growers appeared to compete well with the agriculture weeds and established a thick growth of tall grasses. Unfortunately, the grass stand had limited benefit for wildlife and certain broadleaf weeds were thriving out of sight under the grasses. As key ecological attributes were developed for Metro's prairies, it became evident that Penstemon Prairie would never rise above a "poor" rating for several KEAs of importance to the prairie unit (e.g., native species richness).

An OWEB grant procured by Metro funded more work on the prairie unit, testing weed and grass control strategies and seed mixes and seeding rates to improve KEA condition. The anticipated listing of Streaked Horned Lark and its use of the site in 2006-08 caused us to re-consider the oak plantings in the prairie unit, since horned larks are intolerant of tall plants. Final tasks funded by the OWEB grant included site preparation mowing and sprays on the entire prairie. Subsequent funding provided by the 2013 levy will continue site preparation, seeding in fall 2014 and ongoing weed control.

	0	1	2	3	4
	Pre-initiation	Initiation	Establishment	Consolidation	Maintenance
Emergent Wetland					
When we bought the property	35			13	
Present condition			35	13	
Shrub Wetland					
When we bought the property	15				
Present condition			15		
Riparian Forest					
When we bought the property	77			8	
Present condition	5		72	8	
Prairie (wet and mesic)					
When we bought the property	137				
Present condition	36	88	13		

Metro property stewardship classification (acres)

NATURAL RESOURCES OF SPECIAL INTEREST

Several rare species have been observed on Penstemon Prairie. Streaked Horned Lark (*Eremophila alpestris* ssp. *strigata*), recently listed by the United States Fish and Wildlife Service as Threatened, were noted on several occasions before the tall, thick grasses established on site. It is not certain whether horned larks were breeding on the site, although they were present during breeding bird surveys in 2007 and 2008. A small flock of horned larks foraged in a tilled area for several days during site preparation work in summer 2006. The birds appeared while the operator was tilling; the activity occurred shortly after breeding season probably ended. These sightings are noteworthy because this species had not been documented in Washington County for many years. In 2009 and later, the *Deschampsia* and *Hordeum* were too tall and thick in the prairie to provide nesting habitat for horned larks. Current restoration work is targeted at providing better habitat conditions for them, as well as other prairie/grassland species.

Flocks of Western Meadowlark (*Sturnella neglecta*) began using the prairie and adjacent small woody vegetation in about 2012, shortly after the tall grasses were hayed. As of this report date, they have not remained on site during winter floods or been detected during nesting season. Improvements to the prairie structure and plant composition should benefit this species. Once common in the Willamette Valley, they are now rare.

Northern red-legged frogs (*Rana aurora*) breed in seasonal wetlands, especially the northeast wetland. Egg mass surveys revealed that the frogs use wetlands as they are available. In drier years, some of the more southerly wetlands are not available. The northeast wetland is flooded to an appropriate depth for the frogs nearly every year.

Fish and fish-like vertebrates of interest at Penstemon Prairie include winter steelhead (*Oncorhynchus mykiss*), Chinook salmon (*O. tshawytscha*), Coho salmon (*O. kisutch*), resident cutthroat trout (*O. clarkii*) and Pacific lamprey (*Lampetra tridentata*). The site and adjacent river are not designated critical habitat for any listed species, but they provide rearing, migration and/or residential habitat for all of these species, depending on the season.

Nelson's checkermallow (*Sidalcea nelsoniana*), federally listed as Threatened, was found at Penstemon Prairie in the late 2000s, nearly 10 years after the site was purchased by Metro. It was persisting in an emergent wetland unit on the east side of the property, bounded on the north and south by agriculture lease areas. This low, meandering area was probably too wet for farming, and it also served as a drainage swale receiving water from the drained farmland to the east. It may have been left alone for the last 100 years until Metro began controlling reed canarygrass and planting shrubs in the swale.

