Maple Lane Natural Area

Approvals for Site Conservation Plan

Date first routed: March 5, 2020

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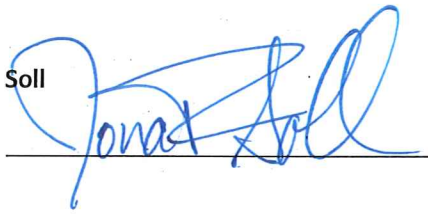
Signature  Date 3/5/2020

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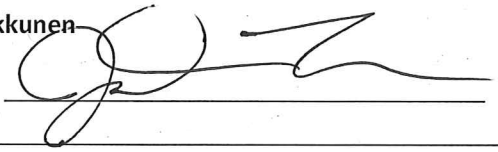
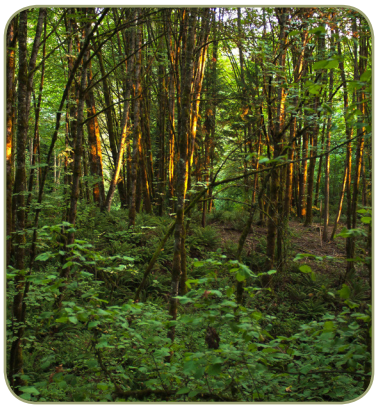
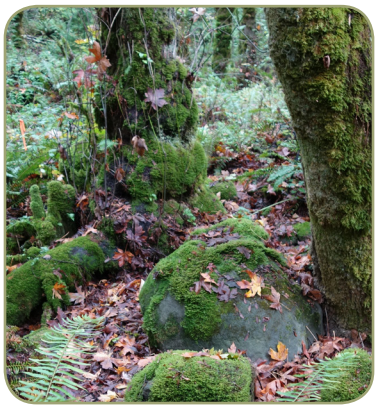
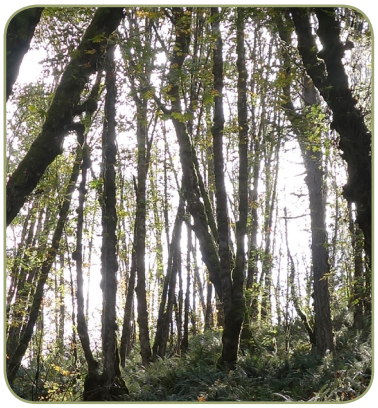
Signature  Date 3/6/20

SITE CONSERVATION PLAN

Maple Lane Natural Area

February 2020

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SECTION 1: INTRODUCTION

1.1 CONTEXT

Maple Lane Natural Area is located in Clackamas County, Oregon along the eastern border of Oregon City.

Metro's ownership in this area totals more than 330 acres, including the 66-acre North Newell Creek Natural Area, the 236-acre Newell Creek Canyon Nature Park and the 28-acre Maple Lane Natural Area. This conservation plan addresses only Maple Lane Natural Area site.

Maple Lane Natural Area occupies 28 acres within forested slopes leading into Newell Creek canyon which contain large tracts of deciduous dominated upland forest.

The Maple Lane Natural Area site conservation plan is a tool for protecting and enhancing the unique characteristics of the site and considering appropriate levels for future access. 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.

1.2 GOALS AND OBJECTIVES OF THE CONSERVATION PLAN

The goal of this site conservation plan is to identify conservation priorities and describe a general course of action that will protect and enhance the area as an environmental and recreational resource for Clackamas County and the Portland metropolitan region. The Maple Lane Natural Area will be maintained and enhanced, to the extent possible, in a manner that is faithful to its natural condition and function. Only those recreational uses that are compatible with the environmental objectives of the conservation plan will be encouraged.

To achieve this goal, the conservation plan establishes a series of priority objectives:

- Restore and maintain high quality habitat including upland forests and intermittent tributaries to Newell Creek.
- Develop appropriate funding strategies to implement strategic restoration and access improvement projects.

1.3 METRO'S PARKS AND NATURE BOND PROGRAM AND NEWELL CREEK TARGET AREA

During the last 25 years, three voter-approved bond measures have allowed Metro to protect and manage 17,000 acres across the region. Voters have protected more than 100 miles of river and stream banks, opened four nature parks and supported hundreds of community projects. Metro continues to protect land in 27 target areas, chosen for their water quality, wildlife habitat and outdoor recreation opportunities.

Additional information about bond investments and goals and objectives for the Newell and Abernethy Creek target area can be found on the Metro website, www.oregonmetro.gov/naturalareas.

Since 1996, Metro has acquired more than 330 acres in the Newell Creek area of Clackamas County, preserving this area for conservation. At Maple Lane Natural Area Metro completed 4 land purchases between the years of 1997 and 2002

Metro's natural area and regional parks levy

By law, capital bond measures must be used for capital investments such as property acquisition and stabilization.

In May 2013 and November of 2016, the region's voters approved five-year local option levies to care for Metro's growing portfolio of natural areas and regional parks. About half of the levy funds will go towards natural area restoration and maintenance. The levy is the first of its kind in the U.S. The citizens' investment will raise about $10 million per year to maintain and improve water quality; preserve regional parks, natural areas and stream frontages; maintain current and implement new restoration projects; and provide new public access opportunities.

The levy will make a difference for most of the 17,000 acres of Natural Areas that Metro oversees. Some of the strategic restoration actions identified in this plan will be funded with the levy.

1.4 HISTORICAL CONTEXT

By the 1840s, Oregon City became the terminus for the Oregon Trail, the route of one of the largest voluntary human migrations in history. One can imagine that every acre of ground surrounding the small settlement was quickly evaluated for potential settlement, building materials and farming. One small creek was named for Robert Newell, a mountain man and trapper who arrived in Oregon City in 1840. A self-taught backwoods healer, he was nicknamed "Doctor Newell." He was instrumental in establishing Oregon statehood and was twice elected as Speaker of the House of Representatives.

In the 1850s, surveys conducted throughout the Willamette Valley found the Newell watershed almost entirely covered by a forest of conifers. Notes from those surveys also make reference to patches of burned timber – forests were seen as impediments to early settlement and were often cleared by burning. Settlers frequently lost control of these land-clearing blazes. There are no survey entries for the inner canyon of Newell Creek, but it is likely that its year-round moist condition kept most fires at bay.

SECTION 2: PLANNING PROCESS SUMMARY

2.1 PLANNING AREA

This conservation plan addresses conditions, plans and activities for the site's 28 acres. Metro ownership and an outline of the planning area are shown on Map 1 and Map 2.

2.2 PLANNING PROCESS

Developing a useful site conservation plan means providing for a site's habitat conservation, enhancement and management as well as considering the potential opportunities for compatible public access. This plan will build on previous planning, restoration and management efforts while acknowledging that future conservation requires analysis of the site, meaningful engagement of stakeholders and integration of historic, current and future needs. This plan includes several important elements: development of conservation targets, access needs and implementation of projects.

A two-tiered approach is used to improve natural resource conservation and integrate meaningful human experiences through physical and visual access. The plan recognizes that the conservation of species, habitat and natural features must occur simultaneously with the consideration of provision for human access to these natural systems. Education and exposure are the cornerstones for protecting the natural area for decades to come. This two-tiered approach also recognizes that conservation and access have different stakeholders, different funding sources and different strategic approaches. Initially the plan reviewed the overarching project goals and objectives common to both conservation and access. The project team then developed conservation and access strategies independently. Conservation is discussed in Section 4 of this document. Access is discussed in Section 6.

Planning project goals

The planning goals for both the natural resource conservation and access portions of this plan are listed below.

Natural resource conservation

- Map and define major habitat types.
- Establish habitat and species conservation targets.
- Define key ecological attributes and analyze stresses and their sources for the conservation targets.
- Establish strategies and actions to restore habitat.
- Prioritize actions and implement.

Access

- Assess existing public use of Maple Lane Natural Area.
- Develop cost estimates for improvements to natural area regulatory and information signage.
- Identify and implement priority actions.

SECTION 3: EXISTING CONDITIONS

This section of the conservation plan provides background on existing conditions for Maple Lane Natural Area.

3.1 PHYSICAL ENVIRONMENT

Located within Oregon City, Newell Creek originates near Clackamas Community College and winds north to its confluence with Abernethy Creek, a tributary of the Willamette River. Newell Creek supports significant native populations of fish, including coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*Oncorhynchus clarkii*) and steelhead (*Oncorhynchus mykiss*). The presence of these native fish and the relatively large size of the bordering undeveloped land make the canyon biologically notable. The natural area includes a native forest of red cedar (*Thuja plicata*), Douglas fir (*Pseudotsuga menziesii*), big-leaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*) with an understory of fern, snowberry (*Symphoricarpos albus*) and salmonberry (*Rubus spectabilis*). Lands surrounding the natural area are predominately zoned for urban and industrial uses.

Geology

There are two key geologic formations at the site – the relatively level "Boring" basalts of the upper terrace, and the cemented sands and gravels that form the architecture of the canyon. The Boring basalts are characterized by reddish colored soils with large, embedded boulders. Oregon City residents are familiar with red soil exposed along road cuts. The clusters of boulders that decorate nearly every entry drive in the upper watershed have been excavated from this red soil matrix. The sand and gravel layer is composed of Troutdale and Sandy River formations. These lie under the younger Boring basalt and are exposed within the canyon of Newell Creek. There are also older rocks buried under the entire watershed, known as Columbia River basalts. These are the base rocks for our entire region, having originated from a series of lava flows tens of millions of years ago. They are as much as 900 feet thick in places. These are the dark, sturdy rocks that form the bluffs along the Willamette River in Oregon City, and much of the Columbia River Gorge. Over time they were gently folded and faulted, resulting in topographic highs and lows. In some of these topographic lows, such as Newell Creek, thick sediments were deposited on top of the Columbia River basalt, filling in the depression.

The Sandy River Mudstone and Troutdale Formations consist of mudstone, siltstone, sand and gravel. Both were laid down by the ancestral Columbia River, which once flowed far south of its present course, right through where Oregon City now stands. One can envision these formations as a layer cake, with some layers much denser than others. The dense layers made from fine sediments tend to block water from penetrating down. This results in local high water tables or springs. The Troutdale Formation has two levels. The lower consists of gravel and sand derived from basalt pebbles and cobbles, but also includes minor amounts of granite and quartzite. These cemented gravels are quite

permeable and can stand over 100 vertical feet. The upper consists of finer grained sands, silts and clays that are from local volcanic debris, but also includes basalt gravel layers.

Soils

Most of the Newell Creek Watershed has residual soils, formed by gradual weathering of the Boring lavas. In parts of the canyon, this soil is mixed with external sources, including deposits from the Missoula Floods dating from roughly 14,000 years ago. Thus, the red colored soil at the top of the canyon gives way to tan colored, silty clays, which developed directly on the Sandy River and Troutdale formations. The contact zone between bedrock and soil is usually gradual rather than abrupt, and can be identified as a zone of weathered or soft bedrock. This contact point is of great importance, because each soil layer has different strength and many of the landslides appear to originate here.

