Corral Creek Natural Area

Approvals for Site Conservation Plan

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SITE CONSERVATION PLAN

Corral Creek Natural Area



July 2015

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INTRODUCTION

CONTEXT

Corral Creek Natural Area is an approximately 32-acre property located near Wilsonville, Oregon just south of Metro's Graham Oaks Nature Park. The site is roughly bordered by Wilsonville Road to the west, farmland to the north, low density housing developments to the south and east and is approximately 150 feet (one tax lot) away from bordering the Willamette River. Corral Creek Natural Area is part of the Tonquin Geologic target area and borders the urban growth boundary at its southeast corner. Corral Creek falls within the Clackamas County rural reserve south and is zoned as Exclusive Farm Use (EFU).

Corral Creek Natural Area consists of two properties purchased under the 1995 Open Spaces Bond Measure. The Richen/Stefan property is a 22-acre parcel acquired in 1997 and the Michel property is an 11-acre parcel acquired in 2001. These acquisitions contributed to the 1995 Acquisition program goals of preserving riparian buffers in the Mill/Corral Creek floodplain, creating a Tonquin Greenway connecting the Willamette River to the Tualatin River Wildlife Refuge and linking the Tonquin Geologic Area with the Willamette River Greenway.

This conservation plan has been developed by Metro staff and includes an overview of the history of the site, existing conditions, conservation targets and recreation and access objectives for the site.

PLANNING AREA

This site conservation plan includes Metro-owned property and considers adjacent parcels that contain important habitat features or would connect Corral Creek Natural Area to Metro's Graham Oaks Nature Park. Relevant habitat features include suitable spring Chinook rearing habitat in Corral Creek, and upland and riparian forest.

KEY METRO STAFF

Jeff Merrill, Associate Natural Resources Scientist
Adam Stellmacher, Lead Natural Resources Specialist
Ryan Jones, Natural Resources Specialist
Mary Meier, Natural Resources Technician
Rod Wojtanik , Principal Regional Park Planner
Tom Heinicke, Real Estate Negotiator

KEY PRIVATE LANDOWNERS

Dyches Family LLC 11850 SW Wilsonville Rd.	Property would create connectivity to Graham Oaks Nature Park, expand mature upland forest habitat of Corral Creek and incorporate approximately 400 feet of Corral Creek that falls outside the natural area. Significant ivy, holly and laurel infestation.
Zamzam LLC 12830 SW Wilsonville Rd.	Large undeveloped parcel to the west of Corral Creek Natural Area, would create connectivity to Graham Oaks Nature Park, connection to the Willamette River and an additional 2,000 feet of Corral Creek

EXISTING PLANNING DOCUMENTS

1995 and 2006 Bond refinement plans for the Tonquin Geologic Area can be found here: M:\suscntr\Natural Areas and Parks\Regional Properties\Tonquin Geologic Area TA\Refinement Plans.

The 2001 Fishman Environmental Services, Tonquin Biological Inventory can be found here: M:\suscntr\Natural Areas and Parks\Regional Properties\Tonquin Geologic Area TA\Scientific & Background Information\Jane's 1995 Tonquin Biological Report

EXISTING CONDITIONS

SITE DESCRIPTION

Corral Creek Natural Area consists of upland and riparian mixed forest with some areas of upland conifer forest. The most upstream portion of the floodplain is dominated by *Phalaris arundinacea* (reed canarygrass) and *Rubus bifrons* (Himalayan blackberry). Though some shrubs are present from natural recruitment and from restoration planting that occurred during initial stabilization of the property, the densities are very low. The conditions improve downstream with the riparian forest in better condition with some mature *Fraxinus latifolia* (Oregon ash) in the overstory and a heavy shrub component of *Salix* (willow sp.) and *Cornus sericea* (red osier dogwood). The stream channel is incised (5 to 10 feet) and lacks significant large wood, though evidence that the creek does access the floodplain is present (i.e. flood debris visible in riparian shrubs). There is recent beaver activity on the site as evidenced by freshly cut and chewed sticks. There are several dams visible in the stream though none appear active. Corral Creek is identified by ODFW as rearing habitat for spring *Oncorhynchus tshawytscha* (Chinook salmon), and *Oncorhynchus clarkii* (coastal cutthroat trout) were observed during a 2001 biological inventory.

The portion of the site south of the creek is primarily mature upland mixed forest with a heavy deciduous component. North of the creek the site is primarily upland conifer forest, with a 2-acre patch of mature *Pseudotsuga menziesii* (Douglas-fir) serving as a significant habitat feature. There is also a densely planted 5-acre stand of 10-15 year old conifers that were part of the initial stabilization work on the property on the north side of the creek. Densities are such that understory growth has been suppressed by shade and barring a disturbance event individual tree development and growth will eventually stagnate. The upland forest generally lacks significant numbers of standing dead trees and downed wood, though these features are more prevalent in the mature conifer patch.

Hedera helix/hibernica (English/Irish ivy) is pervasive in the understory of the upland areas, although treatments initiated in 2014 have begun to reduce its prevalence. *Ilex aquifolium* (European holly), *Crataegus monogyna* (European hawthorn) and *Prunus laurocerasus* (English laurel) are also present. The weed infestation spreads across property boundaries and is present on all neighboring properties as well. The understory component of the forest has been degraded by ivy cover and there is a lack of recruitment of shade-tolerant native shrubs, trees and forbs.

SOILS

Several soil types are present at Corral Creek Natural Area. Soils present include Chehalis silt loam, McBee silty clay loam and Willamette silt loam and are indicative of the floodplain associated with Corral Creek. Additionally, Xerochrepts and Haploxerolls (well-drained soils on rocky escarpments) reflect the steep slopes rising abruptly from the stream channel to the surrounding landscape.

Table 1: Soils present at Corral Creek Natural Area

MAP SOIL SYMBOL	MAP UNIT NAME	DESCRIPTION	ACRES
16	Chehalis silt loam	Very deep, well-drained soils on floodplains. Where not cultivated, vegetation typically includes Douglas-fir, red alder, grand fir, western redcedar, bigleaf maple and Oregon white oak with an understory of vine maple, trailing blackberry, swordfern, brackenfern, Oregon grape, wild ginger, violet and western rattlesnake plantain.	12.6
56	McBee silty clay loam	Very deep, moderately well-drained soils on floodplains and low terraces. Where not cultivated, vegetation typically includes Douglas-fir, Oregon ash, wild rose, snowberry, blackberry and grass.	6
86	Willamette silt loam	Very deep, well-drained soils on broad terraces. Where not cultivated, vegetation typically includes Oregon white oak, Douglas-fir, hazel, oat grass and other native grasses.	8.5
92	Xerochrepts and Haploxerolls	Soil on terrace escarpments. Where not cultivated, vegetation typically includes Douglas-fir, Oregon white oak, bigleaf maple, western redcedar, red alder, western hazel, Oregon grape and salal.	5.3

VEGETATION AND WILDLIFE

In 2001 Fishman Environmental Services conducted natural resource inventories on properties within the Tonquin geologic area, including Corral Creek Natural Area.

Fishman Environmental utilized the National Vegetation Classification System to define plant communities at Corral Creek. They defined the plant communities to the level of plant associations. A plant association is defined as a plant community with a definite floristic composition and uniform habitat condition that repeats itself across the landscape. This adds an additional layer of detail to the habitat types and conservation targets identified in this site conservation plan. The Fishman Environmental plant associations and species list can be found in Appendix A.

Fishman Environmental utilized several methods to collect wildlife presence information including standardized surveys, small mammal trapping, timed searches, casual observations and animal sign (e.g. tracks, runways, scat). Aquatic habitats were sampled using dipnets and a small block-net seine to inventory fish, aquatic amphibians and aquatic macroinvertebrates and a 500-micron mesh dip or kick net to inventory macroinvertebrates. Below is a summary list of the species recorded:

Table 2: Wildlife present at Corral Creek Natural Area

FISH	REPTILES AND AMPHIBIANS	BIRDS	MAMMALS	BUTTERFLIES AND OTHER INVERTEBRATES
cutthroat trout*	common garter snake, *Thamnophis sirtalis*	American crow, *Corvus brachyrhynchos*	beaver, *Castor canadensis*	*Terrestrial:*
red-sided shiner	Pacific treefrog (Pacific chorus frog), *Hyla regilla*	American goldfinch, *Carduelis tristis*	black-tailed deer, *Odocoileus*	ochre ringlet
sculpin				banana slug
				banded snail

FISH	REPTILES AND AMPHIBIANS	BIRDS	MAMMALS	BUTTERFLIES AND OTHER INVERTEBRATES
	(*Pseudacris regilla*)	American kestrel, *Falco sparverius* American robin, *Turdus migratorius* Bewick's wren, *Thryomanes bewickii* black-capped chickadee, *Parus atricapillus* black-headed grosbeak, *Pheucticus ledovicianus* bushtit, *Psaltriparus minimus* cedar waxwing, *Bombycilla cedrorum* chestnut-backed chickadee, *Parus rufescens* common yellowthroat, *Geothlypis trichas* flycatcher, *Empidonax species* golden-crowned kinglet, *Regulus satrapa* northern flicker, *Colaptes auratus* *pileated woodpecker, *Dryocopus pileatus* red breasted nuthatch, *Sitta canadensis* red-breasted sapsucker, *Sphyrapicus ruber* red-tailed hawk, *Buteo jamaicensis* song sparrow, *Melospiza melodia* spotted towhee, *Pipilo maculatus* Steller's jay, *Cyanocitta stelleri* Swainson's thrush, *Catharus ustulatus* western scrub jay, *Aphelocoma coerulescens* western tanager, *Piranga ludoviciana* western wood pewee, *Contopus sordidulus* *willow flycatcher, *Empidonax traillii*	*hemionus* coyote, *Canis latrans* raccoon, *Procyon lotor* Townsend's chipmunk, *Eutamias townsendii* Townsend's mole, *Scapanus townsendii* vole, *Microtus species*	*Aquatic:* small mayfly stream snail stonefly saddle-back cased caddis fly cased caddis fly finger net caddis fly crawling water beetle net-spinning caddis fly, riffle beetle black fly cranefly midge moth fly aquatic wasp crayfish scud freshwater limpet

* Sensitive species

RECENT MANAGEMENT HISTORY

Until very recently the Corral Creek Natural Area has remained unmanaged after the initial 1995 Open Spaces Bond stabilization work took place. The upland conifer stabilization plantings were generally a success and the 10-15 year old trees are growing vigorously. The riparian plantings were less successful and there are large areas dominated by blackberry and reed canarygrass. This was likely due to a lack of maintenance on the plantings, which in an area dominated by reed canarygrass will lead to plant mortality. Future planting will include several years of maintenance until the plants are free to grow.

Blackberry and reed canarygrass were cut and sprayed across the property in 2014 as site preparation for eventual riparian planting. Additionally, ivy and invasive tree treatments were scheduled for fall/winter 2014/15 in preparation for an understory planting in 2016.

There is the potential to partner with the Clackamas Soil and Water Conservation District (CSWCD) to implement invasive species abatement on neighboring private properties. CSWCD is currently exploring landowner interest in conjunction with the Metro Land Management team.