In 2011, during a site visit to monitor the *Sidalcea* population in the swale, another rare plant was found there: *Penstemon hesperius*. This species was thought to be extinct until 2008, when it was discovered at the Tualatin River National Wildlife Refuge. The occurrence at Penstemon Prairie is only the third location known for this plant. The second location was destroyed in a road-widening project (although the plants were salvaged).

The discovery of two rare plants in the swale caused us to re-think the shrub planting there. For the last two years, Metro staff marked Penstemon and checkermallow plants, weeded them by hand, and cut shrubs that would compete with them for resources. Seed from plants at the other locations (Herman Road and Tualatin Refuge) was planted at the Native Plant Center. In 2013, Metro staff and volunteers out-planted 300 Penstemon and 300 checkermallow into other areas at Penstemon Prairie to expand their population and distribution.

CONSERVATION TARGETS

There are four conservation targets for Penstemon Prairie:

- Emergent wetland (nested targets of *Penstemon hesperius* and *Sidalcea nelsoniana*)
- Wet/mesic prairie (nested targets of Streaked Horned Lark (*Eremophila alpestris* ssp. *Strigata*) and Western Meadowlark (*Sturnella neglecta*)
- Riparian forest
- Shrub wetland

CURRENT AND DESIRED FUTURE CONDITION OF CONSERVATION TARGETS

TARGET	CURRENT CONDITION	DESIRED FUTURE CONDITION
Emergent wetland	Generally quite good, with nice diversity of native plants. There are some problem areas with exotic species that require control.	Maintain the diversity of native plants and reduce cover of exotics. Continued dominant cover by native plants.
Wet/mesic prairie	The unit's seed bank of agriculture weeds threatens its health. Current status is relatively poor condition, but is in the process of restoration.	Much-reduced cover of exotic plants. Mosaic of plant cover including short native grasses and sedges, and wildflowers providing habitat for pollinators, grassland birds and other wildlife.
Riparian forest	Most of the riparian forest is young; it was planted in the late 2000s. It is under a good maintenance regime and is establishing nicely.	Mature mix of native trees and shrubs providing food and shelter for a variety of wildlife and recruiting down wood into the adjacent river. Also provides shade for temperature management of the river.
Shrub wetland	Its condition varies, and this target will be revisited in parts of the site in the next year or two. Shrubs are establishing nicely in some areas, but in others they are experiencing considerable competition from invasive plants and require more maintenance.	Well-established thickets of shrubs that provide food and shelter for wildlife. A robust diversity of species is present. Invasive plant coverage is minimal.

Non-technical status and DFC of targets

Key ecological attributes for emergent wetlands at Penstemon Prairie

				INDICATO		CURRENT	DFC* FOR	LONG		
CATEGORY	KEA	INDICATOR	POOR	FAIR	GOOD	VERY GOOD	RATING	THIS SCP	TERM DFC	COMMENTS
Condition	Native wetland plant cover in emergent area	Dominance of native herbaceous plants characteristic of the region's wetlands	<25% cover of vegetated areas	25-50% cover of vegetated areas	50-75% cover of vegetated areas	>75% cover of vegetated areas	Good or very good	Very good	Very good	Healthy seed bank of natives contributed heavily to the good condition here.
Condition	Hydrology	Hydroperiod	Both the filling/inundation and drawdown/drying of the site deviate from natural conditions (either increased or decreased magnitude and/or duration)	Site's filling or inundation patterns are characterized by natural conditions, but thereafter are subject to more rapid/extreme drawdown or drying compared to more natural wetlands OR Patterns are of substantially lower magnitude or duration than under natural conditions, but thereafter site is subject to natural drawdown or drying	The filling or inundation patterns in the site are of greater magnitude (and greater or lesser duration than would be expected under natural conditions; but thereafter, the site is subject to natural drawdown or drying	Hydroperiod of the site is characterized by natural patterns of filling or inundation and drying or drawdown	Very good	Very good	Fair?	The site is subject to releases into the Tualatin from Henry Hagg Lake. Drain tile systems in upstream farmland can add to the flashy character. This KEA may be at great risk of more severe winter flooding and extended summer drought due to climate change.