The Natural Resources Conservation Service has divided soils of the watershed into five series: Bornstedt, Helvetia, Jory, Woodburn, and Xerochrepts/Haploxerolls. The first four soils are deep and moderately well drained. In most of the steeper portions of the canyon, the soils are colluvial, as they have been transported down slope from their place of origin. These are a mixture of the Boring Lava red clays and gray Sandy River Mudstone/Troutdale soils. They are generally thinner than the alluvial, or flood deposited soils, but sometimes appear as very deep blocks, indicating old landslides.

Much of the rim of the watershed has been developed and therefore has been or is being re-contoured and surfaced with fill. The properties and thickness of this fill vary widely and are site-specific, generally composed of the local residual soil, basalt gravel, cobbles and sometimes bricks, organic debris, wood, concrete and even garbage in some cases.

The primary soil types are present at Maple Lane Natural Area. Soils present include woodburn silt loam and xerochrepts/haploxerolls.

Table 1. Soils present at the Maple Lane Natural Area

MAP SOIL SYMBOL	MAP UNIT NAME	DESCRIPTION
91C	Woodburn silt loam	This deep, moderately well-drained soil is on broad valley terraces. Permeability of this Woodburn soil is moderate to a depth of 38 inches and slow below this depth. Available water capacity is about 10 to 13 inches. Effective rooting depth is 60 inches or more. Runoff is medium and the hazard of water erosion is moderate. Slope is 8-15 percent.
92F	Xerochrepts and Haploxerolls	On terrace escarpments. Deep and well-drained, moderate to moderately slow permeability and rooting depths are 40 to 60 inches or more. Runoff is rapid and erosion hazard is severe. Slope is 20-60 percent.

Landslides

North Newell, Maple Lane and the Newell Creek Canyon Nature Park sites are well known as places prone to landslides. All landform features associated with landslides, including scarps, tension crack, shear zones and toes, are found within the steeper section of the canyon. Scarps are found near the top of a landslide and generally begin at the surface as tension cracks. Tension cracks can be found

throughout a landslide. Shear zones are located along the sides of landslides, while the toes are at the bottom.

3.2 STREAMS AND WETLANDS

The site includes a small unnamed intermittent tributary that flows west though the site before crossing under highway 213 and joining Newell Creek.

Newell Creek

Newell Creek, a tributary to Abernethy Creek has been shaped largely by seasonally driven rainfall. The upper terrace that generally follows Beavercreek and Molalla roads has no surface creeks. Historically, rainfall was intercepted by forest cover and water that reached the ground was held in place or allowed to slowly percolate to the groundwater table. Only a small amount ran off the surface during infrequent, large storms.

Map 3 shows the soils, topography, streams and wetlands present at Maple Lane Natural Area.

3.3 MAJOR HABITAT TYPES

Maple Lane Natural Area can be characterized by one major natural habitat type, upland conifer-hardwood forest. Historically, Newell Creek canyon appears to have been primarily old growth conifer forest, dominated by Douglas fir and western red cedar. There was likely a significant hardwood component that included big leaf maple, red alder and black cottonwood (*Populus trichocarpa*) trees. Hardwoods were most likely found along streams and wet areas, and in areas of recent disturbance, such as landslides. Big leaf maple is shade tolerant and probably grew underneath taller Douglas fir, western hemlock (*Tsuga heterophylla*) and western red cedar. Years of logging, road construction, railroad construction, agriculture, and urban development along the canyon rim have gradually taken a toll on the native forest.

Upland forest

Upland coniferous and deciduous forests are the dominant natural habitat of the region. Low-elevation Pacific Northwest old-growth forests typically are dominated by conifers including Douglas-fir, western redcedar and western hemlock (*Tsuga heterophylla*), with grand fir (*Abies grandis*) and hardwood species also occurring. Under natural conditions, trees of many of the dominant species commonly live to be 350 to 750 years old or older and frequently have diameters of eight feet or more. Plant and animal use of forests follows the changes in forests over time, with different suites of species dominating depending on forest age, canopy closure and site conditions. Biodiversity is higher in forests where some light reaches the forest floor and where standing and fallen dead wood is ample and of mixed age and size. Currently, forests younger than 60 years dominate western Oregon due to current forestry practices, and the decline of old growth-associated species reflects these changes in overall forest structure across the region.

As part of the upland forest habitat at Maple Lane Natural Area, there are openings or gaps where conifers or other trees have not readily established or are dominated by shrubs in the understory. Shrub habitat (commonly called scrub shrub) includes areas dominated by woody vegetation less than six meters (20 feet) tall (Portland-Vancouver Biodiversity Guide 2012). Characteristic species include shrubs, young trees and trees or shrubs that are small or stunted because of environmental

conditions. Shrubs add complexity to forested habitats, greatly increasing the amount of area available for cover and nesting. Numerous studies in the Pacific Northwest document the importance of shrubs to a wide variety of arthropods, amphibians, small mammals and birds. The fruit and flowers of shrubs – particularly deciduous ones – host abundant pollinator and prey species. The diets of deer and elk consist largely of shrub browse. Shrubs also provide important habitat connectivity and may effectively widen a forested biodiversity corridor.

Stands of upland forest can be categorized by the age of trees, species and composition of understory species. Upland forests in the greater Portland-Vancouver region provide primary habitat for at least 94 species and are used by at least 129 more species (Portland-Vancouver Regional Conservation Strategy 2012).

Key plants

Native forbs found in this habitat include sword fern (*Polystichum munitum*), lady fern (*Athyrium filix-femina*), wood fern (*Dryopteris* spp.), licorice fern (*Polypodium glycyrrhiza*), false Solomon's seal (*Maianthemum racemosum*), trailing blackberry (*Rubus ursinus*), fringe cup (*Tellima grandiflora*), largeleaf avens (*Geum macrophyllum*), Henderson's sedge (*Carex hendersonii*), inside out flower (*Vancouveria hexandra*), wild ginger (*Asarum* spp.), Columbia brome (*Bromus vulgaris*), trillium (*Trillium* spp.), fairy bells (*Prosartes* spp.), miner's lettuce (*Claytonia perfoliate*), stinging nettle (*Urtica dioica*), hedge-nettle (*Stachys* spp.) and heal-all (*Prunella vulgaris*). Shrubs and trees found in this habitat may include Pacific yew, big leaf maple, red alder, Douglas fir, Grand fir, western hemlock, Western red cedar, Oregon white oak (*Quercus garryana*), cascara (*Frangula purshiana*), salmonberry, thimbleberry (*Rubus parviflorus*), hazelnut (*Corylus cornuta*), Indian plum (*Oemleria cerasiformis*), vine maple, ocean spray (*Holodiscus discolor*), black hawthorn, Western serviceberry (*Amelanchier alnifolia*), tall (*Mahonia aquifolium*) and dull Oregon grape (*Mahonia nervosa*), mock orange (*Philadelphus lewisii*), red elderberry, salal (*Gaultheria shallon*), red huckleberry (*Vaccinium parvifolium*) and snowberry.

Key wildlife

Partners in Flight identifies the following focal species for coniferous forests in western Oregon: Vaux's swift (*Chaetura vauxi*), brown creeper (*Certhia americana*), red crossbill (*Loxia curvirostra*), pileated woodpecker (*Dryocopus pileatus*) and varied thrush (*Ixoreus naevius*) (old growth and mature forests); hermit warbler (*Setophaga occidentalis*), Pacific-slope flycatcher (*Empidonax difficilis*), Hammond's flycatcher (*Empidonax hammondii*), Pacific wren (*Troglodytes pacificus*), black-throated gray warbler (*Setophaga nigrescens*) and Hutton's vireo (*Vireo huttoni*) (mature/young/pole forests); and olive-sided flycatcher (*Contopus cooperi*), western bluebird (*Sialia mexicana*), orange-crowned warbler (*Vermivora celata*) and rufous hummingbird (*Selasphorus rufus*) (young forests). Other birds utilizing this habitat may include Townsend's warbler (*Setophaga townsendi*), evening grosbeak (*Coccothraustes vespertinus*), Swainson's thrush (*Catharus ustulatus*), Anna's hummingbird (*Calypte anna*), cedar waxwing (*Bombycilla cedrorum*), bushtit (*Psaltriparus minimus*), chestnut-backed (*Poecile rufescens*) and black-capped chickadee (*Poecile atricapillus*), American robin (*Turdus migratorius*), Steller's jay (*Cyanocitta stelleri*), Bewick's wren (*Thryomanes bewickii*), golden-crowned kinglet (*Regulus satrapa*) and Cooper's hawk (*Accipiter cooperii*). Other wildlife species may include Douglas' squirrel (*Tamiasciurus douglasii*), common garter snake, rubber

boa (*Charina bottae*), elk, black-tailed deer, mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), coyote, red fox, weasel (*Mustela frenata*) and a variety of small mammals.

Current extent and attributes

Maple Lane includes 28 acres of upland coniferous forest habitat, with tree age in the range of two to more than 100 years. Some variations of canopy structure in this habitat type include red alder/big leaf maple, Douglas fir/big leaf maple/red alder and cedar/big leaf maple.

Native fish and wildlife

The Newell Creek Watershed offers relatively high quality habitat, given its urban context. With nearly 330 acres of riparian and upland forests preserved at Newell, there are a large number of wildlife species that can find food and shelter. These potentially include 18 amphibians, 149 birds, 76 mammals and 21 reptiles associated with urban woodlands.

Biodiversity connectivity (corridors)

Native animals and plants require the ability to establish or re-establish local populations in a specific location to persist over time. Furthermore, ongoing breeding interaction between small populations can create a larger, more genetically robust meta-population. In areas such as ours, where significant habitat fragmentation has occurred, relatively narrow, linear connections (corridors) can help meet these needs.

In 2010-2011, Metro hosted a series of biodiversity corridor workshops on behalf of The Intertwine Alliance. The results were compiled and made available to participants via a map server. The workshops gathered the opinions of wildlife and habitat professionals in the region; the results are best professional opinion only, are not meant to be property specific, and make no attempt to prioritize or assess on-the-ground issues such as barriers. Nonetheless, the information can provide valuable insight into existing and potential connectivity from Maple Lane Natural Area to other important habitat areas in the region. Maple Lane is both a large habitat patch and a major north-south wildlife corridor.

Biodiversity corridors in the area of Maple Lane Natural Area include:

- West and south to Newell and Abernethy Creek riparian areas. This corridor connects to the Willamette River greenway and upstream on Abernethy Creek.
- Connection east and south to the forested hills of the upper Abernethy Creek watershed.

Climate change adaptation considerations

At Maple Lane Natural Area, stressors from climate change will likely derive primarily from increased competition from invasive species, intensified summer drought and altered hydrology and water temperature.

Metro will need to be vigilant in Early Detection-Rapid Response activities for invasive species, and more staff and financial resources may be needed to address invasive species in the future. Establishing native plants where needed now can help defend against invasive species at Maple Lane Natural Area. These activities are addressed in this conservation plan.