Metro has held initial meetings with the Oregon Department of Fish and Wildlife (ODFW) and CSWCD to discuss opportunities for stream restoration on the site. The project has been delayed due to funding shortfalls at ODFW, although this opportunity will be revisited in the next fiscal year.

Table 3: Metro property stewardship classification (acres)

	0 PRE-INITIATION	1 INITIATION	2 ESTABLISHMENT	3 CONSOLIDATION	4 MAINTENANCE
Riparian Forest					
Present Condition	2.5	0	0	12.2	0
Upland Forest					
Present Condition	0	0	0	17.3	0

NATURAL RESOURCES OF SPECIAL INTEREST

The lower reach of Corral Creek is identified by ODFW as rearing habitat for spring Chinook salmon (StreamNet Interactive Map). Upper Willamette Chinook Salmon are listed as “threatened” under the endangered species act by the National Marine Fisheries Service. Cutthroat trout were observed during a 2001 biological inventory. Coastal cutthroat trout in the Lower Willamette hydrologic unit are on the ODFW sensitive species list.

ACCESS FOR MANAGEMENT

The main access to Corral Creek Natural Area is a gated pull-off from Wilsonville Road, with a site address of 12400 SW Wilsonville Road. With a posted speed of 45 MPH, this access point suffers from limited sight distances. To the east there is an undeveloped long “flag” driveway and access easement, shared with 12340 SW Wilsonville Road. From there, the access easement continues to

the south crossing an agricultural field intersecting with the natural area. It seems unlikely that this would be developed as an access point given the existing access and the potential impact on the neighbor's agricultural field.

CONSERVATION

CONSERVATION TARGETS

Conservation targets are composed of a species, suites of species (guilds), communities and ecological systems that represent and encompass the full array of native biodiversity of the site, reflect local and regional conservation goals and are viable or at least feasibly restorable (The Nature Conservancy, 2007).

There are three conservation targets for Corral Creek Natural Area: upland forest, riparian forest and native fish.

Table 4: Non-technical status and DFC of targets

TARGET	CURRENT CONDITION	DESIRED FUTURE CONDITION
Riparian forest	Mixed condition, generally good downstream but poor upstream due to invasion by reed canarygrass and blackberry.	Good condition with healthy mix of species and sizes of trees and shrubs.
Upland forest	Maturing mixed conifer/deciduous in areas with moderate to high levels of ivy, holly and laurel. Low levels of native shrubs and seedling tree recruits. Young overstocked conifer plantation in Northeast corner.	Low levels of invasive plants in the understory, healthy shrub/forb understory and young trees scattered throughout. Appropriate spacing in conifer plantation with shrub component enhanced.
Native fish	Moderately degraded stream conditions due to incision, lack of large wood in the stream and general lack of complexity.	Additional large wood in stream leading to increased complexity, aggradation of the stream bed and more frequent connection to the floodplain.

KEY ECOLOGICAL ATTRIBUTES

Key ecological attributes are the features that define that target and aspects of a conservation target's biology or ecology that, if missing or altered, would lead to the loss of that target over time (The Nature Conservancy, 2007). KEAs define the conservation target's viability. They are the biological or ecological components that most clearly define or characterize the conservation target, limit its distribution or determine its variation over space and time. They are the most critical components of biological composition, structure, interactions and processes, and landscape configuration that sustain a target's viability or ecological integrity. KEAs are rated from poor to good. This rating helps establish the restoration goals and guide us in development of restoration actions for the conservation targets.

Table 5: Key ecological attributes for riparian forest (streams or rivers) at Corral Creek Natural Area

CATEGORY	KEA	INDICATOR	---------- INDICATOR RATING ----------				CURRENT RATING	DFC* FOR THIS SCP	LONG TERM DFC	COMMENTS
			POOR	FAIR	GOOD	VERY GOOD				
Size	Riparian forest width	Average width of riparian forest	<15 m (50 ft) each side of stream	15-30 m (50-100 ft) each side of stream	30-61 m (100-200 ft) each side of stream	>61 m (200 ft) each side of stream	Good	Good	Good	Constrained by area available, need to avoid loss of area. Blends into upland forest in steeper areas.
Condition	Vegetative structure: tree layer	% native tree canopy cover	<20% cover	20-30% cover	30-40% cover	40% or more	Fair	Good	Very Good	The upstream reach has the lowest percent canopy cover while downstream is better.
Condition	Native tree and shrub richness	# native tree and shrub species per 0.4 ha (1 ac)	<5 species	5-10 species	10-15 species	>15 species	Good	Very Good	Very Good	A definitive species list has not been created but revegetation will include planting a wide mix of appropriate species to enhance species richness.
Condition	Floodwater access to the 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)	Poor	Fair	Good	The upstream reach is most severely incised and disconnected. Short term actions such as placement of large wood structures or construction of beaver dam analogues and long term actions such as riparian revegetation will help to aggrade the stream and reconnect to floodplain.

*Desired future condition

Table 6: Key ecological attributes for upland forest at Corral Creek Natural Area

CATEGORY	KEA	INDICATOR	---------- INDICATOR RATING ----------				CURRENT STATUS	DFC* FOR THIS SCP	LONG TERM DFC	COMMENTS
			POOR	FAIR	GOOD	VERY GOOD				
Size	Forested habitat patch size	Patch size (includes native shrub patches or natural clearings)	< 12 ha (30 ac)	12-40 ha (30-100 ac)	40-61 ha (100-150 ac)	>61 ha (150 ac)	Fair	Fair	Good?	Constrained by area available, need to avoid loss of area. Potential for acquisition to add to area and connect with Graham Oaks Nature Park.
Condition	Native tree and shrub richness	Number of native tree and shrub species per acre	<5 species per 0.4 ha (1 ac)	5-8 species 0.4 ha (1 ac)	8-12 species per 0.4 ha (1 ac)	>12 species per 0.4 ha (1 ac)	Good	Very Good	Very Good	Efforts will focus on improving the shrub component which is most constrained by invasive cover.
Condition	Vegetative structure: native tree and shrub layer	% native tree and shrub canopy cover (combined)	<25% cover	25-50% cover	50-75% cover	>75% cover	Good	Very Good	Very Good	Tree canopy cover is more intact than understory shrub layer leading to a Good overall rating. Efforts will focus on improving the shrub component and adding shade-tolerant trees to eventually replace maturing trees.
Condition	Standing and downed dead trees	Average # snags and large wood (> 50 cm, or 20 in, DBH) per acre	< 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	Poor	Fair	Opportunities to make small improvements (i.e. small scale snag creation, wildlife pile creation) but currently limited by lack of large mature conifers.
Landscape context	Edge condition	% of edge bordered by natural habitats and/or managed for conservation	Patch surrounded by non-natural habitats (0-25% natural habitat)	25%+ of patch bordered by natural habitats	50-75% of patch bordered by natural habitats or managed for conservation	75-100% of patch bordered by natural habitats or managed for conservation	Fair	Fair	Fair	This KEA is constrained by established surrounding land uses.

*Desired future condition

Table 7: Key ecological attributes for native fish habitat at Corral Creek Natural Area

CATEGORY	KEA	INDICATOR	---------- INDICATOR RATING ----------				CURRENT STATUS	DFC* FOR THIS SCP	LONG TERM DFC	COMMENTS
			POOR	FAIR	GOOD	VERY GOOD				
Condition	Key pieces and # of pieces of large wood in wetted areas of the stream and adjacent streambank	# key pieces and large wood per 305 m (1,000 ft) reach	<10 large wood pieces and 0-1 key pieces	10-20 large wood pieces and 2-5 key pieces	20-40 large wood pieces and 6-10 key pieces	>40 large wood pieces and >10 key pieces	Poor	Fair	Good	Addition of large wood can improve to fair condition. Eventual natural recruitment can improve further.

*Desired future condition

THREATS AND THEIR SOURCES

An effective conservation strategy requires an understanding of threats (stresses) to targets and the sources of those threats. Adjacent development and subsequent disruption of natural systems place stress on the resource and its inhabitants and threaten the health of the greater ecosystem.

Table 8: Summary of Corral Creek Natural Area's threats:

CONSERVATION TARGET	STRESS (DEGRADED KEA)	SEVERITY	SCOPE	OVERALL STRESS RANK	SOURCE (THREAT)	CONTRIBUTION	IRREVERSIBILITY	OVERALL SOURCE RANK	OVERALL THREAT RANK	COMMENTS
Riparian forest	Reduced native tree and shrub richness	Medium	Medium	Medium	Invasive species	Medium	Low	Low	Low	Ranked contribution Medium due to ongoing and future plans to address threat.
Riparian forest	Low overstory and shrub cover	High	Medium	Medium	Invasive species	Very High	Low	High	Medium	Pertains to portion of the floodplain dominated by reed canarygrass and blackberry.
Upland forest	Reduced native tree and shrub richness	Medium	Medium	Medium	Invasive species	High	Low	Medium	Low	Ranked contribution High due to fairly extensive ivy cover in the understory. Threat is mainly to shrub richness but lack of shade-tolerant tree recruitment is a future concern.
Upland forest	Loss of surrounding native habitat	High	High	High	Development/land conversion	High	Medium	Medium	Medium	Residential housing and agricultural development flanks natural area. Additional property acquisition in area could add additional protected acres.
Upland forest	Low understory shrub cover	Medium	High	Medium	Previous forest management; invasive species	High	Low	Medium	Low	Low cover in mature forested areas due to invasive species cover; low cover in conifer plantation due to density of planting resulting in lack of resources (light, water, etc.)
Native fish/ riparian forest	Altered Hydrology/Habitat simplification	Medium	Medium	Medium	Development/land conversion; previous forest management	High	Medium	Medium	Low	Altered hydrology can be addressed onsite but upstream/headwaters conditions are beyond our control.

CLIMATE CHANGE CONSIDERATIONS

In coming decades, climate change is expected to increase summer temperatures and the severity of winter storms, as well as reduce precipitation in summer. In a small area such as Corral Creek Natural Area, where surrounding development and invasive plants have already had great impacts on the health of Metro's land, it is difficult to know whether climate change could make the situation much worse for most of the conservation targets.

Direct effects that may occur

- Increased summer temperatures
- Increased severity of winter rain events leading to flashier stream flows
- Decreased water availability in summer; the future summer flow and its deviation from historic conditions are not known

Indirect effects that may occur

- Range shifts by undesirable plants increasing competition
- Disease introductions and/or increased vulnerability to disease
- Loss of synchronicity of plant reproduction and pollinators
- Loss of synchronicity of resident and migratory animals, habitat and food sources (e.g., insect hatches and stream flows for rearing Chinook salmon)

Corral Creek may provide a corridor and habitat for organisms that must shift their ranges in response to climate change. As a relatively small creek system it is unlikely to be an important corridor but it may be a valuable refuge in the short term for organisms on the move.