*Desired future condition

Key ecological attributes for shrub wetlands at Penstemon Prairie

				INI	DICATOR RATING		CURRENT	DFC* FOR	LONG	
CATEGORY	KEA	INDICATOR	POOR	FAIR	GOOD	VERY GOOD	RATING	THIS SCP	TERM DFC	COMMENTS
Condition	Native shrub	Number of native shrub	<2 species	3-4 species	4-5 species	>6 species	Good or	Very good	Very good	Natural recruitment and planted
	richness	species per acre					very good			shrubs contribute to diversity.
Condition	Vegetative	Percent native shrub	<30% cover or >80% cover	30-50% cover	50-70% cover	70-80% cover	Good?	Very good	Very good	Some pockets of Phalaris
	structure:	canopy cover								arundinacea require control.
	shrub layer									
Condition	Vegetative	Percent native tree	>30% cover	30-20% cover	20-10% cover	<10% cover	Good?	Very good	Very good	Natural recruitment of Oregon ash
	structure:	canopy cover								may require some control efforts in
	tree layer									years beyond the scope of this SCP.
*Desired fut	ura condition									

*Desired future condition

Key ecological attributes for riparian forest at Penstemon Prairie

				INDICAT		CURRENT	DFC* FOR	LONG		
CATEGORY	KEA	INDICATOR	POOR	FAIR	GOOD	VERY GOOD	RATING	THIS SCP	TERM DFC	COMMENTS
Condition	Native tree and shrub richness	<pre># native tree and shrub species per 0.4 ha (1 ac)</pre>	<5 species	5-10 species	10-15 species	>15 species	Good or very good	Very good	Very good	
Condition**	Riparian habitat continuity	Gaps in woody vegetation	>2 gaps >50 m (55 yards) OR >3 or more 25-50 m (27-55 yards) gaps	1 or 2 gaps >50 m (54 yards) OR 2 or more gaps between 15-25 m (16-27 yards)	1, 25-50 m (27-55 y) gap OR 2 or more gaps between 15-25 m (16-27 yards)	0 or 1, 15-25 m (16-27 yards) gap	Good	Very good	Very good	This is also important to CWS's temperature management program.
Condition	Standing and downed dead trees	Average # snags and large wood (> 50 cm, or 20 in, DBH) per 0.4 ha (1 ac)	< 5 snags and <5% down wood	5-11 snags and 5-10% down wood	12-18 snags and 10-20% down wood with moderate variety of size and age classes	> 18 snags and >20% cover down wood in a good variety of size and age classes	Poor?	Fair	Good	Need for more snags and down wood may need to be met more slowly because of temperature management program.
Condition	Floodwater access to floodplain	Degree of connection between stream/ floodplain during high water events	Extensively disconnected by channel incision, dikes, tide gates, elevated culverts, etc.	Moderately disconnected by channel incision, dikes, tide gates, elevated culverts, etc.	Minimally disconnected by channel incision, dikes, tide gates, elevated culverts, etc.	Completely connected (backwater sloughs, channels)	Fair	Fair or good	Good	Channel incision and dikes are present, but new connections between floodplain and river are occurring.

*Desired future condition

** This KEA may not be appropriate where native turtles are present, because nesting turtles require some open habitat. Patches of bare ground may accommodate turtles and are important to native ground-nesting bees.