3.1 EXISTING PUBLIC USE

Neighbors have been recreating informally on the site since before it was purchased. Access to the property is from Maple Lane Court on the east side of the site.

SECTION 4: CONSERVATION

This section provides a comprehensive framework for conservation planning at Maple Lane Natural Area. This framework generally follows The Nature Conservancy's Conservation Action Planning template (The Nature Conservancy, 2007) and includes analyzing the site, establishing conservation targets, evaluating key ecological attributes for each conservation target, analyzing threats affecting conservation targets and developing action plans to abate serious threats. More detailed information is available in Appendix A.

4.1 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). Map 9 shows the conservation targets for Maple Lane Natural Area.

The methodology for determining conservation targets and key ecological attributes is discussed in detail in Appendix A.1, Conservation Targets, and Appendix A.2, Key Ecological Attributes. Using onsite natural habitat types and regional conservation planning efforts as guides, conservation targets were selected that encompass the site's biodiversity values and regional conservation priorities.

Maple Lane Natural Area only includes a single conservation target: upland forest.

4.2 KEY ECOLOGICAL ATTRIBUTES

Key ecological attributes (KEAs) are 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.

Appendix A.2 (Key Ecological Attributes) and table 2 below describes the site's KEAs and indicators for each of the four conservation targets in more detail.

4.3 THREATS AND SOURCES

An effective conservation strategy requires understanding the threats to conservation targets and the sources of those threats. For example, adjacent development and subsequent disruption of natural systems place stress on the resource and its inhabitants and threaten the health of the greater ecosystem.

At Maple Lane Natural Area, the following threats are evident:

- Increased competition (invasive species throughout the site; see Appendix A.4).
- Altered vegetation structure.
- Habitat conversion.
- Human disturbance (illegal camping on Metro and neighboring property).

The methodology for defining threats and sources was established by The Nature Conservancy. It is a well-established, objective methodology with a scientific basis, and is described in more detail in Appendix A.3, Threats and Sources.

Information on Maple Lane Natural Area's conservation targets, KEAs, significant threats and management actions to address those threats is summarized in Table 2 below. More detailed information is available in Appendix A.1, A.2 and A.3, and in the Maple Lane Stewardship Plan. The following section outlines short- and long-term management strategies for conservation targets.

Table 2. Summary of conservation targets at Maple Lane Natural Area

CONSERVATION TARGETS	ATTRIBUTES OF HEALTHY HABITAT
Upland forest	An abundant natural habitat of the region, low-elevation Pacific Northwest old-growth forests are typically dominated by Douglas fir, western red cedar, and western hemlock, with grand fir and hardwood species also occurring. Plant and animal use of forests follows the changes in forests over time, with different suites of species dominating depending on forest age, canopy closure and site conditions. Biodiversity is higher in forests where some light reaches the forest floor and where standing and fallen dead wood is ample and of mixed age and size. The size of habitat (patch size) is a key consideration for wildlife diversity. Current cover: Approximately 28 acres.

SECTION 5: STRATEGIC RESTORATION AND STEWARDSHIP

5.1 RESTORATION

This conservation plan outlines strategic actions to be carried out at Maple Lane 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 will be developed by Metro staff to address site-specific conditions encountered in the areas targeted for restoration action.

About 2 acres of habitat are in need of intensive restoration. This primarily includes removal of non-native, invasive species, understory planting of native trees, shrubs and forbs, and maintenance of plantings in order to ensure successful establishment. The information below summarizes conservation targets' key ecological attributes, significant threats to the habitat, and strategic restoration and stewardship actions that can be taken to keep or bring the KEAs into the desired range.

Conservation target: Upland forest

Short-term goals 2020-2024

Increase percent cover and richness of native trees and shrubs. Establish shade tolerant conifers, especially grand fir, western red cedar and hemlock trees, in the understory of deciduous dominated stands.

Long-term goal

The desired future condition is to have all size and condition key ecological attributes ranked as *good* to *very good*, thereby maintaining and restoring habitat suitable for upland forest-dependent wildlife species. The edge condition key ecological attribute is expected to maintain a *fair* ranking due to the site being bordered on three sides by roads and development.

Summary of upland forest restoration work completed through 2019

Restoration work in upland forest areas was started in 1997 by managing invasive species. Multiple passes of invasive species treatments have been completed.

Key ecological attribute outside normal range of variation

- Richness and percent cover of native trees and shrubs: portions of the site are dominated by non- native ivy (*Hedera* spp.), holly (*Ilex aquifolium*), laurel (*Prunus laurocerasus*) and cherry trees and have reduced the cover and richness of the upland forest habitat.
- Standing and downed dead trees: most upland forest habitat areas on the site lack dead wood. This is primarily due to historic logging and illegal use of the site.

Critical threats very high and high range

- Altered native species composition: logging and long-term human use have simplified the plant communities and have introduced non-native species that can out-compete native plant species.

Strategic restoration and stewardship actions

- Plant native conifer trees (grand fir, western red cedar and hemlock) to fill in areas with less than 75 percent combined canopy cover of trees and shrubs.
- Early detection and treatment of invasive species should target all EDRR species with the goal of preventing establishment of any such species not already present in the Natural Area. Surveys for and treatment of EDRR species should occur annually.

5.2 PRIORITIZING STRATEGIC RESTORATION AND STEWARDSHIP ACTIONS

It is important to prioritize restoration and stewardship activities for several reasons. Budgetary or time constraints are likely to limit how much work can be accomplished at a given site during a given time period. Specific actions may rise to the top due to the scarce or unique nature of a habitat type or because abating a certain threat now will save time and money in the future. Table 3 assigns priority rankings to key actions; this does not mean that the other actions are not important, simply that they are not the most important actions within the next 3-5 years.

Table 3. Priority status conservation targets at Maple Lane Natural Area.

CONSERVATION TARGET	PRIORITY
Upland forest	Medium to low

5.3 ONGOING STEWARDSHIP AND RESTORATION PROGRAMS

The following actions represent ongoing systems or programs that are in place and practices that will be continued and/or enhanced. These actions align with maintaining the conservation targets in good or very good condition.

Stewardship

Metro's Parks and Nature Program is committed to long-term stewardship of Maple Lane Natural Area. Metro staff will conduct multiple site walks per year to monitor natural resource condition and public use of the natural area. As determined necessary by staff and consistent with this plan, specific treatments or actions will be implemented to ensure that the health and condition of the natural area is maintained. Some periodic stewardship actions that are implemented by Metro staff include invasive species management, visits to monitor for illegal use of the site, cleanup of illegal dumping, mowing of buffer and roadside areas for fire safety, replacing signage and response to complaints. Table 4 describes high and medium priority maintenance action at the site. Additional details about the stewardship of the site can be found in the Maple Lane Site Stewardship Plan.

Table 4. High and medium priority stewardship actions at Maple Lane Natural Area.

ACTIVITY	FREQUENCY/DURATION	PRIORITY
Site walk	1 times per year	High
EDRR (weed invasion treatments)	1 times per year	High
Property line encroachments	1 time per year	Medium
Entry/rule sign inspection	1 times per year	Medium
Gates and fence inspection	1 times per year	High

Invasive species management

Invasive plant species can impact the habitat values for which land is conserved. Natural lands are not fully protected unless they also are managed for the features that first motivated preservation. Invasive species can change community structure, composition and ecosystem processes on these lands in ways that may not be anticipated or desirable. Careful management can minimize these negative impacts. Metro has initiated an early detection and rapid response program for invasive species including false brome (*Brachypodium sylvaticum*), meadow knapweed (*Centaurea nigrescens*) and garlic mustard (*Alliaria petiolata*), which have been documented in the area. Invasive species will be controlled by hand pulling or herbicide application as they are detected. Other invasive plant species will be controlled as part of restoration projects or ongoing management of habitat areas. See Appendix A.4 for a list of invasive species.

5.4 LONG-TERM STRATEGIES

The following actions may be necessary to achieve the long-term goals of this site conservation plan but are not identified as priority actions during the time period of this plan.

- Commercial or pre-commercial thinning of upland forest areas to maintain optimal tree growth and to increase downed wood and snags.
- Acquisition of fee title or conservation easements of adjoining private lands.

SECTION 6: RECREATION AND ACCESS

Neighbors have been recreating informally on the site since before it was purchased. Access to the property is from South Maple Lane Court on the east side of the property.

6.1 PLANNING FOR ACCESS

The 2016 Parks and Nature System Plan and bond measure refinement plans have identified Maple Lane Natural Area as a publicly accessible natural area due to its ability to provide access to the Oregon City Loop trail. As new information and understanding of the site and its value come to light, the site's classification may be reconsidered. Any discussion regarding future public access shall respect the conservation goals described in this document, consider previous intentions for the site, and respond to current department goals and priorities as well as community needs. While funding is not currently available to study access improvements, an access planning process would seek stakeholder input to help guide future access and infrastructure investments for public access.

Oregon City Loop Regional Trail

A multi-use trail loop around Oregon City will one day connect to the Trolley Trail, the future Newell Creek Canyon Nature Park, Canemah Bluff Natural Area and the Willamette Greenway. The loop includes the WPA-era McLoughlin Promenade, the iconic Oregon City Municipal Elevator and a planned river walk trail above Willamette Falls.

During any planning process for access, thoughtful consideration goes in to integrating public access and honors the conservation value and targets of the natural resource area. Some of the potential opportunities/constraints that are discussed include the natural area experience, environmental education and stewardship, historical and cultural uses, local/regional recreational demand, natural resource impacts, patch fragmentation, wildlife corridor disruption, public right-of-way access, land use and development permit requirements, long term operations and maintenance, as well as capital development and maintenance funding.

6.2 PROGRAMMATIC (EDUCATION AND VOLUNTEERS)

In addition to meeting conservation goals, Metro's regional parks and natural areas were created to 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, underserved communities 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. Public walks are advertised in Metro's quarterly "Big Backyard" publication. Information about conservation education programming is also available on Metro's website, www.oregonmetro.gov/parks/nature-education.

Volunteer program

The primary goal of the volunteer program is to provide a variety of high-quality, meaningful volunteer opportunities that help the community build connections to nature, learn about our program and add value and capacity to Metro's work. Through these opportunities, community members are able to learn about and enjoy Maple Lane Natural Area, work alongside fellow community members, learn new skills or polish existing ones and gain the satisfaction of contributing to the long-term health and livability of their communities.

Wildlife monitoring volunteers

Metro's volunteer wildlife monitoring program provides valuable information about Metro's natural areas while offering a unique and in-depth service opportunity for community members. By focusing on indicator species, such as amphibians and birds, volunteers provide data to help Metro's science and stewardship team gauge the progress of its restoration efforts and track the effects of public use on wildlife. More details about how this volunteer monitoring is used can be found in section 7 below.

Native Plant Center volunteers

Metro's Native Plant Center, located near Wanker's Corner in Tualatin, provides an important supply of rare locally adapted native seeds and plant stock to support Metro's natural area restoration projects. Staff and volunteers collect, grow and distribute native species for planting at restoration sites throughout the region.