Table 9: Threats and actions for KEAs of important targets affected by climate change

TARGET	KEA	THREAT	ACTION	NOTES
Riparian forest	Floodwater access to the floodplain	Increased severity and flashiness of flows in storm events	Implement placement of large wood, construction of beaver dam analogues, grading and riparian planting to aggrade stream and reconnect floodplain	Planting appropriate riparian species and constructing beaver dam analogues can in the short and long term encourage beaver to dam the creek improving stream connection to the floodplain.
Upland forest; riparian forest	Low native tree and shrub richness	Less resilience in plant community to respond to climatic changes	Implement understory and riparian enhancement through invasive abatement and native planting	
Native fish	Key pieces and # of pieces of large wood in wetted areas of the stream and adjacent streambank	Habitat simplification and continued stream degradation with flashier flows and change in flow timing	Placement of large wood to increase habitat and facilitate reconnection with floodplain and/or facilitate more active use by beaver through riparian plantings	

NATURAL RESOURCE STRATEGIES

This conservation plan outlines strategic actions to be carried out at Corral Creek Natural Area over the next 10-15 years. They are based on the short- and long-term goals for the conservation targets. The strategic actions described here are general courses of action to achieve these objectives and not highly prescriptive courses of action. Specific prescriptions and projects will be developed by Metro staff to address site-specific conditions encountered in the areas targeted for restoration action. Strategies have been ranked high, medium and low based on a combination of overall threat rank, ease and cost of implementation and regional importance of the conservation target.

High priority strategies

- Improve spring Chinook rearing habitat at Corral Creek:
  - Add additional large wood to the stream channel and streambanks.
  - Enhance connection of stream to floodplain by re-grading stream banks or implementing strategies to aggrade the stream bed, such as the construction of beaver dam analogues.
  - Enhance riparian vegetation in degraded areas.
- Improve forest understory health by controlling ivy and invasive trees and planting native trees and shrubs.
- Revegetate section of floodplain dominated by reed canarygrass and blackberry and plan ahead for adequate maintenance to ensure plants achieve "free to grow" size.

Medium priority strategies

- Work with partners (CSWCD) to implement weed treatments on neighboring properties.
- Explore acquisition opportunities to connect Corral Creek Natural Area with Graham Oaks Nature Park and/or the Willamette River.
- Enhance forest complexity by snag and downed wood creation where appropriate.

Lower priority strategies

- Thin dense conifer plantation to accelerate individual tree growth, promote late successional characteristics (large branches, large canopy) and enhance understory diversity.

Table 10: List of proposed strategies

STRATEGY	SOURCES OF STRESS ADDRESSED	FOCAL CONSERVATION TARGETS/KEAS AFFECTED	WHY IMPORTANT/ TIMING ISSUES	MEASURE(S) OF SUCCESS	RANK
Improve spring Chinook rearing habitat at Corral Creek	Development and land conversion, previous forest management	Native fish/key pieces and # of pieces of large wood in wetted areas of the stream and adjacent	Willamette River Chinook is an ESA listed species	Greater connection of stream to floodplain, addition of large wood to stream/ floodplain	High
Improve forest understory health by controlling ivy and weedy trees and planting native trees	Invasive species	Upland forest/native tree and shrub richness; vegetative structure: native tree and shrub layer	In fairly good condition now	Established understory trees and shrubs; reduced ivy and weedy tree cover	High

STRATEGY	SOURCES OF STRESS ADDRESSED	FOCAL CONSERVATION TARGETS/KEAS AFFECTED	WHY IMPORTANT/ TIMING ISSUES	MEASURE(S) OF SUCCESS	RANK
and shrubs					
Revegetate section of floodplain dominated by reed canarygrass and blackberry	Invasive species	Riparian forest/vegetative structure: native tree and shrub layer	Overall health of Corral Creek depends on well vegetated floodplain	Established riparian trees and shrubs	High
Thin dense conifer plantation to accelerate individual tree growth, promote late successional characteristics (large branches, large canopy) and enhance understory diversity	Previous forest management	Upland forest/native tree and shrub richness; vegetative structure: native tree and shrub layer; standing and downed dead trees	Overstocked condition, trees will eventually lose ability to develop late successional characteristics; current spacing does not allow for healthy shrub or forb understory community and puts trees at risk for forest health issues (e.g. insects, disease, fire)	Widely spaced trees with enhanced shrub understory	Low
Work with partners to retain and improve forest habitat in other ownership	Invasive species	Riparian forest/native tree and shrub richness; upland forest/native tree and shrub richness; vegetative structure: native tree and shrub layer	Improve forest's function as a corridor and as habitat, whether short- or long-term	Reduced ivy and weedy tree cover on adjacent lands	Med
Explore acquisition opportunities to connect Corral Creek Natural Area with Graham Oaks Nature Park and/or the Willamette River	Development and land conversion	All	Protect wildlife corridor and habitat; open opportunities for additional ecological uplift	Acquisition of parcels identified in site conservation plan	Med
Enhance forest complexity by snag and downed wood creation where appropriate	Previous forest management	Upland forest/standing and downed dead trees	Provide habitat for species dependent on standing dead and downed wood (cavity nesters, small mammals, amphibians)	Snag creation and wildlife pile creation	Med

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.3

Table 11: Specific actions to implement strategies

STRATEGY	TARGET	PRIORITY (HOW SOON)	SPECIFIC TASKS	ESTIMATED COST
Improve spring Chinook rearing habitat at Corral Creek	Native fish	FY 15-16	Work with ODFW, CSWCD to implement baseline macro-	$75,000

STRATEGY	TARGET	PRIORITY (HOW SOON)	SPECIFIC TASKS	ESTIMATED COST
			invertebrate sampling; engage water resources firm to design stream enhancements; implement project and rehab any disturbance	
Improve forest understory health by controlling ivy and weedy trees and planting native trees and shrubs	Upland forest	FY 14-15; 15-16	Implement site prep weed treatments; procure plant materials; implement planting and follow-up maintenance	$73,000
Revegetate section of floodplain dominated by reed canarygrass and blackberry	Riparian forest	FY 14-15; 15-16	Implement site prep weed treatments; procure plant materials; implement planting and follow-up maintenance	15,000
Thin dense conifer plantation to accelerate individual tree growth, promote late successional characteristics (large branches, large canopy) and enhance understory diversity	Upland forest	FY 15-16	Contract crew thinning and habitat pile creation	$5,000 to $10,000
Work with partners to retain and improve forest habitat in other ownership	Riparian forest; upland forest	FY 14-15	Contact partners and initiate discussion; invasive species treatments on adjacent parcels	Staff time; implementa-tion cost likely covered by CSWCD
Explore acquisition opportunities to connect Corral Creek Natural Area with Graham Oaks Nature Park and/or the Willamette River	Riparian and upland forests	Next 5 years – before end of 2006 Bond	Engage real estate negotiators; outreach to landowners; due diligence site walks	Staff time and unknown dollar amount
Enhance forest complexity by snag and downed wood creation where appropriate	Upland forest	Anytime	Identify trees for snagging; hire arborist	$5,000

MONITORING PLAN

Monitoring will be done to evaluate habitat, population responses to management action, as well as progress toward achieving habitat and population objectives.

Monitoring addresses threats directly and indirectly, by tracking changes in certain ecological attributes. It implements techniques that are well-established and continues many monitoring efforts already in place. Recent and current monitoring activities have included remote sensing/GIS, amphibian and avian breeding season surveys, and monitoring the success of revegetation efforts. The monitoring plan is likely to change over time, including monitoring of key ecological attributes.

Monitoring for KEAs associated with the three conservation targets is shown below.

Table 12: Monitoring

TARGET KEA(S)	INDICATOR	METHOD	THRESHOLD FOR ACTION?	FREQUENCY AND COST
Riparian forest - Vegetative structure: tree layer	% native tree canopy cover	Visual inspection; simple survival	Reinvasion of invasives; high	Check yearly first 3 years after

TARGET KEA(S)	INDICATOR	METHOD	THRESHOLD FOR ACTION?	FREQUENCY AND COST
		survey	mortality of plantings	implementation
Riparian Forest - Native tree and shrub richness	Number of native tree and shrub species per acre	Visual inspection; simple survival survey	Reinvasion of invasives; high mortality of plantings	Check yearly first 3 years after implementation
Riparian forest - Floodwater access to the floodplain	Degree of connection between stream/ floodplain during high water events	Visual inspection during high water events and over time	Continued incision of stream channel	Observe during high flow the winter after completing; reassess stream conditions 5 years after project.
Upland forest - native tree and shrub richness	Number of native tree and shrub species per acre	Visual inspection; simple survival survey	Reinvasion of invasives; high mortality of plantings	Check yearly first 3 years after implementation
Upland forest - Vegetative structure: native tree and shrub layer	% native tree and shrub canopy cover (combined)	Visual inspection; simple survival survey	Reinvasion of invasives; high mortality of plantings	Check yearly first 3 years after implementation
Native fish - Macro-invertebrate population*	TBD	Macroinvertebrate sampling	Deviance from baseline sampling	TBD

* Not KEA but done as part of stream restoration project

ACCESS AND RECREATION

OVERVIEW

Metro staff conducted an internal process review to consider an appropriate level of access for each of its natural areas. That process looked at determining, strictly from a working staff level, what would be an appropriate level of access (Habitat Preserve, Natural Area/Low Access, Natural Area/ High access, or Nature Park) to Metro natural area properties. The access designation offered here is 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 can accept people at the stated level. It does not suggest that the entire site should have that level of access. Access level definitions can be found here: M:\suscntr\Natural Areas and Parks\Teams\Target Area teams\Conservation & Stewardship Planning\Access Planning\definitions for Metro property access inventory.

The current designated site access level for Corral Creek Natural Area is *Natural Area/Low Access*. This is defined as follows:

> Current access by neighbors or local residents is permitted but not encouraged. Low access sites do not have formalized parking and interpretive or wayfinding signage. Trails on these sites are informal or demand in nature and are not built or maintained actively. Demand trails that travel through sensitive areas are actively decommissioned. Basic rule signage is posted at the property gate or primary entrance. These sites are visited monthly or bi-monthly by Metro staff to inspect for unauthorized use and to conduct maintenance.

EXISTING PUBLIC ACCESS

There is no formal public access at Corral Creek Natural Area and the site appears to have little to no public use. Current access from the right-of-way to the natural area consists of shoulder parking with access into the site through a cable gate.

From the cable gate, an old skid road leads in to the site. This road converts to a faint game trail which bisects the property and eventually takes you onto a private property to the north. It does not seem like the trail receives much if any, human usage.

Due to the steep slopes and private property conflicts, access to the Willamette River is impossible at this time. Additionally, there are no views of the river from the natural area and there is no indication that the river is near by.

FUTURE ACCESS

Corral Creek Natural Area is currently designated as a low access site. If, in the future, it is deemed appropriate for public access, additional research and points to consider are as follows:

Vehicular access

Due to the high speeds of Wilsonville Road and limited site distances, additional research in traffic analysis and engineering will need to be considered.

Pedestrian access

Due to the steep grades and side slopes visitors would be required to navigate, limited opportunities exist to connect Graham Oaks Nature Park and Corral Creek Natural Area by entrance across from Bell Road. Due to the combined drive/access easement with the private residence at 12340 SW Wilsonville Road, providing pedestrian access at this location seems inappropriate.

Signage

Standard rules and regulations and wayfinding signage should be installed at each entry point.

Trail network

A majority of the site consists of flat, low land areas with limited side slopes on which to develop a sustainable trail system. Should Corral Creek Natural Area be considered for future access and trail development, thoughtful consideration should be given to the alignments, material choices and long term maintenance. Due to the size and shape of the natural area and the location of the creek the property, limited opportunities exist to develop a loop trail. Due to the steep slopes and private property conflicts, access to the Willamete River is impossible at this time.