Key ecological attributes for wet and mesic prairie at Penstemon Prairie

				INDICATC		CURRENT	DFC* FOR	LONG					
CATEGORY	KEA	INDICATOR	POOR	FAIR	GOOD	VERY GOOD	STATUS	THIS SCP	TERM DFC	COMMENTS			
Size	Grassland	Number of potential	<16 ha (40 ac) contiguous habitat:	16-49 ha (40-120 ac) of contiguous	49-162 ha (120-400 ac) of suitable	>162 ha (400 ac) of suitable	Fair	Fair	Fair	It may be possible to increase			
	bird habitat	male meadowlark	mix of prairie and degraded prairie,	prairie or other suitable habitat, i.e.	contiguous/connected habitat, i.e.	contiguous or connected habitat,				acreage by removing a portion of			
		territories (8 ha, or 20 ac	savanna or appropriate pasture	enough suitable habitat for 2 to 5	enough for 6 to 20 male territories;	i.e. enough suitable habitat for >20				the riparian forest planted in late			
		units)	habitat, i.e. insufficient prairie/	male meadowlark territories	alternatively, 3 patches of closely	male meadowlark territories;				2000s where it greatly exceeds the			
			savanna habitat for 2 male		associated suitable habitat, each	alternatively, 3 patches of suitable				buffer needed for temperature			
			meadowlarks					>16 ha (40 ac) in size.	contiguous or connected habitat,				management.
						each >57 ha (140 ac)							
Condition	Native grass	Native species richness	<20 native herbaceous plant species	20-39 native herbaceous plant	40-59 native herbaceous plant	> 60 native herbaceous plant	Poor or	Good	Very good				
	and forb	(for the mosaic)	with high fidelity to the system	species with high fidelity to the	species with high fidelity to the	species with high fidelity to the	fair						
	presence		types present within the patch	system types present at the patch	system types present at the patch	system types present at the patch							
Condition	Native grass	Frequency of native	< 2 native high fidelity herbaceous	At least 2 native high fidelity	At least 3 native high fidelity	At least 7 native high fidelity	Poor	Fair	Very good	This is a rather ambitious goal but			
	and forb	herbaceous species in	prairie species occurring with >50%	herbaceous prairie species	herbaceous prairie species	herbaceous prairie species				well worth it.			
	abundance	(11 sq ft) quadrats	frequency and <9 additional species	occurring with >50% frequency and	occurring with >75% frequency and	occurring with >75% frequency and							
			occurring with at least 10%	at least 9 additional species	at least 9 additional species	at least 15 additional species							
			frequency	occurring with at least 10%	occurring with at least 25%	occurring with at least 25%							
				frequency	frequency	frequency							
Condition	Native forb	Percent cover native	<20%	20-30%	30-50%	>50%	Fair	Very good	Very good	Will require diligent weed control.			
	and grass	forbs and grasses											
	abundance												

*Desired future condition

Key ecological attributes for streaked horned lark at Penstemon Prairie

				INDICAT		CURRENT	DFC* FOR	LONG		
CATEGORY	KEA	INDICATOR	POOR	FAIR	GOOD	VERY GOOD	STATUS	THIS SCP	TERM DFC	COMMENTS
Size	Area of	Acres of sparsely	Bare ground largely absent	Patches of bare ground occupy	Patches of bare ground occupy 20-	Patches of bare ground occupy	Fair?	Good	Good	Fortunately patches do not have to
	suitable	vegetated/bare ground		<20% of site	40% of site	>40% of site				be large, as long as they are within
	nesting									a matrix of low-stature vegetation.
	habitat									
Condition	Suitable	Graminoid height	>61 cm (24 in)	30-61 cm (12-24 in)	15-30 cm (6-12 in)	<15 cm (6 in)	Varies	Good	Good to	This KEA contributed to the decision
	graminoid						from poor		very good	to mow and spray the tall grasses.
	height for						to good			
	streaked									
	horned lark									
	nesting									
Condition	Vegetative	Percent woody	Woody vegetation covers >10% of	Woody vegetation covers	Woody vegetation covers <5% of	Woody vegetation absent	Good	Very good	Very good	This KEA is the basis for removing
	cover;	vegetation cover	site	5-10% of site	site					seedling oaks that were planted.
	woody									
	species									
Condition	Foraging	Presence of herbaceous	Not present	Present, but all exotic	Exotic plus at least one native	Multiple native species present	Very good	Very good	Very good	
	habitat	species with seed size								
		0.8-1mm								