Restoration volunteers

The restoration volunteer program focuses on providing groups of all kinds the opportunity to contribute to the health and vitality of our parks, natural areas and cemeteries. Primarily involving a short-term commitment of one day, restoration volunteers experience an engaging, hands-on learning opportunity with immediate, tangible results. Volunteer projects at Maple Lane have primarily focused on clean up events and planting native trees and shrubs.

6.3 SITE MANAGEMENT

Metro's management of the site will include enforcement of the posted rules to provide protection for wildlife and water quality, and to protect the safety and enjoyment of any person visiting these facilities.

Special use permits

Special use permits are required for certain regulated and non-traditional uses of parks and natural areas to ensure public health and safety and to protect natural resources, properties and facilities owned or managed by Metro. Special use permits are required for commercial film, video or photography; educational activities or educational events; festivals and organized sports activities; use of amplified sound; equipment or other elements potentially posing a safety threat or public

nuisance; concession services; site restoration or alteration, biological research, scientific collection (soil, wildlife or vegetation disturbance of any kind); any organized activity, event or gathering involving 25 or more people.

Archaeological resources

Maple Lane Natural Area is steeped in history and may contain archeological resources. If, during any site investigation, alteration or improvement, an archaeological resource is discovered, Metro will work with the State Historic Preservation Office to evaluate and document the find. If any damage or unlawful use is identified, Metro would partner with the Clackamas County Sheriff to investigate.

Dogs

One of the most difficult management issues for public access is the introduction of dogs by visitors. Research shows that even if dogs stay on the trails, they are perceived as predators by wildlife. The zone of influence of a dog, even on leash, can be several hundred feet on either side of a trail. Because of the potential disturbance to wildlife and wildlife habitat, dogs are not allowed within Maple Lane Natural Area. Educational signage, self-policing and strict enforcement are all needed to effectively manage this sensitive issue.

Signage

Any future signage developed for the natural area should utilize Metro's current brand and signage standards manual. The manual establishes a graphic standard that will be integrated into the entire signage plan. The manual addresses each of the three types of signs: regulatory, wayfinding and interpretive.

6.4 STRATEGIC ACTIONS (ACCESS AND SITE MANAGEMENT)

The following actions describe the proposed access and site management improvements over the life of this plan. The projects were established as part of the development of this plan and should be revisited every two to three years for additions and updates. Cost estimates for these actions are included in Section 7.2 of this document.

Signage

Regulatory and information signs will be installed, including natural area rules, maintenance road/fire lane identification and sensitive habitat signs. Signs will be placed at strategic locations throughout the natural area.

Fencing

Replace and repair existing fences to control site boundaries. Fencing should be constructed to allow wildlife to pass over and under to promote wildlife corridor connections.

6.5 BEYOND FIVE YEARS OR AS NEEDED

In the future there may be increased demand to access and recreate at Maple Lane Natural Area. Future access improvements, including the Oregon City Loop Trail, will need a more in-depth analysis of opportunities and constraints for trails and public access, including meetings with partners, neighbors and the public and developing a detailed access master plan.

SECTION 7: COORDINATION

The conservation plan has laid out the history and context of Maple Lane Natural Area, along with the conservation, management and public access projects for the next five years. For those projects to be realized, coordination will be needed on a number of fronts. Important coordination points include:

- Balancing future public access with natural resource (habitat) improvements.
- Monitoring restoration efforts to track effectiveness and make changes to the priorities and goals as needed.
- Coordinating with neighbors and local stakeholders to implement projects.
- Funding to realize the strategic restoration and access actions identified in this plan.

7.1 MONITORING FRAMEWORK

Monitoring at Maple Lane Natural Area is an integral part of an adaptive management approach to restoration and stewardship. Based on the monitoring plan developed by Metro, a feedback loop is created between monitoring and management decisions. Monitoring will be done to evaluate habitat, population responses to management action, as well as progress toward achieving habitat and population objectives.

The monitoring strategy is based on threats and key ecological attributes associated with conservation targets. 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.

Monitoring techniques

Some monitoring techniques are used to monitor more than one conservation target. This discussion is intended to provide a general introduction but not detailed methods.

Remote sensing/GIS

Several metrics for health of conservation targets relate to canopy cover and size of a habitat. Where a desired condition is a minimum canopy cover, it can be estimated with GIS software using current aerial photography. Similarly, important connections within the Natural Area and to off-site habitat can be inspected with aerial photographs.

Wildlife monitoring

Monitoring of pond-breeding amphibians using egg mass surveys, limited land-based amphibian surveys and breeding bird surveys using breeding season point counts is conducted by staff, contractors or Metro-trained volunteers at the Maple Lane Natural Area. In some cases, wildlife monitoring can establish a baseline for and tracked post-project response to restoration efforts.

Site walk

Ocular (visual) estimates can be used to determine the presence or absence of a species within a

short timeline and at a very low cost. This method of monitoring is typically used to determine intervals for treatments or success of a planting when managing projects.

Photos

Permanent photo points are established to provide long term documentation of changes to habitats over time. Typically, photo points are marked by a permanent landscape feature or metal stakes and photos are taken at a landscape scale over long term periods of time.

Conservation targets and monitoring techniques

Upland forest

Annual site walks will be used to monitor this conservation target. When large scale restoration work is implemented, the monitoring actions for this conservation target should be revisited.

Table 5. Habitat monitoring actions.

HABITAT	MONITORING ACTIVITY (TECHNIQUES)	FREQUENCY/DURATION	PRIORITY
Upland forest	Site walk (project management)	1 time per year	Low

7.2 FUNDING

Costs in Tables 6 and 7 are general estimates for the purpose of understanding the magnitude of costs to implement the structural elements of the plan, as described in Sections 4 and 5. The costs are estimated of hiring contractors to complete the work and include a construction contingency for time and materials. In addition to these project implementation costs we have included staff time and annual stewardship costs for Maple Lane Natural Area in Table 8.

Table 6. Access and recreation strategic action cost estimates.

STRATEGIC ACTION	COST
Signs (regulatory signs replaced annually for 5 years)	$2,500
Total	**$2,500**

Table 7. Conservation target strategic restoration action cost estimates

STRATEGIC ACTION	COST
Upland forest Invasive species treatments + additional plantings	$25,000
Total	**$25,000**

Table 8. Annual stewardship cost estimates.

ANNUAL STEWARDSHIP*	COST
EDRR surveys and invasive weed treatments (entire site)	$1,500
Maintenance of existing Infrastructure (average of multiple small actions)	$500
Total (per year cost)	**$2,000**

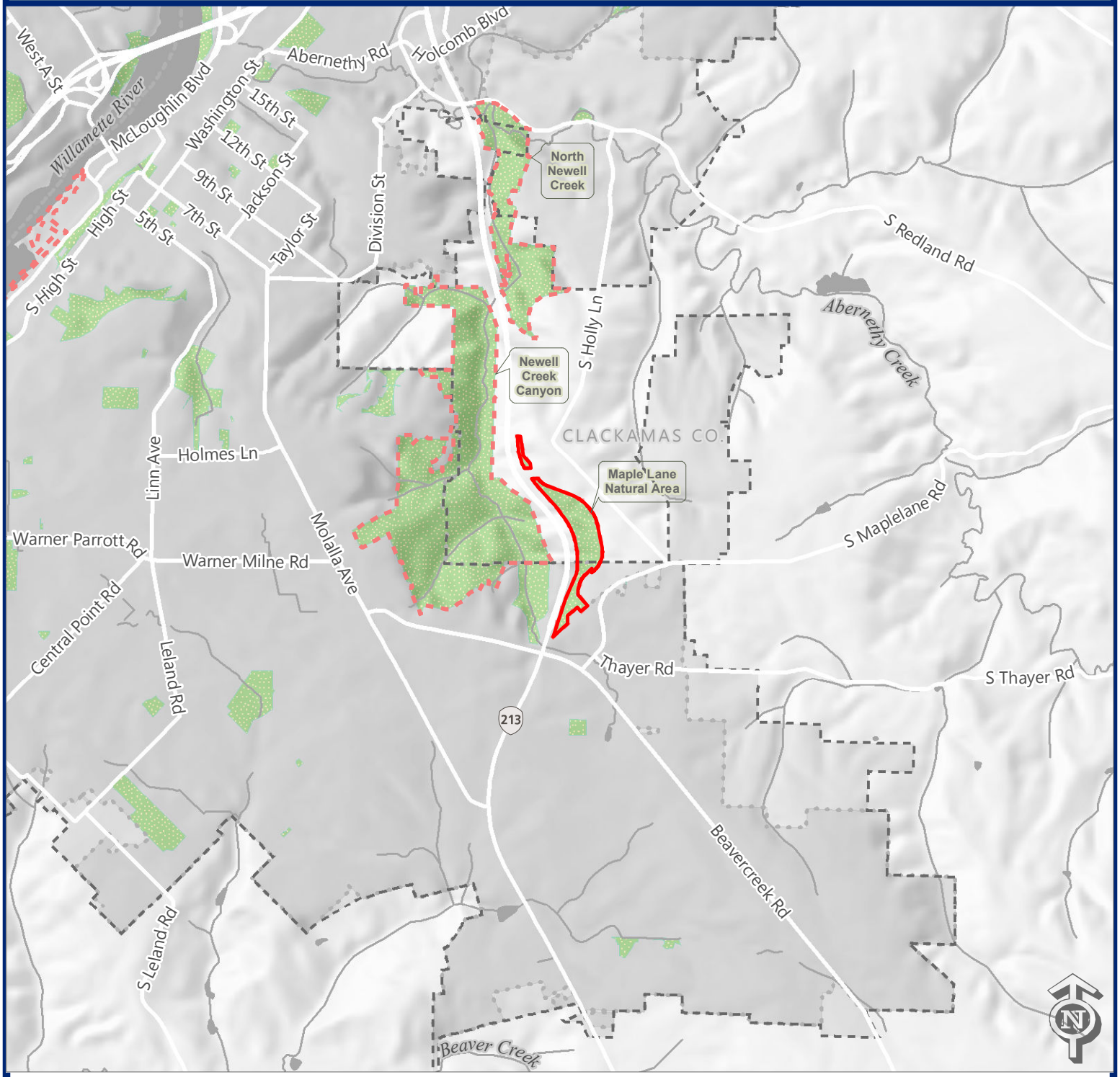
* Stewardship actions and costs are described in more detail in the Maple Lane Site Stewardship Plan

7.3 PUBLIC INVOLVEMENT

As projects are developed, Metro will provide local stakeholders and residents near Maple Lane Natural Area with pertinent information about the work before it is implemented. Project information may include background on the project, timing, cost, materials types and other information as necessary for interested parties to be aware of the project and its implications.