Regional trail connections

The Ice Age Tonquin Trail does pass through Graham Oaks Nature Park but its alignment takes users to the east and down Willamette Way East, which is approximately ¾ mile to the east of Corral Creek Natural Area. There are no regional trails, other than the Ice Age Tonquin Trail, that are located and/or planned in close proximity to Corral Creek Natural Area.

EDUCATION AND VOLUNTEERS

Metro's regional parks and natural areas were created to intentionally give residents within our region opportunities to enjoy, experience, participate in and understand the natural world. Conservation education staff at Metro work with schools, civic organizations and the general public to provide nature programs that thoughtfully connect people to Metro's parks and natural areas. Schools and civic groups who are interested in programs contact Metro to request a program.

PARTNERS

POTENTIAL PARTNERS

- Clackamas Soil and Water Conservation District: Weed treatments on neighboring private property
- City of Wilsonville: Future access or trail planning

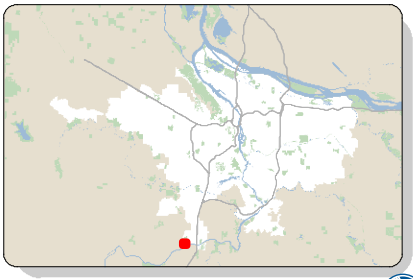
Site Map

Corral Creek Natural Area site

Other Metro sites

Bond Measure

1995 Bond Measure



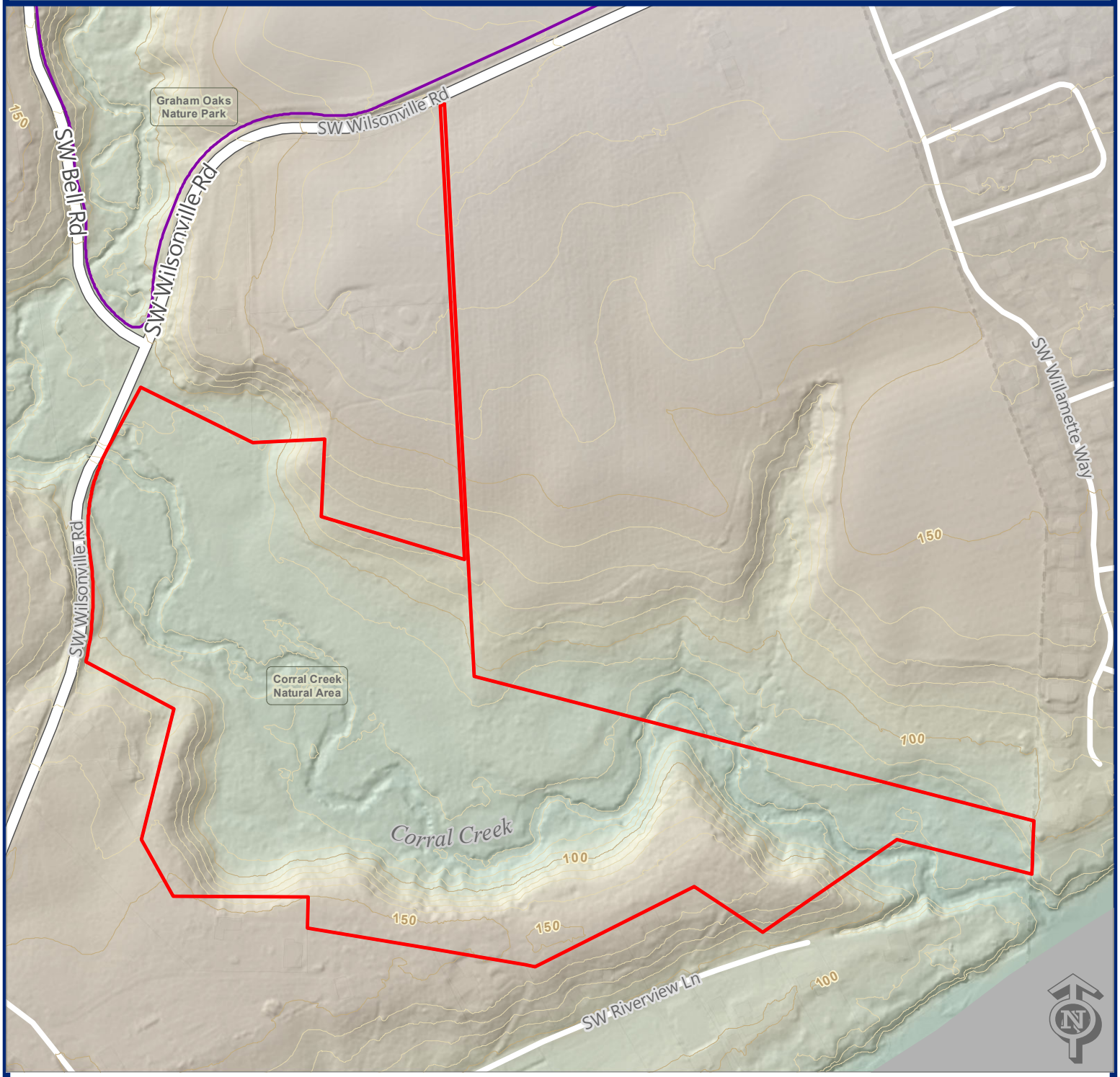
0 475 950 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Topography



Corral Creek Natural Area site

Other Metro sites

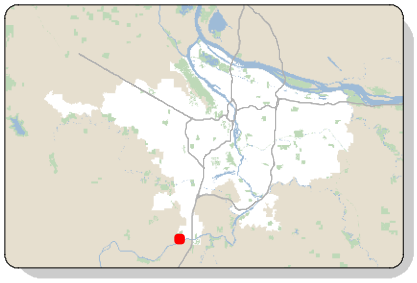
Streams (Dogami 2010)