*Desired future condition

CONSERVATION				OVERALL				OVERALL	OVERALL	
TARGET	STRESS (DEGRADED KEA)	SEVERITY	SCOPE	STRESS RANK	SOURCE (THREAT)	CONTRIBUTION	I IRREVERSIBILITY	SOURCE RANK	THREAT RANK	COMMENTS
Emergent wetland	Reduced native wetland plant cover in	High	Very High	High	Invasive plants	Very High	Medium	High	High	Active management required.
	emergent area									
Emergent wetland	Altered hydrology	Medium	Low	Low	Climate change, water management upstream	Very High	Very High	Very High	Low	
Shrub wetland	Reduced native shrub richness	Low	Low	-	Invasive plants	Very High	Medium	High	-	Shrub plantings increased richness.
Shrub wetland	Reduced shrub cover	Low	Low	-	Invasive plants	Very High	Medium	High	-	
Shrub wetland	Excessive tree cover	Medium	High	Medium	Climate change, water management upstream	Very High	Medium	High	Medium	
Riparian forest	Low native tree and shrub richness	Low	Low	-	Prior land use	Very High	Medium	High	-	Riparian plantings reversed much loss of richness.
Riparian forest	Low riparian habitat continuity	Low	Low	-	Climate change, prior land use	Very High	Medium	High	-	
Riparian forest	Lack of snags and down wood	Medium	High	Medium	Prior land use	Very High	Medium	High	Medium	
Riparian forest	Loss of floodwater access to the floodplain	Medium	Medium	Medium	Prior land use, water management upstream	Very High	Medium	High	Medium	
Wet prairie	Few potential male meadowlark territories (8 ha, or 20 ac units)	Low	Low	-	Woody plant encroachment	Very High	Low	High	-	
Wet prairie	Reduced native species richness	High	Very High	High	Invasive plants	Very High	Medium	High	High	
Wet prairie	Low frequency of native herbaceous species in (11 sq ft) quadrats	High	Very High	High	Invasive plants	Very High	Medium	High	High	
Wet prairie	Low percent cover native forbs & grasses	High	Very High	High	Invasive plants	Very High	Medium	High	High	
Streaked horned lark	Lack of suitable nesting habitat	High	High	High	Invasive plants	Very High	Medium	High	High	
Streaked horned lark	Excessive graminoid height for streaked horned lark nesting	High	Very High	High	Invasive plants	Very High	Medium	High	High	
Streaked horned lark	Presence of woody species	Medium	High	Medium	Woody plant encroachment	Very High	Low	High	Medium	
Streaked horned lark	Lack of foraging habitat	High	Very High	High	Invasive plants, woody plant encroachment	Very High	Medium	High	High	

CLIMATE CHANGE CONSIDERATIONS

Most climate models forecast increased summer temperatures, drier summers and more severe winter storms in our region. At Penstemon Prairie, this may result in shifting boundaries of plant communities and shifting dominance of species. For example, the mesic prairie may become more like an upland prairie in its moisture regime, and some of the plants preferring wetter conditions may become less abundant or drop out of the plant community. Emergent and shrub wetlands are probably at greatest risk, since the other habitat targets have diverse species that should take advantage of changing conditions. A shift in precipitation patterns to heavier winter rains and less spring and summer rains would cause wetlands to dry faster and earlier in the season. This could stress shrubs and herbaceous plants (including Penstemon and checkermallow) with lack of water, inadequate duration of drying season to complete life cycles, etc. A drier regime in shrub wetlands may allow trees to encroach that would not have tolerated the previously wet conditions. Metro may revisit the water control structure in coming decades and use it again to hold water on the site for longer periods and draw it down more slowly.