VICINITY MAP

Metro

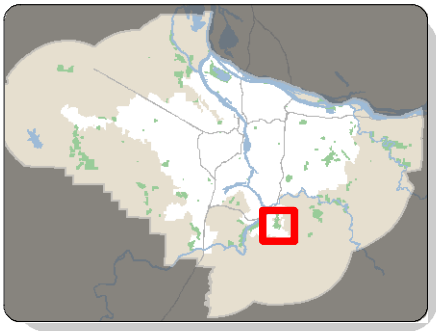


Maple Lane Natural Area site

Other Metro sites

Parks and/or Natural Areas

0 0.8 1.6 Miles

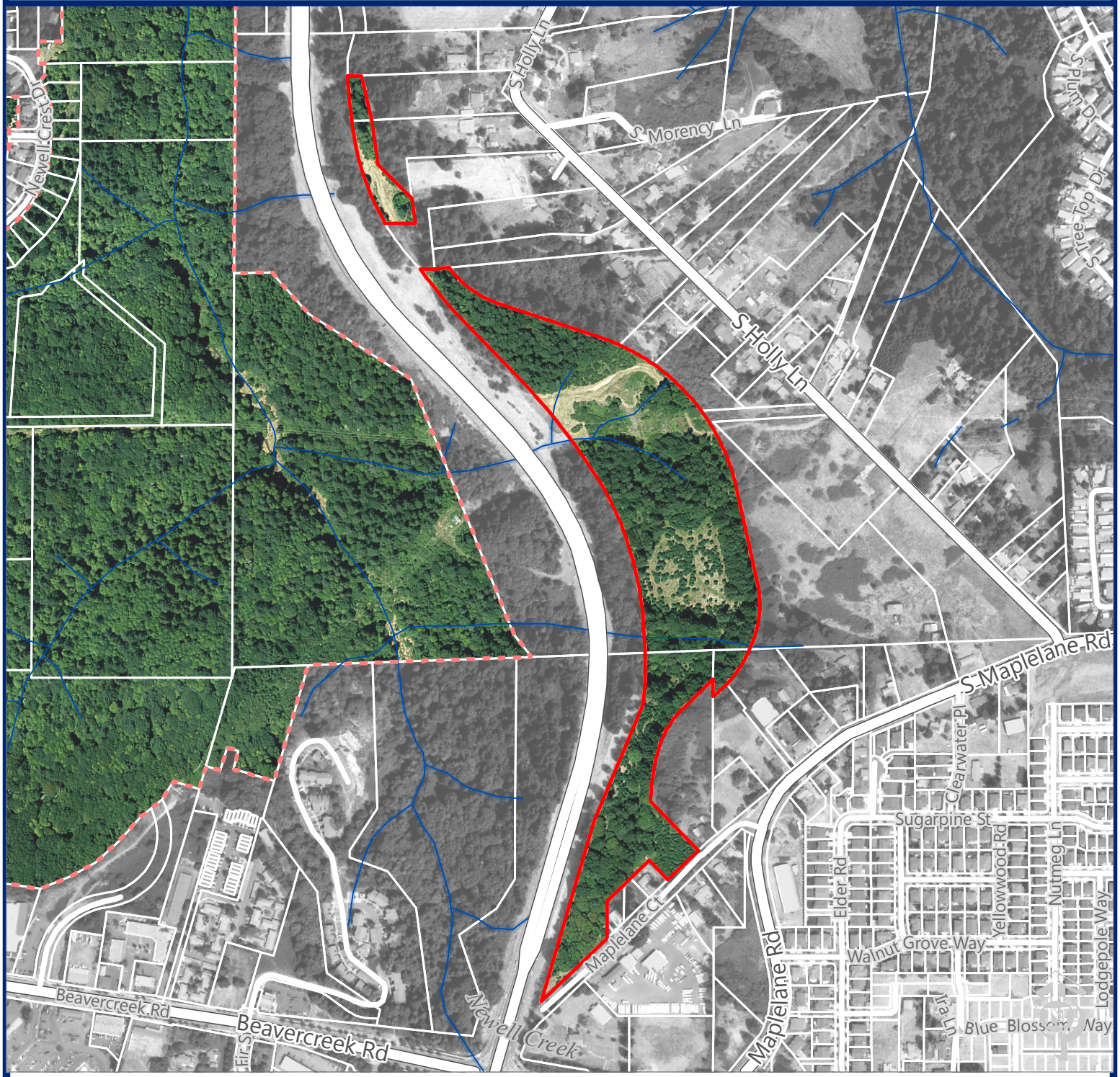


Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

SITE MAP

Metro

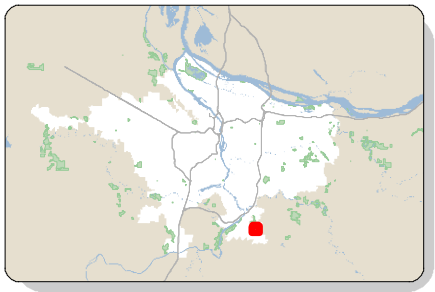


Maple Lane Natural Area site

Other Metro sites

NHDplusStrmFlowline

Perennial stream



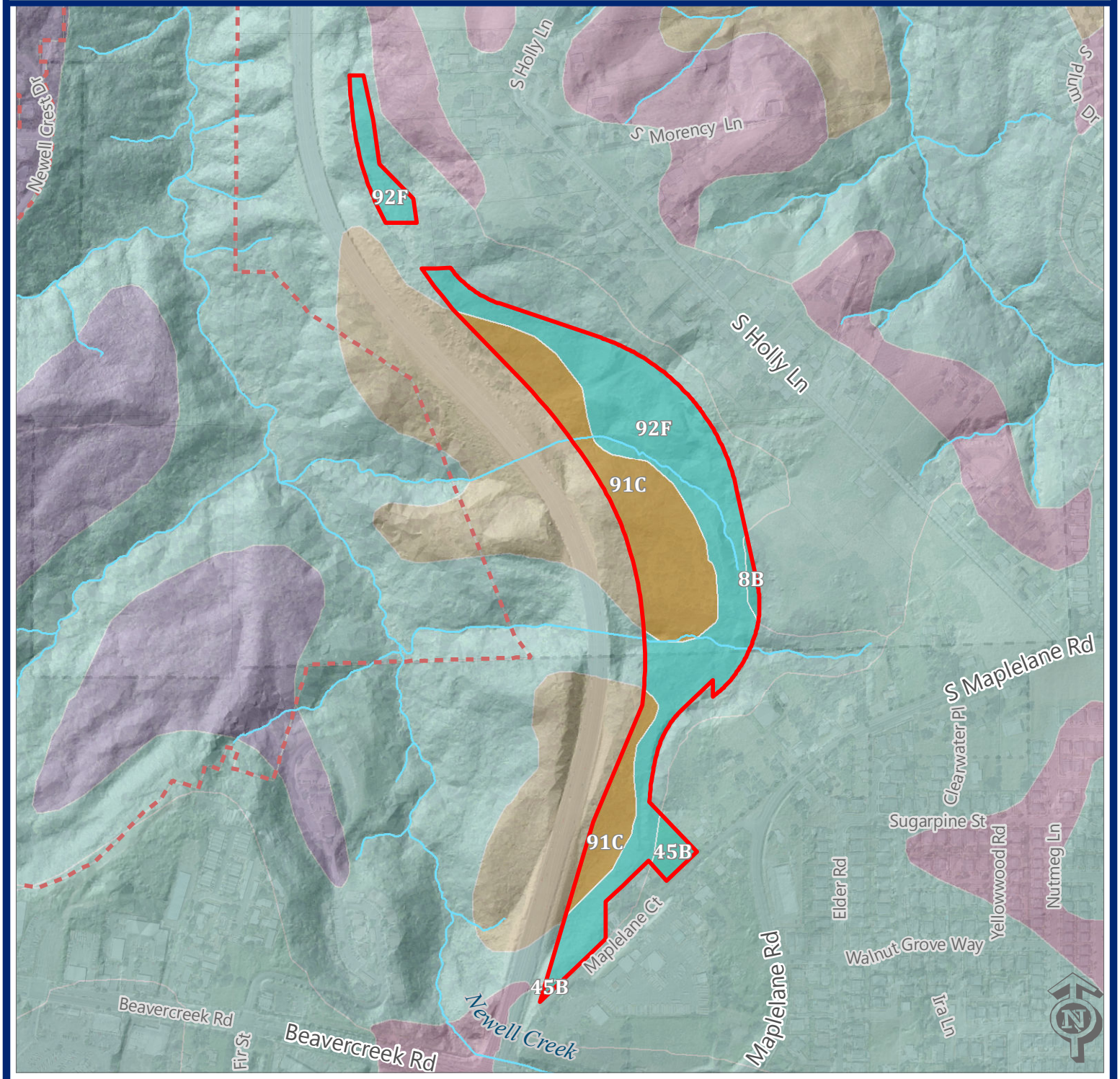
0 820 1,640 Feet

Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

SOILS

Metro



Maple Lane Natural Area site

Other Metro site

45B - Jory silty clay loam, 2 to 8 percent slopes

8B - Bornstedt silt loam, 0 to 8 percent slopes

91C - Woodburn silt loam, 8 to 15 percent slopes

92F - Xerochrepts and Haploxerolls, very steep

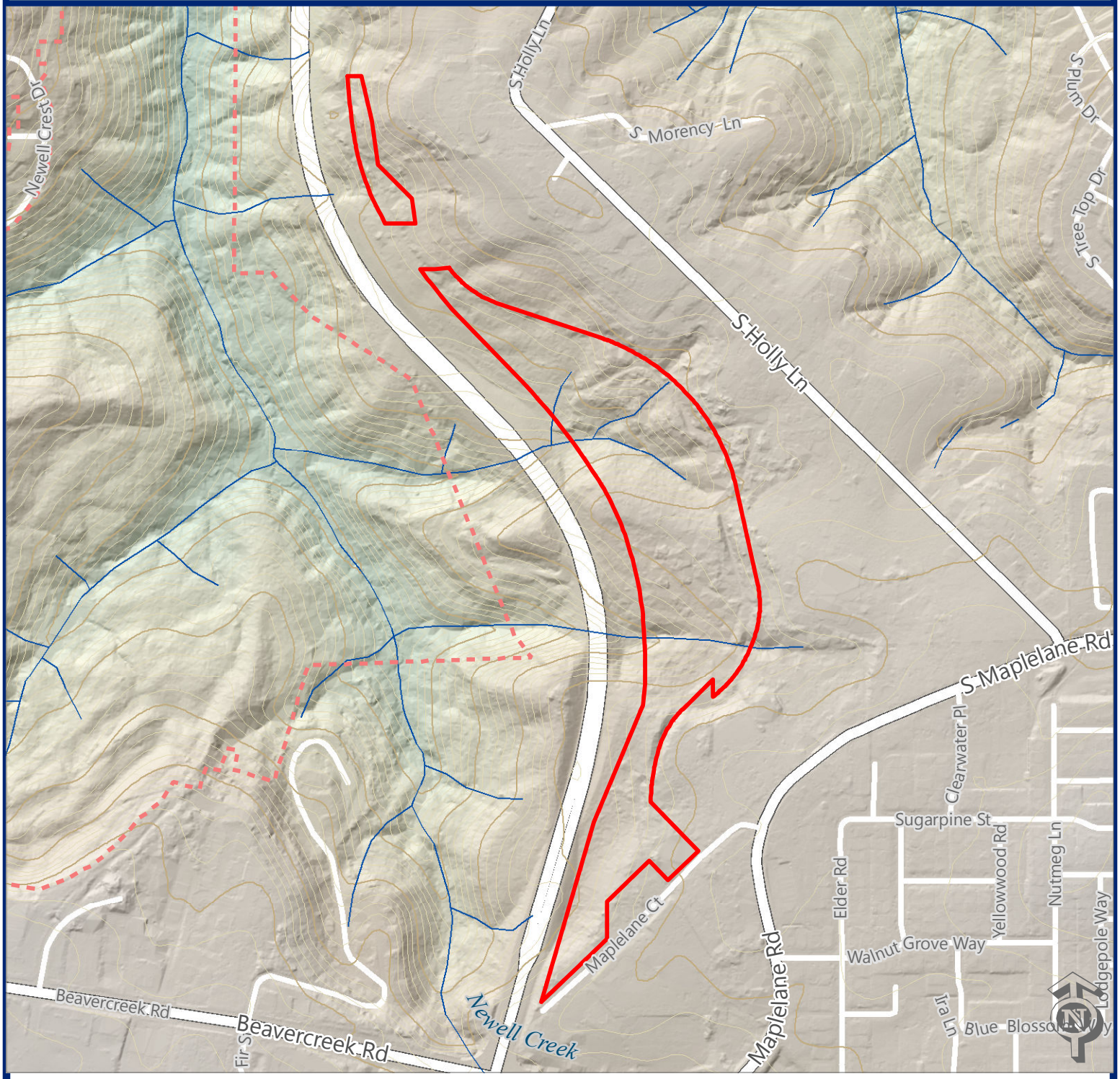
0 730 1,460 Feet

Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

TOPOGRAPHY

Metro



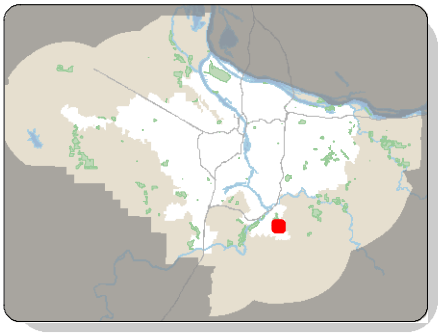
Maple Lane Natural Area site

Other Metro sites

10 ft contour

50 ft contour

0 825 1,650 Feet

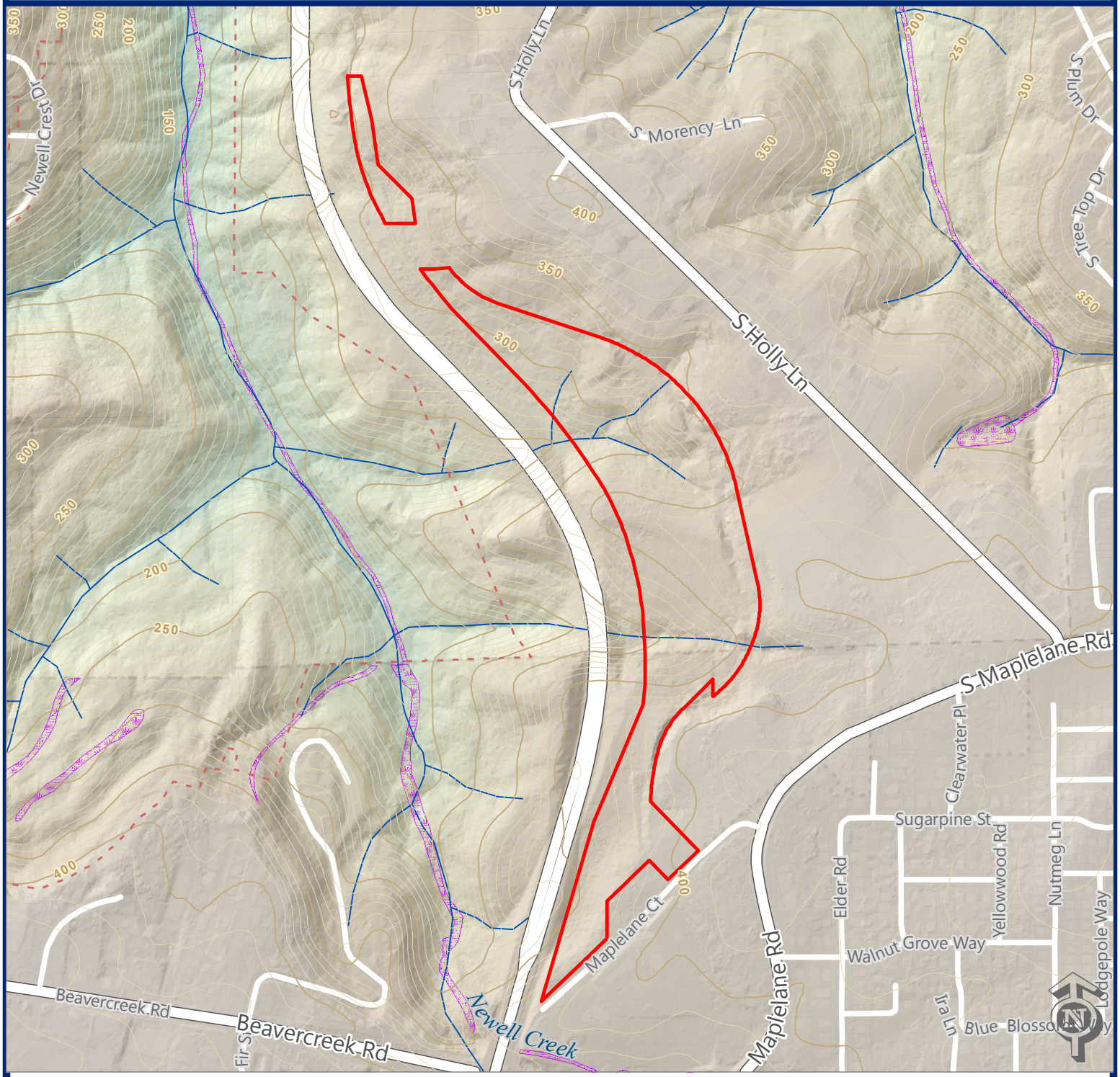


Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

HYDROLOGY

Metro



Maple Lane Natural Area site

Other Metro sites

Wetlands (Wetlands Conservancy data)

NHD Flowlines

Perennial stream

Hydric soils

0 810 1,620 Feet

map date: 4/25/2019

CURRENT COVER

Metro

Maple Lane Natural Area site

Other Metro sites

Upland forest - mixed

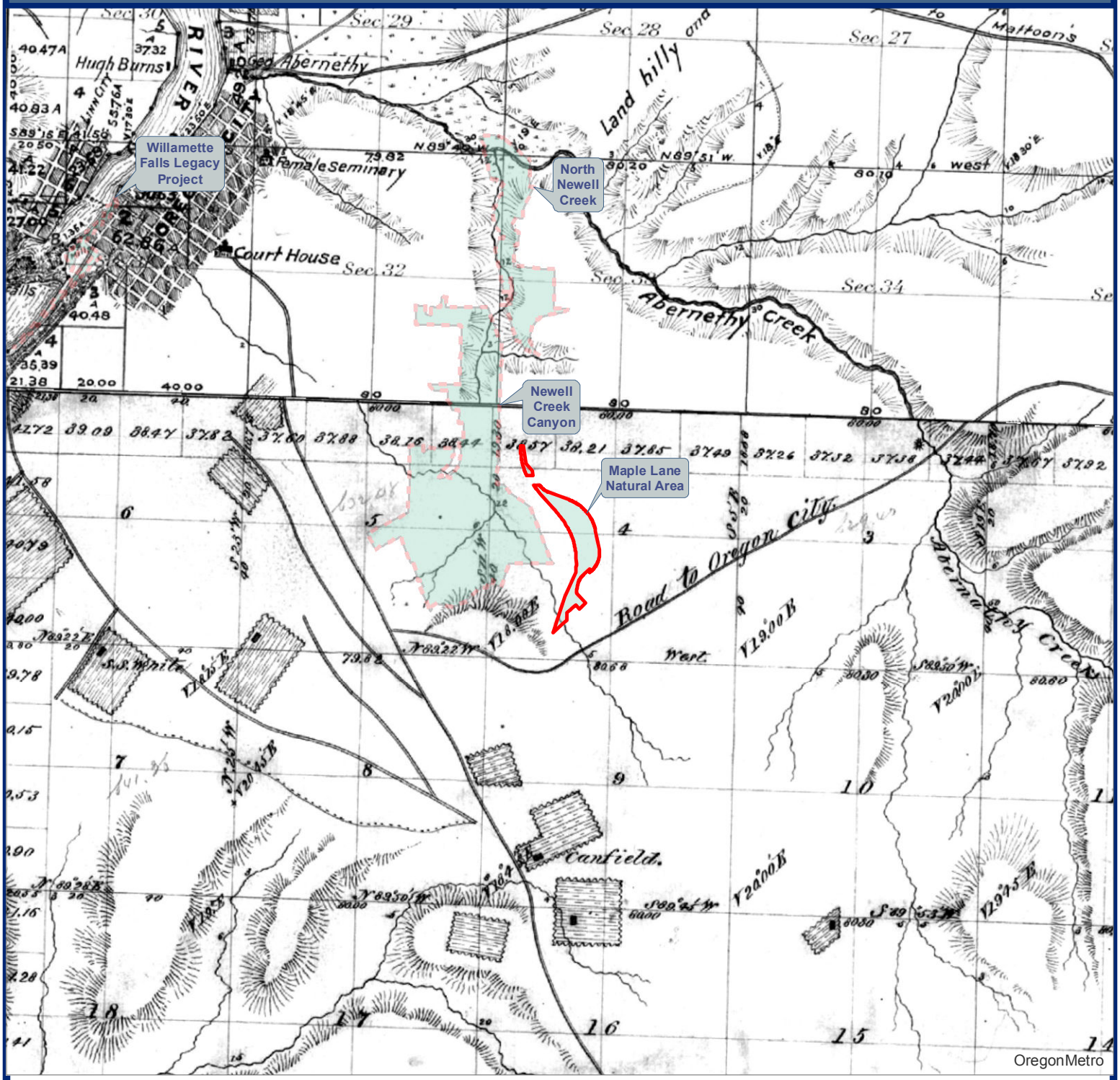
0 725 1,450 Feet

Maple Lane Natural Area Site Conservation Plan

GENERAL LAND OFFICE (GLO) MAP

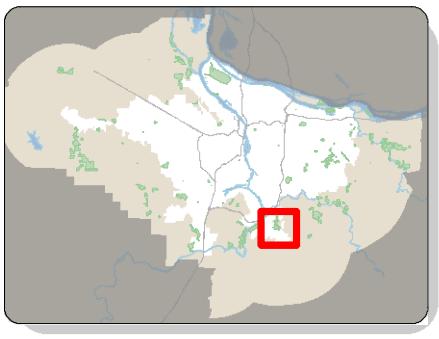
This map is the 1852 public land survey of the Portland, OR region.