Perennial

55800 - Artificial Path

10 ft contour

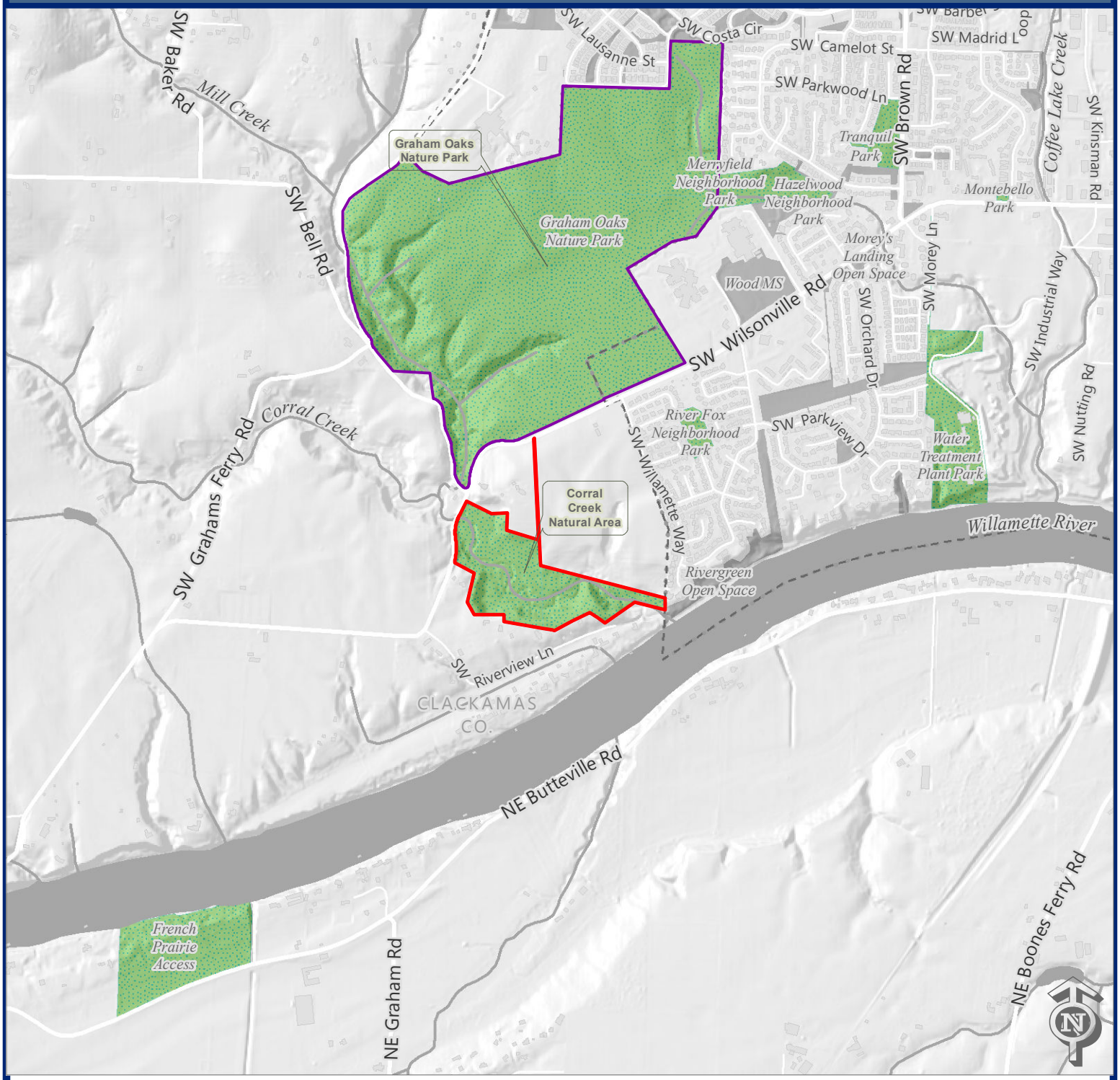
50 ft contour



0 480 960 Feet

Metro

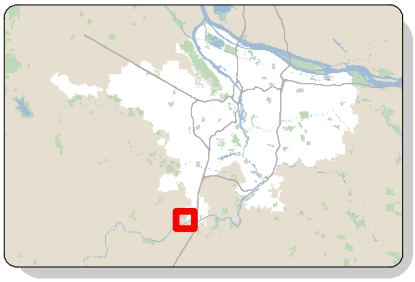
Vicinity Map



Corral Creek Natural Area site

Other Metro sites

Park and/or natural area



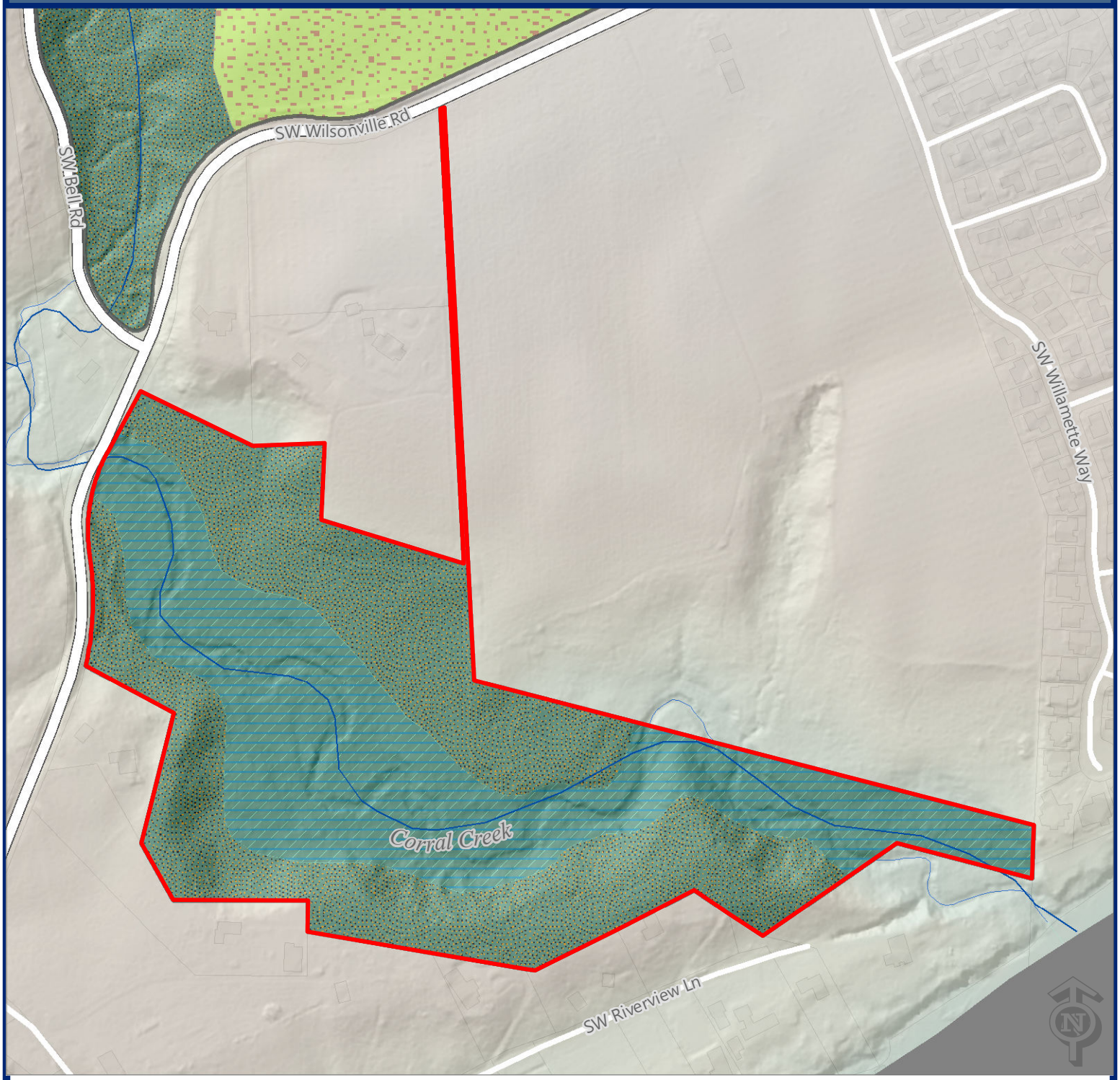
0 0.4 0.8 Miles

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Current Cover



Corral Creek Natural Area site

Other Metro sites

Current cover

Agriculture

Riparian forest

Savanna - oak

Upland forest - mixed

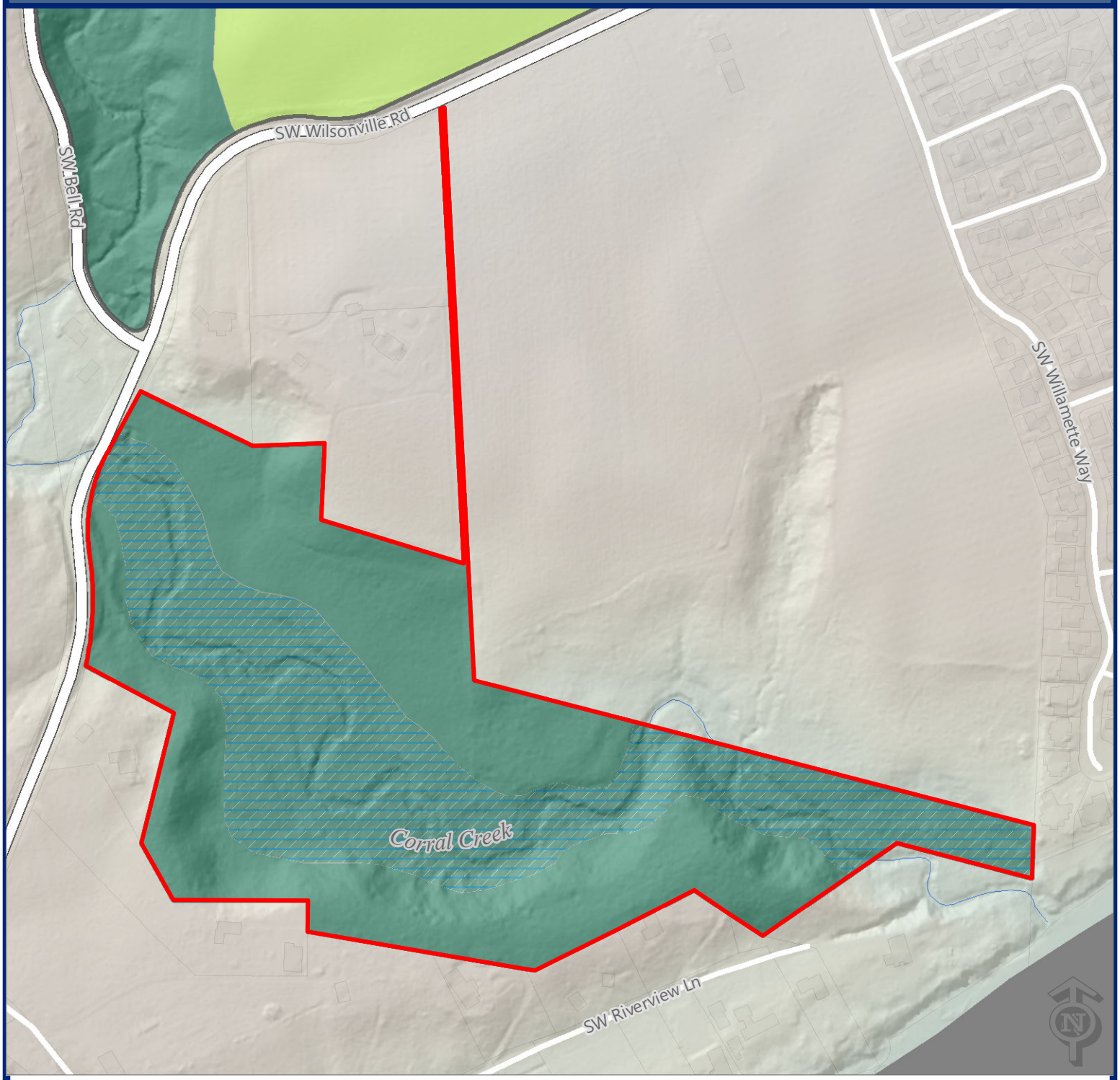
0 420 840 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Stewardship Classification



Corral Creek Natural Area site

Other Metro sites

Stewardship Type

- Developed
- Riparian forest
- Savanna
- Upland forest

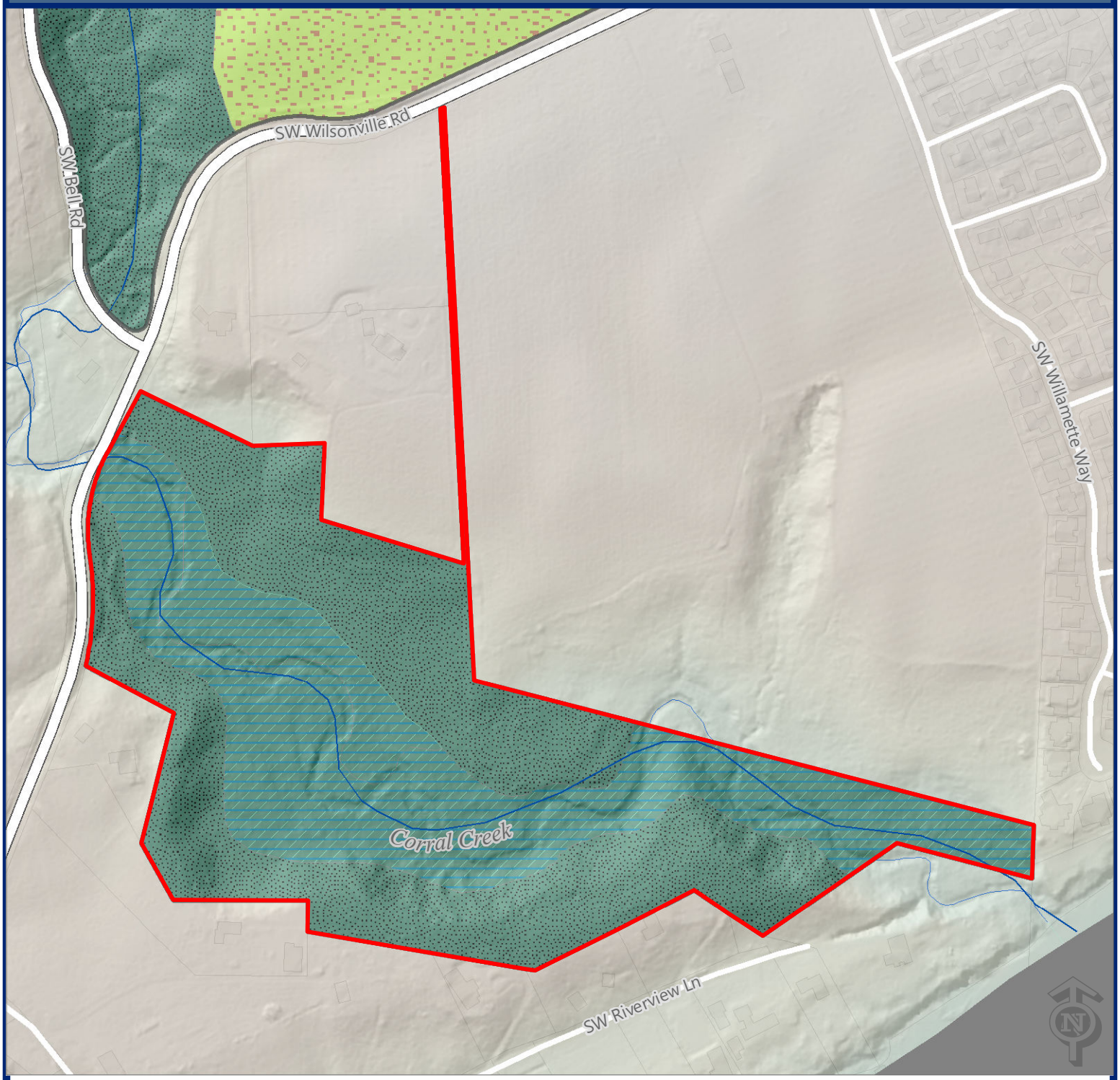
0 420 840 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Conservation Targets



Corral Creek Natural Area site

Other Metro sites

NHD Flowlines

Perennial stream

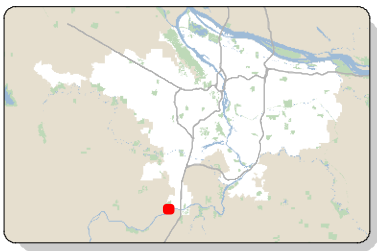
Conservation targets

No targets

Oak savanna

Riparian forest

Upland forest



0 420 840 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Management Status

Corral Creek Natural Area site

Other Metro sites

Management status

- 0 - Pre-Initiation
- 1 - Initiation
- 3 - Consolidation
- 4 - Refinement and long-term maintenance
- 9 - No targets (developed)