DIRECT EFFECTS THAT MAY OCCUR

- Increased summer temperatures
- Increased severity of winter rain events these may increase the flashiness of the Tualatin River, reducing bank stability and increasing erosion
- Decreased water availability in summer

INDIRECT EFFECTS THAT MAY OCCUR

- Range shifts by undesirable plants, increasing competition with native plants
- Disease introductions and/or increased vulnerability to disease
- Loss of synchronicity of plant reproduction and pollinators
- Loss of synchronicity of resident and migratory animals and food sources (e.g., insect hatches, seed production)

TARGET	KEA	THREAT	ACTION	NOTES
Emergent wetland	Native wetland plant cover in emergent area	Invasive plants	Ongoing weed control	
Emergent wetland	Hydrology	Climate change, water management upstream	Water level management	Beyond the timeline of this SCP
Shrub wetland	Excessive tree presence	Climate change, water management upstream	Water level management	Beyond the timeline of this SCP
Prairie	Native grass and forb abundance	Invasive plants	Ongoing weed control	
Riparian forest	Riparian habitat continuity	Climate change, prior land use	Bank stabilization, planting & maintenance	
Streaked Horned Lark	Foraging habitat	Tree encroachment	Ongoing control of woody plants	

Threats and actions for KEAs of important targets affected by climate change

RECREATION AND ACCESS

The parks and natural areas planning group is developing a new visitor experience overview that will be added to this site conservation plan as an appendix at a later date.

Metro staff conducted an internal process to consider an appropriate level of access for each of its natural areas. The access designation is offered as a starting point, with the understanding that judgment will always be needed on a case-by-case basis, and indicates that some part of that site could accept people at the stated level. It does not suggest that the entire site should have that level of access.

The designated access level at Penstemon Prairie is <u>Natural Area – Preserve</u>. Access to these sites that contain very sensitive or rare habitat is actively discouraged. Signs, if they exist, indicate that access is not permitted. Demand trails are actively decommissioned as they are discovered. Entrances to these sites may intentionally be maintained so that it is not obvious that they lead to a Metro natural area.

At present, the site is accessed by volunteers for seed collection and wildlife monitoring. Metro occasionally leads tours at the site. There is mild but steady equestrian use; riders follow the mowed equipment route next to the water. This activity is a nuisance but not a major issue, although it results in some wildlife disturbance.

NATURAL RESOURCE STRATEGIES

Metro's focus at Penstemon Prairie is on developing and maintaining a prairie mosaic suitable for grassland birds and other prairie-dependent species, addressing threats to emergent wetlands and the health of rare plant species populations, and maintaining the health of the riparian corridor. Metro will take the lead on the emergent wetland-prairie habitat complex and Clean Water Services will have primary responsibility for the riparian areas. Strategies are described below.

The greatest single threat to Penstemon Prairie for the life of this plan is invasive plants. This threat is most urgent for the emergent wetland, wet/mesic prairie and Streaked Horned Lark conservation targets. It results in an overall threat rank of "high" for seven key ecological attributes:

- Native wetland plant cover (emergent wetland)
- Native species richness (wet/mesic prairie)
- Frequency of native herbaceous species (wet/mesic prairie)
- Percent cover of native herbaceous plants (wet/mesic prairie)
- Presence of suitable nesting habitat (Streaked Horned Lark)
- Height of vegetation for nesting habitat (Streaked Horned Lark)
- Presence of forage plants (Streaked Horned Lark)

Clearly, strategies for conserving these targets must focus on control of invasive species. Other threats are related to the legacy of prior land use and water management upstream from the site. Climate change, which may pose a serious threat in the future, is not expected to affect wetland hydrology to a great degree in the lifespan of this plan.

High-priority strategies for invasive species control include:

- Regular site visits and visual monitoring for invasive plants that threaten the site, followed by active management and control. Some rhizomatous grasses can have the greatest effect on native herbaceous plant communities. Examples are *Phalaris arundinacea* (reed canarygrass) and *Alopecurus geniculatus* (meadow foxtail). Broadleaf weeds of significance at the site include *Mentha pulegium* (pennyroyal), *Limnanthes* (butter and eggs), *Raphanus sativa* (wild radish), *Kickxia elatine* (fluvel), *Convolvulus arvensis* (field bindweed), and *Daucus carota* (wild carrot).
- Developing plant lists and procuring seeds and other propagules to seed and plant areas where invasive plant control occurs.