Metro



Maple Lane Natural Area site

Other Metro sites



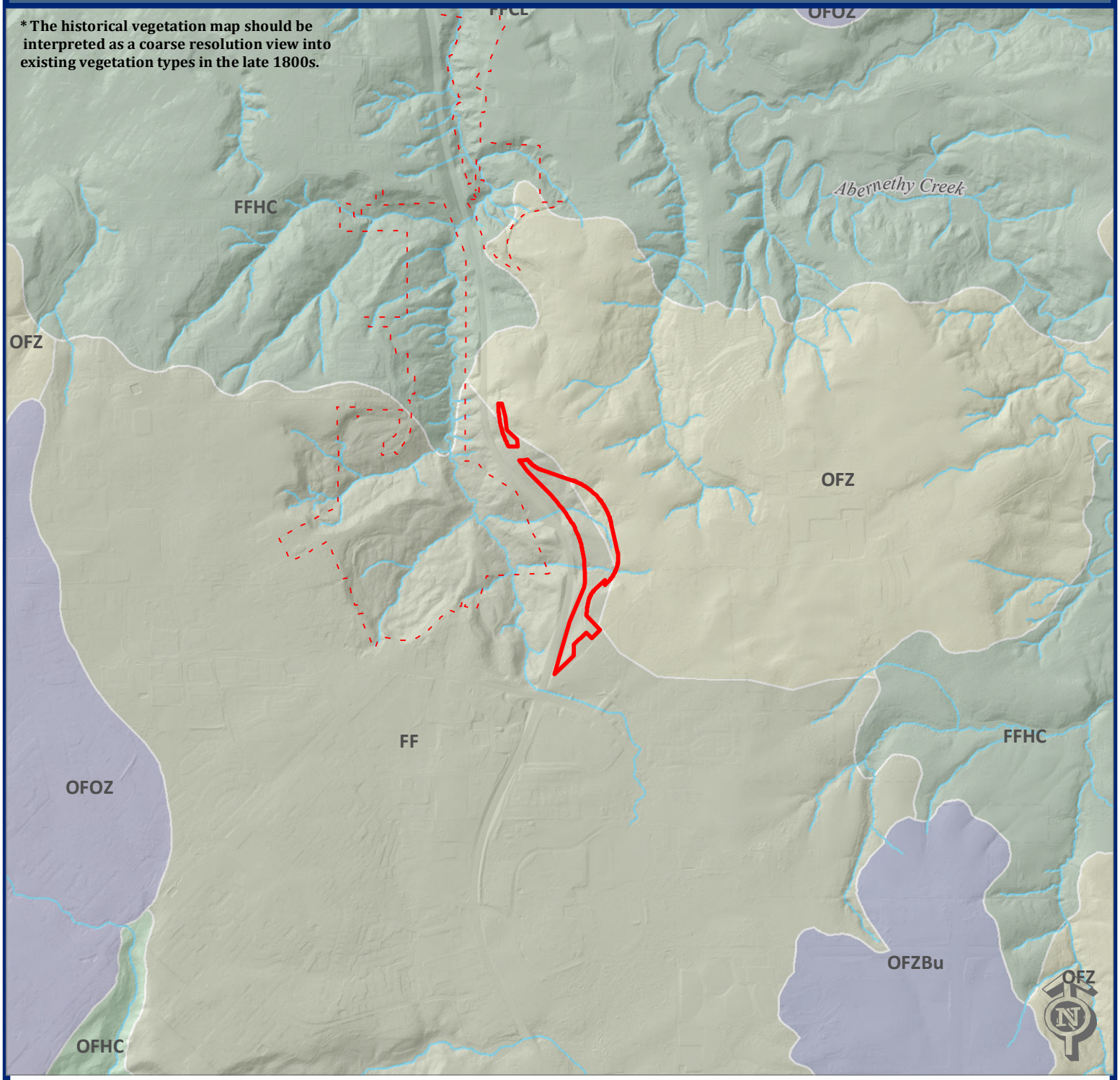
0 0.85 1.7 Miles

Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

HISTORICAL VEGETATION

Metro



Maple Lane Natural Area site

Other Metro sites

FF - Closed forest; Upland

FFCL - Closed forest; Riparian & Wetland

FFHC - Closed forest; Upland

OFHC - Woodland

OFOZ - Woodland

OFZ - Woodland

OFZBu - 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

Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

CONSERVATION TARGETS

Metro

Maple Lane Natural Area site

Other Metro sites

Upland forest

0 830 1,660 Feet

Maple Lane Natural Area Site Conservation Plan

map date: 4/25/2019

APPENDIX A.1 | CONSERVATION TARGETS

INTRODUCTION

Conservation targets are composed of a suite of species, 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). Priority conservation targets represent species or habitats that are the conservation focus for a given area or management unit.

Conservation targets establish the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. They are the foundation of conservation planning. Key ecological attributes (KEAs) for each conservation target will be evaluated. KEAs are 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). Viability of the conservation target is inferred by the condition of the KEAs. Analysis of threats affecting conservation targets inform the development of action plans to abate serious threats and monitoring plans to gauge success of the action plans. Conservation targets then should consist of species or communities that will provide the focus of management actions and monitoring. Species or communities that for whatever reason are too expensive to manage or monitor are not good candidates for conservation targets.

METHODS

Regional conservation plans were referenced to align the conservation goals of the Maple Lane Site Conservation Plan (Table 1). These plans included the Oregon Department of Fish and Wildlife's Oregon Conservation Strategy (ODFW, 2006); The Nature Conservancy's Ecoregional Assessment of the Willamette Valley – Puget Trough-Georgia Basin (Floburg et al., 2004); the Northwest Power and Conservation Council's Willamette Subbasin Plan (Primozich and Bastasch, 2004) and Partners in Flight's Conservation Strategy for Landbirds in Lowlands and Valleys of Western Oregon and Washington (Altman, 2000). These plans identify both focal habitats and focal species as conservation targets.

RESULTS

Using onsite habitat types and regional conservation planning efforts as guides, conservation targets were selected that encompass the site's most threatened biodiversity values as well as regional conservation targets (Table 1). Each of the conservation targets are represented in one or more of the regional conservation plans listed below.

Table 1. Maple Lane Natural Area site conservation targets and relationships to other conservation strategies.

CONSERVATION TARGETS	OREGON CONSERVATION STRATEGY *(ODFW, 2006)*	WILLAMETTE BASIN SUBBASIN PLAN *(Primozich, 2004)*	LANDBIRD CONSERVATION STRATEGY *(Altman 1999, 2000)*	ECOREGIONAL ASSESSMENT *(Floburg et al., 2004)*
Upland conifer-hardwood forest	Late successional conifer forests	Old growth conifer forest	Low elevation western hemlock/western red cedar	Douglas fir-western hemlock-western red cedar forests

While not elevated to the level of "conservation targets," certain fish and wildlife species that depend on riparian habitats are integrated into these habitats' key ecological attributes. These species are rare or declining, and implementing specific management practices may aid their conservation. Some Maple Lane Natural Area species with special state or federal status are listed in Table 2.

Table 2. Federal and state status for species of conservation interest at Maple Lane Natural Area.

SPECIES OF CONSERVATION INTEREST	FEDERAL STATUS	STATE STATUS	OREGON CONSERVATION STRATEGY SPECIES?
Northern red-legged frog	Species of Concern	Sensitive–Vulnerable	Yes

APPENDIX B.2 | KEY ECOLOGICAL ATTRIBUTES

Key ecological attributes (KEAs) are 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. For each KEA, one or more indicators were selected to assess the health of the KEA.

Indicators are measurable entities related to the condition of the KEA (The Nature Conservancy, 2007). A good indicator should be:

- ***Biologically relevant:*** The indicator should represent an accurate assessment of target health.
- ***Sensitive to anthropogenic stress:*** The indicator should be reflective of changes in stress.
- ***Measurable:*** The indicator should be capable of being measured using standard procedures.
- ***Cost-effective:*** The indicator should be inexpensive to measure using standard procedures.
- ***Anticipatory***: The indicator should indicate degradation before serious harm has occurred.
- ***Socially relevant:*** The indicator's value should be easily recognizable by stakeholders.

KEA indicators were categorized by type: size, condition or landscape context:

- ***Size:*** A measure of the area or abundance of the conservation target's occurrence.
- ***Condition:*** A measure of the biological composition, structure and biotic interactions that characterize the occurrence.
- ***Landscape context:*** An assessment of the target's environment including ecological processes and regimes that maintain the target occurrence such as flooding, fire regimes and many other kinds of natural disturbance, and connectivity such as species targets having access to habitats and resources or the ability to respond to environmental change through dispersal or migration.

The status of an indicator will vary over time either within an acceptable range of variation that sustains the conservation target or beyond a critical threshold that threatens the viability of the conservation target. The range is described as *very good*, *good*, *fair* or *poor*. The *very good* and *good* ratings mean that the indicator is functioning within its acceptable rang of variation. *Fair* and *poor* ratings mean an indicator is outside its acceptable range of variation. When information was lacking to define all four categories then only a subset of the four categories was defined.

Definitions for the four categorizes follow those used by The Nature Conservancy:

- ***Very Good***: The indicator is functioning within an ecologically desirable status, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to "natural" as possible and has little chance of being degraded by some random event).
- ***Good:*** The indicator is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.

- ***Fair:*** The indicator lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.
- ***Poor:*** Allowing the indicator to remain in this condition for an extended period will make restoration or prevention of extirpation of the target practically impossible (e.g., too complicated, costly and/or uncertain to reverse the alteration).

KEAs and their indicators for Maple Lane Natural Area conservation targets are provided in the following tables.

Table 1: Key Ecological Attributes for Upland Forest at Maple Lane 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)	Poor	Poor	Poor to Good	Calculate by delineating forest patch in GIS. If more than one patch present, rank based on a composite. In the Puget Sound, most native forest birds were present in patches ≥ 42 ha (104 ac). Local studies suggest a lowest threshold for birds and mammals of about 12 ha (30 ac). (Environmental Law Institute, 2003; Donnelly and Marzluff, 2004; Soll and Hennings, 2010)
Condition	Native tree and shrub richness	Number of native tree and shrub species per ac	< 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)	Fair	Good	Good	Estimate overall native tree and shrub richness via site walk. Native wildlife species diversity is associated with native vegetation. A diversity of shrubs is more likely to provide food and shelter for species over the seasons. Shrub diversity is particularly important to pollinators and songbirds. (Hagar, 2003; Hennings, 2006; Burghardt et al. 2009)
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	Estimate overall vegetative structure via site walk. Native bird species richness is associated with the amount of native shrub cover. (Hagar, 2003; Hennings, 2006) Numbers based on data analysis from local studies at 54 riparian study sites. (Hennings, 2001) Native shrub cover was as high as ~60%, with highest native shrub cover in the 50-60% tree canopy cover range.
Condition	Mature trees	Number and size (dbh) of species such as Douglas fir, western red cedar, western hemlock and grand fir	Mature trees lacking	< 3 per ac with dbh >24 in	3-5 per ac with dbh >24 in	>5 per ac with dbh >24 in	Fair/Good	Good	Very Good	Recruitment of native trees necessary for long-term health of upland forests. Saplings are <2m tall. Based on PIF (2000) biological objective for WV large-canopy trees in riparian deciduous woodland.
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	Good	Good	Estimate via site walk. Rankings distilled from multiple references and particularly from *Habitat Conservation for Landbirds in Lowlands and Valleys of Western Oregon and Washington* (Altman and Alexander, 2012) and DecAID results for species' use of dead wood in Westside Lowland Conifer-hardwood forests.
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	Asses via aerial photographs. The intactness of the edge can be important to biotic and abiotic aspects of the site. Derived from *Ecological integrity assessment: North Pacific dry Douglas fir forest and woodland* (Crawford, 2011).