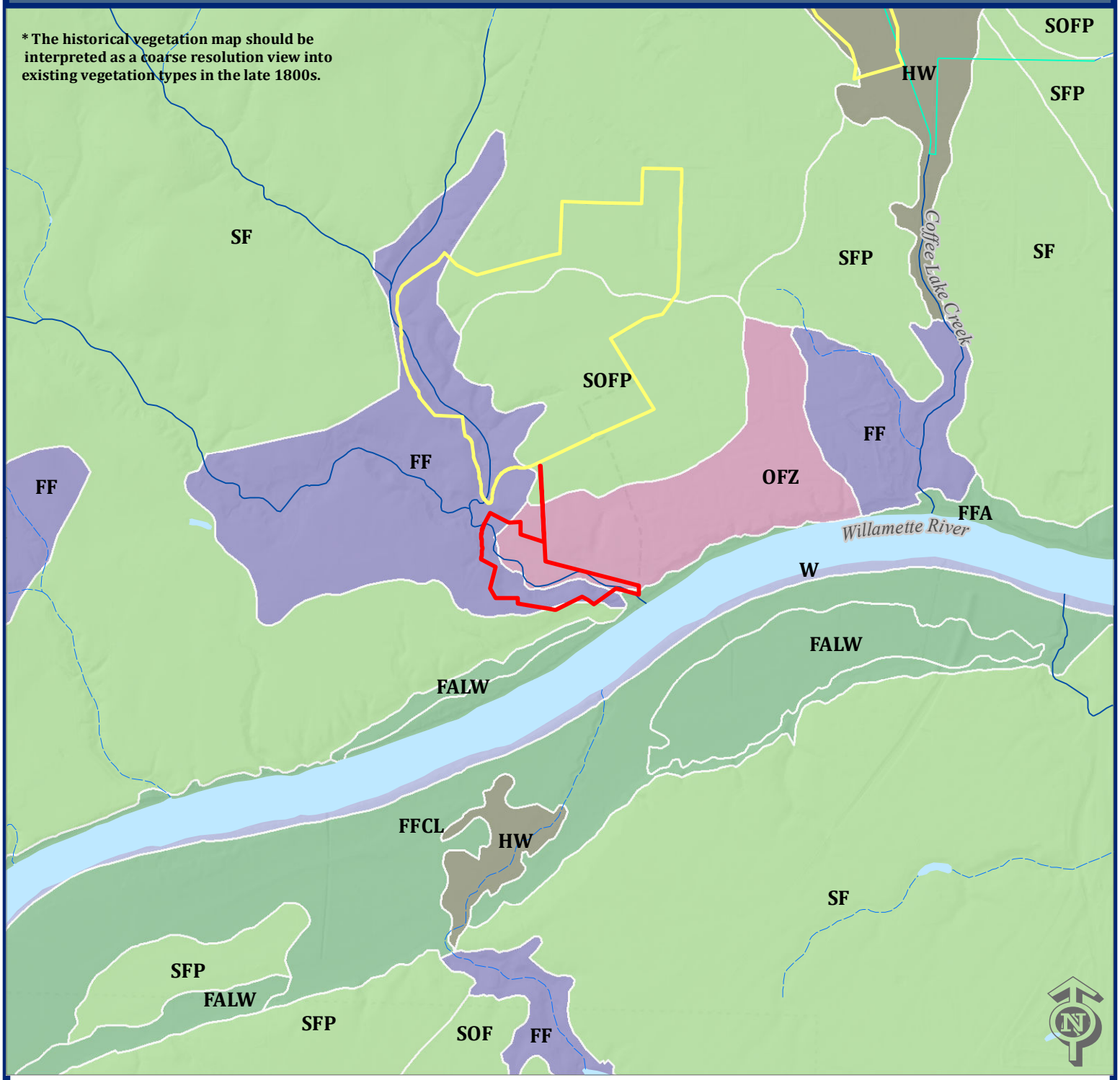
0 420 840 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Historical Vegetation (1851-1910)



Corral Creek Natural Area site

Other Metro sites

Historical vegetation

- Closed forest; Riparian & Wetland
- Closed forest; Upland
- Savanna
- Shrubland
- Water
- Woodland

*** Labels refer to vegetation subclasses. Detailed descriptions can be found in T:\OBMO\GIS\DATA_V\vegetation\Historical**

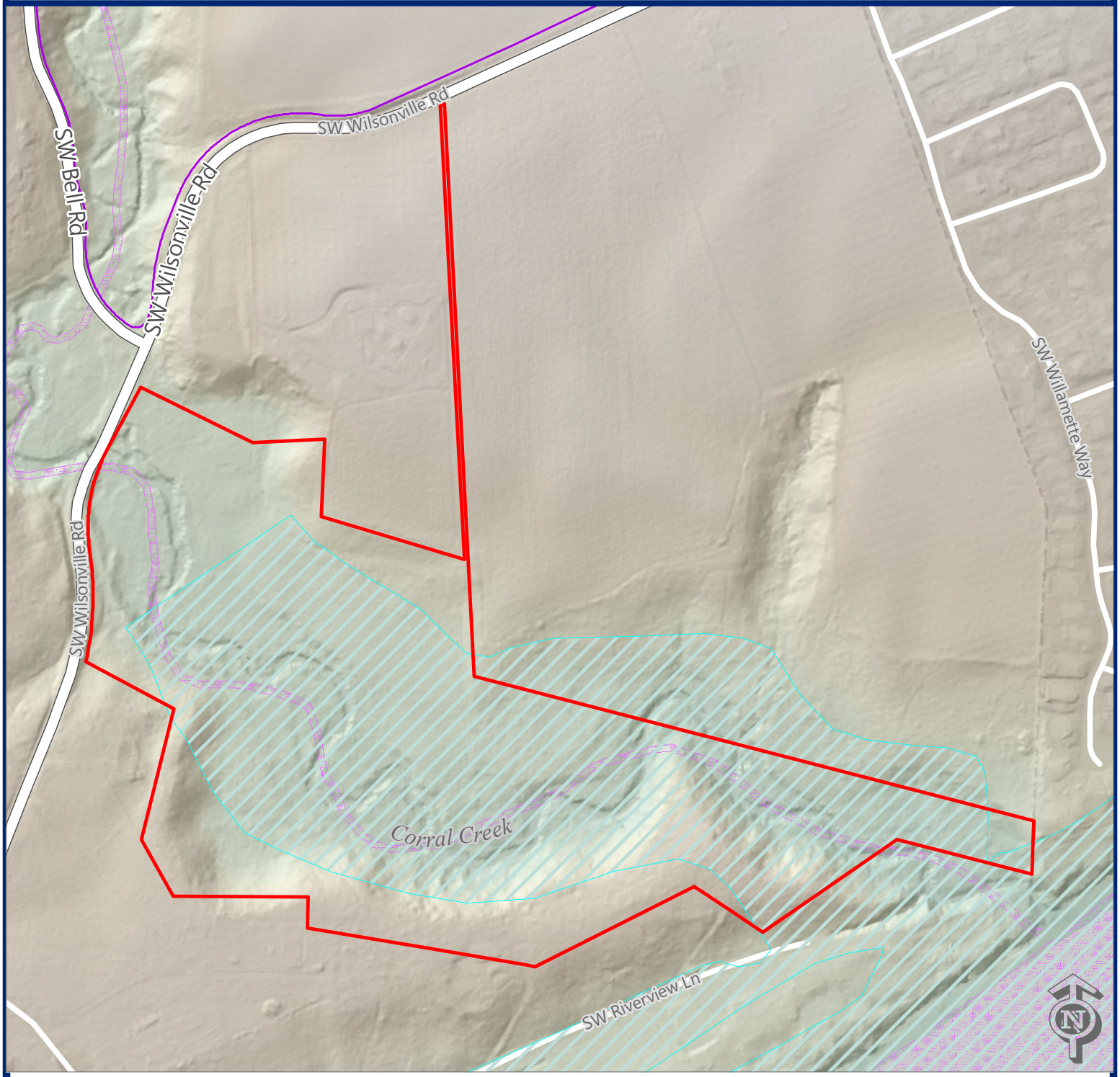
0 2,000 4,000 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Hydrology

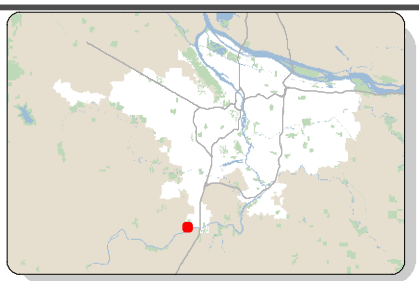


Corral Creek Natural Area site

Other Metro sites

100 year floodplain

Wetlands (Wetlands Conservancy data)