STREAKED HORNED LARK

The listing of Streaked Horned Lark as Threatened in late 2013 complicates site management and requires different strategies than Metro typically considers. The bird is now protected wherever it occurs, and the 4(d) rule does not include habitat management measures. Activities such as weed treatments could be in violation of the Endangered Species Act if they are thought to be harassing or otherwise threatening these highly mobile, nomadic birds. Metro is working on a Safe Harbor Agreement with U.S. Fish and Wildlife Service to enable ongoing habitat management at Penstemon Prairie if and when horned larks return. We are working with USFWS on language for that agreement to allow weed treatments, haying, grazing, prescribed burns and other routine management activities on this and other prairie sites in Metro's portfolio.

STRATEGY	SOURCES OF STRESS	FOCAL CONSERVATION TARGETS/KEAS AFFECTED	WHY IS IT IMPORTANT AND ANY TIMING ISSUES	MEASURE(S) OF SUCCESS	RANK
Visual surveys for and treatment of weeds several times per year	Invasive plants	Emergent and shrub wetlands, wet and mesic prairie, Streaked Horned Lark	Phenology varies greatly among weeds – must catch them at the right season for treatment	Reduced frequency and cover	High
Safe Harbor Agreement	Invasive plants, woody plant encroachment	All	Depending on how USFWS chooses to interpret its rules, any and all activities at the site could be restricted in the absence of an agreement	Ability to manage the site and vegetation	High
Soften or pull back hard edges at prairie units by managing tall vegetation	Woody plant encroachment	Streaked Horned Lark, wet prairie (number of potential meadowlark territories)	Horned larks are extremely intolerant of high-stature vegetation	Good habitat structure on edges	High
Cut trees in shrub units, shrubs in emergent wetland	Woody plant encroachment, excessive tree cover	Emergent wetland and shrub wetland	Must be done every 3-5 years to retain proper habitat structure	Good habitat structure	High

Proposed strategies

STRATEGY RANK:

High: Must do within 5 years to protect target viability

Medium: Target will persist without it but will degrade over 5-10 years or require additional future management **Low:** Addresses a non-critical threat or one that is unlikely to threaten target viability within 10 years

SPECIFIC ACTIONS AND FUNDING REQUIREMENTS

		PRIORITY		
STRATEGY	TARGET	(HOW SOON)	SPECIFIC TASKS	ESTIMATED COST
Visual surveys for and treatment of weeds several times per year	All	2014	Site walks with Natural Resources Specialists and/or Natural Resources Technicians three times during growing season; identify weeds and plan treatments; implement treatments; riparian forest will be maintained by Clean Water Services	\$5,000 - \$20,000 per year, depending on habitat condition
Safe Harbor Agreement	All	Spring 2014	The agreement is in draft form as of 2/2014, with details to be discussed and negotiated with USFWS	Staff time – 4-5 days
Soften or pull back hard edges at prairie units by managing tall vegetation	Prairie, Streaked Horned Lark	2014	Visit site with partners on previous plantings, ensure compatibility with their goals, mark trees and shrubs, have staff or contractors cut and possibly stump treat	\$2,500 (one crew day)
Cut trees in shrub units, shrubs in emergent wetland	Shrub and emergent wetland	2014	Staff or contractor mow emergent wetland in late summer; staff walk shrub unit in fall to cut and stump treat trees as needed	\$1,000 (one contractor day with mower)

Specific actions to implement strategies

MONITORING PLAN

Monitoring for key ecological attributes associated with the five conservation targets is shown below.