*Desired future condition

APPENDIX A.3 | THREATS AND SOURCES

INTRODUCTION

A stress is the "…impairment or degradation of the size, condition and landscape context of a conservation target, and results in reduced viability of the target," (The Nature Conservancy, 2007); or, in other words, a degraded key ecological attribute (KEA) that is outside its acceptable range of variation. Stresses may also reduce the viability of nested conservation targets such as grassland birds. A source of stress is an extraneous factor, either human (e.g., policies, land use) or biological (e.g., non-native species) that infringes upon a habitat or species target in a way that results in stress. Put together, stresses and their sources constitute a threat.

Analysis of threats to conservation targets at North Newell Creek Natural Area involves three parts:

- Identify stresses and apply stress-rating criteria.
- Identify sources of stress, rank and assign threat-to-system rank.
- Assign overall threat rank.

BACKGROUND ON METHODS

Identify stresses and apply stress-rating criteria

In identifying stresses, we applied the concept that a stress is any alteration of a KEA that can result or has resulted in a KEA declining below a *good* rating. For each conservation target, KEA indicators with ratings of *poor* or *fair* were analyzed by asking the question "What types of destruction, degradation or impairment are responsible for the 'poor' or 'fair' rating?" We also considered those KEA indicators with *good* and *very good* ratings but likely to degrade to *poor* or *fair* if no management actions are taken.

Stresses are ranked according to two criteria: severity and scope of the anticipated damage.

Severity

The level of damage to the conservation target that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- **Very high:** The threat is likely to destroy or eliminate the conservation target over some portion of the target's occurrence at the site.
- **High:** The threat is likely to seriously degrade the conservation target over some portion of the target's occurrence at the site.
- **Medium:** The threat is likely to moderately degrade the conservation target over some portion of the target's occurrence at the site.
- **Low:** The threat is likely to only slightly impair the conservation target over some portion of the target's occurrence at the site.

Scope

The geographic extent of impact on the conservation target at the site that can reasonably be expected within 10 years under current circumstances (i.e., given the continuation of the existing situation).

- **Very high:** The threat is likely to be widespread or pervasive in its scope and affect the conservation target throughout the target's occurrences at the site.
- **High:** The threat is likely to be widespread in its scope and affect the conservation target at many of its locations at the site.
- **Medium:** The threat is likely to be localized in its scope and affect the conservation target at some of the target's locations at the site.
- **Low:** The threat is likely to be very localized in its scope and affect the conservation target at a limited portion of the target's location at the site.

Once severity and scope ratings are determined, they are combined to develop a stress ranking using the following stress ranking table (The Nature Conservancy, 2007).

Table 1. Stress ranking

	SCOPE			
SEVERITY	**VERY HIGH**	**HIGH**	**MEDIUM**	**LOW**
Very high	Very high	High	Medium	Low
High	High	High	Medium	Low
Medium	Medium	Medium	Medium	Low
Low	Low	Low	Low	Low

Identify sources of stress and apply threat to system rank

Sources of stresses are the proximate cause of the stress. A source of stress may be either human activities or biological (e.g., non-native species). Sources of the stress are rated in terms of contribution and irreversibility as defined below.

Contribution

The expected contribution of the source, acting alone, under current circumstances (i.e., given the continuation of the existing management/conservation situation).

- **Very high:** The source is a very large contributor of the particular stress.
- **High:** The source is a large contributor of the particular stress.
- **Medium:** The source is a moderate contributor of the particular stress.
- **Low:** The source is a low contributor of the particular stress.

Irreversibility

The degree to which the effects of a source of stress can be restored.

- **Very high:** The source produces a stress that is irreversible (e.g., wetlands converted to a shopping center).
- **High:** The source produces a stress that is reversible, but not practically affordable (e.g., wetland converted to agriculture).
- **Medium:** The source produces a stress that is reversible with a reasonable commitment of resources (e.g., ditching and draining of wetland).
- **Low:** The source produces a stress that is easily reversible at relatively low cost (e.g., off-road vehicles trespassing in wetland).

The contribution and irreversibility of each source across all the stresses to each conservation target is ranked using Table 2, resulting in a source of stress rank for each contribution/irreversibility combination.

Table 2. Source ranking

	CONTRIBUTION			
IRREVERSIBILITY	**VERY HIGH**	**HIGH**	**MEDIUM**	**LOW**
Very high	Very high	High	High	Medium
High	Very high	High	Medium	Medium
Medium	High	Medium	Medium	Low
Low	High	Medium	Low	Low

In a similar fashion stress and source rankings are combined to develop a threat ranking specific to that conservation target (Table 3).

Table 3. Threat ranking

	SOURCE			
STRESS	**VERY HIGH**	**HIGH**	**MEDIUM**	**LOW**
Very high	Very high	Very high	High	Medium
High	High	High	Medium	Low
Medium	Medium	Medium	Low	Low
Low	Low	Low	Low	Low

Threat-to-system rank

A threat-to-system rank is a summary ranking for all threats associated with a particular source of stress to a conservation target. Where multiple threats related to the same source of stress occurred, the threat-to-system rank is adjusted by using the "3-5-7" rule as follows:

- Three *high* rankings equal a *very high.*
- Five *medium* rankings equal a *high.*
- Seven *low* rankings equal a *medium.*

Table 7 illustrates the threat-to-system ranking.

Table 4. Conservation target A

	STRESS 1	STRESS 2	STRESS 3	THREAT TO SYSTEM RANK
Stress rank	High	Medium	Medium	
Source A rank	High	Medium	N/A	High*
Source B rank	Low	N/A	Medium	Medium**

N/A = Not applicable: stress/source combination does not affect conservation target
**, ** See Table 4*

Overall threat rank

The last step in the process is to summarize threats across the system and apply an overall threat rank to each threat (source/stress combination). Overall threat ranks are determined by combining threat-to-system ranks across all system/targets affected by that threat. For each threat, DEA will combine the threat-to-system ranks across all conservation targets into an overall threat rank of *very high*, *high*, *medium* or *low* as determined by the "2 Prime" rule which is as follows:

- Two very high threat rankings yield an overall threat rank of *very high.*
- One very high or two high threat rankings yield an overall threat rank of *high.*
- One high or two medium threat rankings yield an overall threat rank of *medium.*
- Less than two medium threat rankings yield an overall threat rank of *low.*

The overall threat rank represents the degree to which a particular source causes stress to the conservation target.

Table 5. Overall threat rank

	TARGET 1	TARGET 2	TARGET 3	OVERALL THREAT RANK
Threat A	*High**	Very high	High	High
Threat B	*Medium***	Medium	High	Medium
Threat C	N/A	Medium	Low	Low

**, ** from Tables 5,6*

Threats and source analysis for the Maple Lane Natural Area

Threats for the Maple Lane Natural Area conservation targets are listed in tables 6 below.

Table 6. Upland forest

STRESS	STRESS RANK	SOURCE	SOURCE RANK	THREAT RANK	COMMENTS
Increased competition from invasive species	High	Encroachment of non-native invasive species	High	High	Extensive invasive weeds such as Himalayan blackberry, holly, laurel, clematis and ivy. Tied to native species KEAs.
Habitat conversion	High	Previous forest management practices	Medium	Medium	Community is simplified due to past logging activities and extensive human use. May not develop old-growth characteristics for very long time. Diversity lacking. Requires replanting and weed control. Tied to native species KEAs.
Lack of downed and standing dead wood	Medium	Previous forest management practices	High	Medium	Snags and down wood are critical habitat elements used by more than 150 species of wildlife in Northwest conifer forests (Hagar 2007). Tied to dead wood KEAs.
Human disturbance (recreational activities)	High	Demand trails, camping, dogs	High	High	Stress to wildlife species utilizing this habitat. Ongoing loss of habitat and vegetation structure by escaped campers and other human use. Disturbance reduces habitat value. Tied to structure/patch size (interior habitat) KEAs.

APPENDIX A.4 | INVASIVE SPECIES

The table below summarizes a preliminary list of invasive plants requiring control in all or parts of Maple Lane Natural Area, including focus areas and timing for control. Invasive species, with the exception of Early Detection Rapid Response (EDRR) species, will be controlled as part of restoration projects or ongoing management of habitat areas. Photos of EDRR species for identification are listed below. A list of noxious weeds for Oregon, including descriptions and photos, can be found at: www.oregon.gov/ODA/PLANT/WEEDS/statelist2.shtml.

Working list of priority non-native species for control at Maple Lane Natural Area (EDRR species common names are in bold)

GENUS	SPECIES	COMMON NAME	FOCUS AREA FOR DETECTION/CONTROL	CONTROL TIMING
Allarium	*petiolata*	**Garlic mustard**	All	Spring
Brachypodium	*sylvaticum*	**False brome**	All	Spring/Fall
Centaurea	*pratensis*	**Meadow knapweed**	Site edges	Summer
Cirsium	*arvense*	Canada thistle	Upland forest, site edges	Spring
Clematis	*vitalba*	Old man's beard	Upland forest	Spring/Fall
Conium	*maculatum*	Poison hemlock	Upland forest, site edges	Spring
Crataegus	*monogyna*	Common hawthorn	Upland forest, site edges	Fall
Cytisus	*scoparius*	Scotch broom	Upland forest, site edges	Fall
Daphne	*laureola*	**Spurge laurel**	All	Spring/Fall
Dipsacus	*fullonum*	Teasel	All	Spring
Hedera	*Helix*	English ivy	All	Winter
Ilex	*aquifolium*	Holly	Upland forest	Fall
Lunaria	*Annua*	Money plant	Upland forest	Spring
Polygonum	*cuspidatum*	Japanese knotweed	All	Summer
Robinia	*pseudoacacia*	Black locust	Upland forest	Fall
Rubus	*armenianus*	Himalayan blackberry	All	Fall
Solanum	*dulcamara*	Bittersweet nightshade	All	Spring

APPENDIX B | REFERENCES AND ADDITIONAL RESOURCES

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