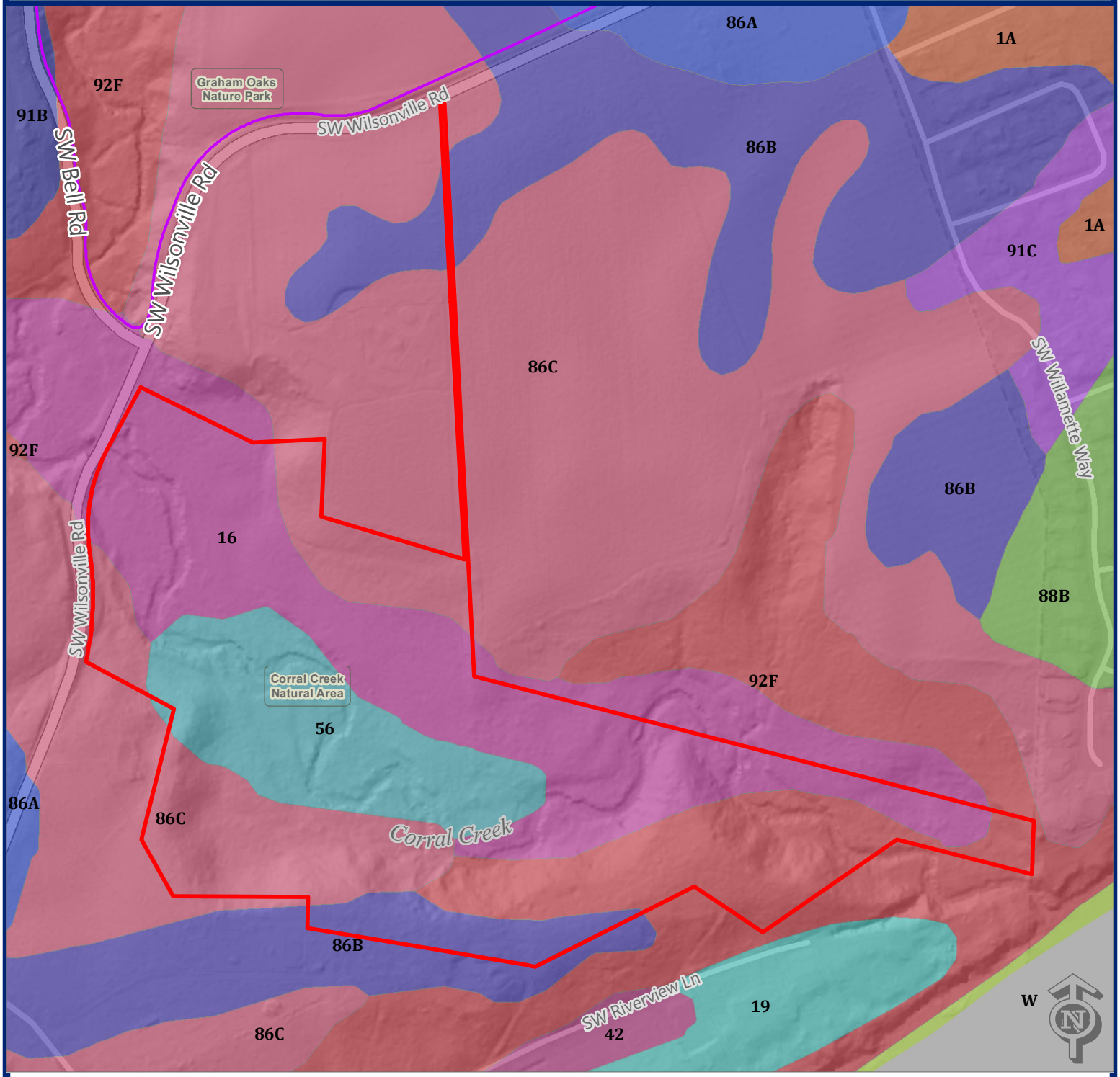
0 470 940 Feet

Metro

Corral Creek Natural Area Site Conservation Plan

map date: 10/31/2014

Soils



Corral Creek
Other Metro sites
Hydric soils

NRCS soils

- Aloha silt loam, 0 to 3 percent slopes
- Chehalis silt loam
- Cloquato silt loam
- Humaquepts, ponded
- McBee silty clay loam
- Water
- Willamette silt loam, 0 to 3 percent slopes
- Willamette silt loam, 3 to 8 percent slopes
- Willamette silt loam, 8 to 15 percent slopes
- Willamette silt loam, wet, 3 to 7 percent slopes
- Woodburn silt loam, 3 to 8 percent slopes
- Woodburn silt loam, 8 to 15 percent slopes
- Xerochrepts and Haploxerolls, very steep

0 425 850 Feet

Metro

map date: 10/31/2014

VISITOR ACCESS ASSESMENT MAP

Corral Creek Natural Area site

Other Metro sites

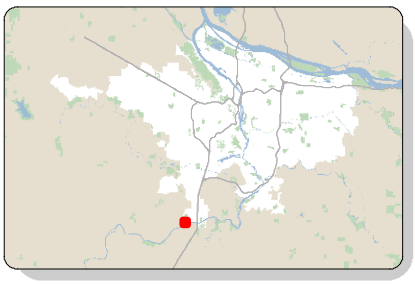
Park and/or natural area

Existing Regional Trails

Existing Local Trails

Bike lane

Moderate traffic through street



0 0.1 0.2 Miles

Metro

Corral Creek Natural Area Site Conservation Plan

created by planning team with illustrator
map date: 10/31/2014

APPENDIX A

FISHMAN ENVIRONMENTAL SERVICES

TONQUIN BIOLOGICAL INVENTORY – CORRAL CREEK NATURAL AREA PLANT ASSOCIATIONS

HW1: The open areas of the floodplain are dominated by reed canarygrass and Himalayan blackberry.

CORRAL CREEK **SATURATED HERBACEOUS COMMUNITY (HW1):** **Himalayan blackberry, *Rubus discolor* / reed canarygrass, *Phalaris arundinacea*** **RUDI / PHAR**			
Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***
SHRUBS			
****Himalayan blackberry***	***Rubus discolor***	***FACU***	***invasive***
HERBS			
****reed canarygrass***	***Phalaris arundinacea***	***FACW***	***invasive***

****Dominant (** ☐25% cover)*

HU1: This meadow contains predominantly non-native grasses and weedy upland species. Many seedlings have been planted in this meadow. The majority of seedlings are Douglas fir, other species include western red cedar, grand fir, Oregon ash and vine maple. Seedlings are typically 5 feet tall. Himalayan blackberry is dominant throughout this community; it has been weed-wacked to approximately 2 feet tall.

CORRAL CREEK ***UPLAND HERBACEOUS COMMUNITY (HU1):*** ***Douglas fir, Pseudotsuga menziesii* / Himalayan blackberry, *Rubus discolor* /** **common velvetgrass, *Holcus lanatus* - tall fescue, *Festuca arundinacea* - orchard grass, *Dactylis glomerata*** **PSME / RUDI / HOLA - FEAR - DAGL**			
Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***
TREES			
****Douglas fir (planted)***	***Pseudotsuga menziesii***	***FACU***	***N***
SHRUBS (most planted)			
****Himalayan blackberry***	***Rubus discolor***	***FACU***	***invasive***
grand fir (planted)	*Abies grandis*	FACU-	N
vine maple (planted)	*Acer circinatum*	FAC-	N
ornamental hawthorn	*Crataegus monogyna*	FACU+	I
Oregon ash (planted)	*Fraxinus latifolia*	FACW	N
western red cedar (planted)	*Thuja plicata*	FAC	N

HERBS			
***common velvetgrass**	***Holcus lanatus***	***FAC***	***I***
****orchard grass***	***Dactylis glomerata***	***FACU***	***I***
****tall fescue***	***Festuca arundinacea***	***FAC-***	***I***
bentgrass	*Agrostis* species	-	-
silver hairgrass	*Aira caryophyllea*	UPL	I
meadow foxtail	*Alopecurus pratensis*	FACW	I
sweet vernalgrass	*Anthoxanthum odoratum*	FACU	I
soft cheat grass	*Bromus mollis*	UPL	I
common centaury	*Centaurium umbellatum* [[*erythraea*]]	FAC	I?
bull thistle	*Cirsium vulgare*	FACU	**noxious**
Queen Anne's lace	*Daucus carota*	UPL	I
blue wildrye	*Elymus glaucus*	FACU	N
barren fescue	*Festuca* [*Vulpia*] *bromoides*	NI	I
catchweed bedstraw	*Galium aparine*	FACU	N
Oregon avens	*Geum macrophyllum*	FACW+	N
spotted cats-ear	*Hypochaeris radicata*	FACU	I
slender rush	*Juncus tenuis*	FACW-	N
nipplewort	*Lapsana communis*	UPL	I
birdsfoot-trefoil	*Lotus corniculatus*	FAC	I
Italian ryegrass	*Lolium multiflorum*	UPL	I
yellow & blue forget-me-not	*Myosotis discolor*	FACW	I
yellow parentucellia	*Parentucellia viscosa*	FAC-	I
reed canarygrass	*Phalaris arundinacea*	FACW	**invasive**
English plantain	*Plantago lanceolata*	FAC	I
roughstalk bluegrass	*Poa trivialis*	FACW	I
self-heal	*Prunella vulgaris*	FACU+	unknown
bracken fern	*Pteridium aquilinum*	FACU	N
sheep sorrel	*Rumex acetosella*	FACU+	I
bitterdock	*Rumex obtusifolius*	FAC	N
Pacific blackberry	*Rubus ursinus*	FACU	N
tansy ragwort	*Senecio jacobaea*	FACU	**noxious**

common dandelion	*Taraxacum officinale*	FACU	I
yellow clover	*Trifolium dubium*	UPL	I
red clover	*Trifolium pratense*	FACU	I
white clover	*Trifolium repens*	FAC	I
American vetch	*Vicia americana*	FAC	N
bird vetch	*Vicia cracca*	UPL	I
common vetch	*Vicia sativa*	UPL	I

***Dominant (□25% cover)**

FDW1: The riparian community lies in the floodplain of Corral Creek. The canopy is dominated by mature Oregon ash with an occasional cedar or alder tree. Openings are dominated by red-osier dogwood and reed canarygrass. Red elderberry, ground ivy, piggy back, stinging nettle are also quite common.

CORRAL CREEK

SEASONALLY FLOODED DECIDUOUS FOREST COMMUNITY (FDW1):

Oregon ash, *Fraxinus latifolia* / red-osier dogwood, *Cornus stolonifera* [[*sericea*]] /

reed canarygrass, *Phalaris arundinacea*

FRLA / COST / PHAR

Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***
TREES			
****Oregon ash***	***Fraxinus latifolia***	***FACW***	***N***
red alder	*Alnus rubra*	FAC	N
western crabapple	*Pyrus* [*Malus*] *fusca*	FACW	N
western red cedar	*Thuja plicata*	FAC	N
SHRUBS			
***red-osier dogwood**	***Cornus stolonifera* [[*sericea*]]**	***FACW***	***N***
vine maple	*Acer circinatum*	FAC-	N
Pacific ninebark	*Physocarpus capitatus*	FACW-	N
blackcap	*Rubus leucodermis*	UPL	N
thimbleberry	*Rubus parviflorus*	FAC-	N
salmonberry	*Rubus spectabilis*	FAC+	N
red elderberry	*Sambucus racemosa*	FACU	N
HERBS			
***reed canarygrass**	***Phalaris arundinacea***	***FACW***	***invasive***

lady fern	*Athyrium filix-femina*	FAC	N
Dewey's sedge	*Carex deweyana*	FACU	N
Sitka sedge	*Carex sitchensis* [[*aquatilis* var. *dives*]]	OBL	N
bull thistle	*Cirsium vulgare*	FACU	**noxious**
common horsetail	*Equisetum arvense*	FAC	I
common scouring-rush	*Equisetum hyemale*	FACW	N
catchweed bedstraw	*Galium aparine*	FACU	N
ground ivy	*Glecoma hederacea*	FACU+	I
cow parsnip	*Heracleum lanatum*	FAC+	N
Pacific waterleaf	*Hydrophyllum tenuipes*	UPL	N
skunk cabbage	*Lysichitum* [[*Lysichiton*]] *americanum*	OBL	N
may lily	*Maianthemum dilatatum*	FAC	N
licorice fern	*Polypodium glycyrrhiza*	UPL	N
creeping buttercup	*Ranunculus repens*	FACW	I
curve-pod yellow-cress	*Rorippa curvisiliqua*	OBL	N
Pacific blackberry	*Rubus ursinus*	FACU	N
clustered dock	*Rumex conglomeratus*	FACW	I
bitterdock	*Rumex obtusifolius*	FAC	N
bittersweet nightshade	*Solanum dulcamara*	FAC+	**invasive**
marsh hedgenettle	*Stachys cooleyae* [*emersonii*]	FACW	N
piggy-back plant	*Tolmiea menziesii*	FAC	N
stinging nettle	*Urtica dioica*	FAC+	unknown
American speedwell	*Veronica americana*	OBL	N

***Dominant (** ☐25% cover)

FDU1 is a small forest pocket on the edge of the field at the north end of the property. The canopy is dominated by big leaf maple and Douglas fir. Dominant shrubs include beaked hazelnut and Himalayan blackberry. The understory is a mix of sword fern, English ivy and Pacific blackberry.