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TARGET KEA(S)	INDICATOR	METHOD	THRESHOLD FOR ACTION?	FREQUENCY COST
Emergent wetland	Dominance of native herbaceous plants characteristic of the region's wetlands	Visual inspection on site walks each year	< 75% native cover or presence of certain weeds*	Routine site visits each year
Emergent wetland	Hydroperiod	Visual inspection on site walks each year	Hydroperiod is no longer characterized by natural patterns of filling or inundation and drying or drawdown.	Routine site visits each year
Shrub wetland	Number of native shrub species per acre	Visual inspection on site walks each year	Less than 6 species	Routine site visits each year
Shrub wetland	Percent native shrub canopy cover	Visual inspection on site walks each year	Less than 70% cover	Routine site visits each year
Shrub wetland	Percent native tree canopy cover	Visual inspection on site walks each year	>10% cover	Routine site visits each year
Riparian forest	<pre># native tree and shrub species per 0.4 ha (1 ac)</pre>	Visual inspection on site walks each year	<15 species	Routine site visits each year
Riparian forest	Gaps in woody vegetation	Visual inspection on site walks each year	More than 1, 15-25 m gap	Routine site visits each year
Riparian forest	Average # snags and large wood (> 50 cm, or 20 in, DBH) per 0.4 ha (1 ac)	Visual inspection on site walks each year	< 5 snags and <5% down wood	Routine site visits each year
Riparian forest	Degree of connection between stream/ floodplain during high water events	Visual inspection on site walks each year	Extensively disconnected by channel incision, dikes, tide gates, elevated culverts, etc.	Routine site visits each year

TARGET KEA(S)	INDICATOR	METHOD	THRESHOLD FOR ACTION?	FREQUENCY COST
Wet prairie	Number of potential male meadowlark territories (8 ha, or 20 ac units)	Estimate via GIS	Less than 5 potential meadowlark territories	When unit boundaries change; little/no cost
Wet prairie	Native species richness (for the mosaic)	Sampling on existing array of randomly located plots	Less than 40 native herbaceous plant species with high fidelity to the system types present at the patch.	Annually for about 5 years; 2 staff days
Wet prairie	Frequency of native herbaceous species in (11 sq ft) quadrats	Sampling on existing array of randomly located plots	<2 native high fidelity herbaceous prairie species occurring with >50% frequency and <9 additional species occurring with at least 10% frequency	Same 2 days as above
Wet prairie	Percent cover native forbs and grasses	Sampling on existing array of randomly located plots	<50% cover	Same 2 days as above
Streaked horned lark	Acres of sparsely vegetated/ bare ground	Visual inspection via site walk	Patches of bare ground occupy <20% of site	Routine site visits each year
Streaked horned lark	Graminoid height	Visual inspection via site walk	>30 cm height is common	Routine site visits each year
Streaked horned lark	Percent woody vegetation cover	Visual inspection via site walk	Woody vegetation present	Routine site visits each year
Streaked horned lark	Presence of herbaceous species with seed size 0.8- 1mm	Visual inspection via site walk	One or fewer native species present	Routine site visits each year

* Certain problem weeds can quickly occupy and degrade emergent wetlands. High-priority weeds on this site include pennyroyal (*Mentha pulegium*) and reed canarygrass (*Phalaris arundinacea*). For these species, intervention needs to occur when cover is less than 5 percent.

PARTNERS

CURRENT PARTNERS

- NRCS and Tualatin SWCD
- Clean Water Services: buffer condition along streams, planning and implementing collaborative restoration plans.
- OWEB
- USFWS Safe Harbor Agreement

POTENTIAL PARTNERS

• No additional partners have been identified at this time.

Site Map



Planning Area



Soils, Topography, and Hydrological Features



Penstemon Prairie Site Conservation Plan

map date: 2/4/2014

Historical Vegetation (1851-1910)



Penstemon Prairie Site Conservation Plan

map date: 2/4/2014

Current Cover



Penstemon Prairie Site Conservation Plan

Conservation Targets



Penstemon Prairie Site Conservation Plan

Management Status



Penstemon Prairie Site Conservation Plan

map date: 2/4/2014