CORRAL CREEK

DECIDUOUS UPLAND FOREST COMMUNITY (FDU1):

big-leaf maple, *Acer macrophyllum*, red alder, *Alnus rubra* / English ivy, *Hedera helix* - Pacific waterleaf, *Hydrophyllum tenuipes* - sword fern, *Polystichum munitum*

ACMA - ALRU / HEHE - HYTE - POMU

Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***

TREES			
****big-leaf maple***	***Acer macrophyllum***	***FACU***	***N***
****red alder***	***Alnus rubra***	***FAC***	***N***
Douglas fir	*Pseudotsuga menziesii*	FACU	N
Pacific yew	*Taxus brevifolia*	NI	N
western red cedar	*Thuja plicata*	FAC	N
SHRUBS			
vine maple	*Acer circinatum*	FAC-	N
dull Oregon grape	*Berberis nervosa*	UPL	N
beaked hazelnut	*Corylus cornuta*	FACU	N
western wahoo	*Euonymus occidentalis*	UPL	N
English holly	*Ilex aquifolium*	UPL	I
Indian plum	*Oemleria cerasiformis*	FACU	N
rose	*Rosa* species	-	-
red elderberry	*Sambucus racemosa*	FACU	N
snowberry	*Symphoricarpos albus*	FACU	N
HERBS			
***English ivy**	***Hedera helix***	***UPL***	***invasive***
****Pacific waterleaf***	***Hydrophyllum tenuipes***	***UPL***	***N***
****sword fern***	***Polystichum munitum***	***FACU***	***N***
northern maidenhair fern	*Adiantum pedatum* [[*aleuticum*]]	FAC	N
wild ginger	*Asarum caudatum*	FACU	N
lady fern	*Athyrium filix-femina*	FAC	N
catchweed bedstraw	*Galium aparine*	FACU	N
Siberian springbeauty	*Montia* [*Claytonia*] *sibirica*	FAC	N
mountain sweet-cicely	*Osmorhiza chilensis*	UPL	N
Pacific blackberry	*Rubus ursinus*	FACU	N
feather false Solomon's seal	*Smilacina racemosa*	FAC-	N
fringecup	*Tellima grandiflora*	UPL	N
foam flower	*Tiarella trifoliata*	FAC-	N
piggy-back plant	*Tolmiea menziesii*	FAC	N
western trillium	*Trillium ovatum*	FACU	N

stinging nettle	*Urtica dioica*	FAC+	unknown
white inside_out flower	*Vancouveria hexandra*	UPL	N

***Dominant (** ☐25% cover)

FMU1: This multi-layered mixed closed canopy is dominated by big-leaf maple and Douglas fir. The Douglas fir trees range in size from approximately 12 inches to over 50 inches in diameter and tower above the big leaf maple. The shrub understory is dominated by vine maple, beaked hazelnut and snowberry and the understory is dominated by sword fern, Pacific waterleaf and white inside-out flower. There is a large pocket of English ivy on the east end which is continuous with a monoculture of ivy in the understory of the adjacent forested properties. Snags and large woody debris are common.

CORRAL CREEK

UPLAND MIXED FOREST COMMUNITY (FMU1):

big-leaf maple, *Acer macrophyllum* - Douglas fir, *Pseudotsuga menziesii* / vine maple, *Acer circinatum* - beaked hazelnut, *Corylus cornuta* - snowberry, *Symphoricarpos albus* / Pacific waterleaf, *Hydrophyllum tenuipes* - sword fern, *Polystichum munitum* - white inside-out flower, *Vancouveria hexandra*

ACMA - PSME / ACCI - COCO - SYAL / HYTE - POMU - VAHE

Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***
TREES			
****big-leaf maple***	***Acer macrophyllum***	***FACU***	***N***
****Douglas fir***	***Pseudotsuga menziesii***	***FACU***	***N***
grand fir	*Abies grandis*	FACU-	N
western red cedar	*Thuja plicata*	FAC	N
SHRUBS			
***vine maple**	***Acer circinatum***	***FAC-***	***N***
****beaked hazelnut***	***Corylus cornuta***	***FACU***	***N***
****snowberry***	***Symphoricarpos albus***	***FACU***	***N***
Saskatoon serviceberry	*Amelanchier alnifolia*	FACU	N
dull Oregon grape	*Berberis nervosa*	UPL	N
ornamental hawthorn	*Crataegus monogyna*	FACU+	I
western wahoo	*Euonymus occidentalis*	UPL	N
salal	*Gaultheria shallon*	FACU	N
English holly	*Ilex aquifolium*	UPL	I
Indian plum	*Oemleria cerasiformis*	FACU	N
baldhip rose	*Rosa gymnocarpa*	FACU	N
evergreen blackberry	*Rubus laciniatus*	FACU+	I

HERBS			
***Pacific waterleaf** (dominant in patches)	***Hydrophyllum tenuipes***	***UPL***	***N***
****sword fern*** *(dominant in patches)*	***Polystichum munitum***	***FACU***	***N***
****white inside_out flower***	***Vancouveria hexandra***	***UPL***	***N***
brome	*Bromus* species	-	-
Dewey's sedge	*Carex deweyana*	FACU	N
Henderson's sedge	*Carex hendersonii*	FAC	N
fairy_bell or fairy lantern	*Disporum hookeri* or *D. smithii*	UPL	N
catchweed bedstraw	*Galium aparine*	FACU	N
English ivy (large patch)	*Hedera helix*	UPL	**invasive**
Smith's melic	*Melica smithii*	UPL	N
bracken fern	*Pteridium aquilinum*	FACU	N
Pacific blackberry	*Rubus ursinus*	FACU	N
western starflower	*Trientalis latifolia*	FAC_	N
western trillium	*Trillium ovatum*	FACU	N

***Dominant (** ☐25% cover)

FMU2: This multi-layered mixed closed canopy is dominated by big leaf maple, Douglas fir and western red cedar with towering mature trees. Shrub cover is less than 25% and is dominated by vine maple and thimbleberry. Ground cover is dominated by sword fern on the moderately steep hillslopes and English ivy on the top of the hillslope and some hillslopes. Off site to the south ivy dominates the understory. Large snags and woody debris are abundant.

CORRAL CREEK

MIXED UPLAND FOREST COMMUNITY (FMU2):

big-leaf maple, *Acer macrophyllum* - Douglas fir, *Pseudotsuga menziesii* - western red cedar, *Thuja plicata* / English ivy, *Hedera helix* - sword fern, *Polystichum munitum*

ACMA - PSME - THPL / HEHE - POMU

Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***
TREES			
****big-leaf maple***	***Acer macrophyllum***	***FACU***	***N***
****Douglas fir***	***Pseudotsuga menziesii***	***FACU***	***N***
****western red cedar***	***Thuja plicata***	***FAC***	***N***
red alder	*Alnus rubra*	FAC	N

SHRUBS			
grand fir	*Abies grandis*	FACU-	N
vine maple	*Acer circinatum*	FAC-	N
Saskatoon serviceberry	*Amelanchier alnifolia*	FACU	N
dull Oregon grape	*Berberis nervosa*	UPL	N
beaked hazelnut	*Corylus cornuta*	FACU	N
western wahoo	*Euonymus occidentalis*	UPL	N
English holly	*Ilex aquifolium*	UPL	I
Indian plum	*Oemleria cerasiformis*	FACU	N
cascara	*Rhamnus purshiana*	FAC-	N
thimbleberry	*Rubus parviflorus*	FAC-	N
red elderberry	*Sambucus racemosa*	FACU	N
red huckleberry	*Vaccinium parvifolium*	UPL	N
HERBS			
***English ivy**	***Hedera helix***	***UPL***	***invasive***
***feather false Solomon's seal** (dominant where ivy is solid groundcover)*	***Smilacina racemosa***	***FAC***	***N***
vanillaleaf	*Achlys triphylla*	UPL	N
Dewey's sedge	*Carex deweyana*	FACU	N
Henderson's sedge	*Carex hendersonii*	FAC	N
catchweed bedstraw	*Galium aparine*	FACU	N
Pacific waterleaf	*Hydrophyllum tenuipes*	UPL	N
small-flowered nemophila	*Nemophila parviflora*	UPL	N
sword fern	*Polystichum munitum*	FACU	N
bracken fern	*Pteridium aquilinum*	FACU	N
fringecup	*Tellima grandiflora*	UPL	N
western trillium	*Trillium ovatum*	FACU	N
stinging nettle	*Urtica dioica*	FAC+	unknown

***Dominant (** ☐25% cover)

FMU3: This deciduous closed canopy forest is a mid-successional forest with a dense red alder and big-leaf maple canopy with patches of Douglas fir on the top of the hillslope and on a terrace above the floodplain. Trees range in size from approximately 10 inches to 24 inches. The shrub understory ranges from 25-80% cover and is dominated by Indian plum, vine maple, red elderberry and snowberry. Groundcover is dominated by sword fern and Pacific waterleaf. The understory has large areas of English ivy on the top of the hillslope and in the Douglas fir patch on the lower terrace. There are also patches of piggy back plant and Pacific blackberry on the lower terrace.

CORRAL CREEK

MIXED UPLAND FOREST COMMUNITY (FMU3):

big-leaf maple, *Acer macrophyllum* - Douglas fir, *Pseudotsuga menziesii* /

beaked hazelnut, *Corylus cornuta* - Himalayan blackberry, *Rubus discolor* / English ivy, *Hedera helix* - sword fern, *Polystichum munitum* - Pacific blackberry, *Rubus ursinus*

ACMA - PSME / COCO - RUDI / HEHE - POMU - RUUR

Common Name	***Scientific Name***	***Indicator Status***	***Native / Introduced***
TREES			
****big-leaf maple***	***Acer macrophyllum***	***FACU***	***N***
****Douglas fir***	***Pseudotsuga menziesii***	***FACU***	***N***
sweet cherry	*Prunus avium*	UPL	I
SHRUBS			
***beaked hazelnut**	***Corylus cornuta***	***FACU***	***N***
****Himalayan blackberry*** *(dominant along ridge)*	***Rubus discolor***	***FACU***	***invasive***
Saskatoon serviceberry	*Amelanchier alnifolia*	FACU	N
black hawthorn	*Crataegus douglasii*	FAC	N
Oregon ash	*Fraxinus latifolia*	FACW	N
English holly	*Ilex aquifolium*	UPL	I
Indian plum	*Oemleria cerasiformis*	FACU	N
poison oak	*Rhus diversiloba* [*Toxicodendron quercifolia*]	FACU	N
cascara	*Rhamnus purshiana*	FAC-	N
Nootka rose	*Rosa nutkana*	FAC	N
snowberry	*Symphoricarpos albus*	FACU	N
HERBS			
***English ivy** (dominant along upper slope)	***Hedera helix***	***UPL***	***invasive***
****sword fern*** *(dominant along lower slope)*	***Polystichum munitum***	***FACU***	***N***
****Pacific blackberry*** *(dominant along upper slope)*	***Rubus ursinus***	***FACU***	***N***

Dewey's sedge	*Carex deweyana*	FACU	N
blue wildrye	*Elymus glaucus*	FACU	N
catchweed bedstraw	*Galium aparine*	FACU	N
bracken fern	*Pteridium aquilinum*	FACU	N
poison oak	*Rhus diversiloba* [*Toxicodendron quercifolia*]	FACU	N

***Dominant (** ☐25% cover)