A photograph of a Mariposa Woodland landscape. The foreground is a field of tall, dry, yellowish-brown grass. In the middle ground, there is a dense stand of trees with light-colored, gnarled trunks and sparse, yellowish-brown foliage. The background shows a clear blue sky. The entire image is framed by a thin black border.

Mariposa Woodland

MANAGEMENT PLAN

June 2009

Mariposa Woodland

MANAGEMENT PLAN

Prepared for

City of Eugene • Parks and Open Space Division • Natural Resources Section

1820 Roosevelt Blvd.

Eugene, Oregon 97401

www.eugene-or.gov/naturalresources

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June 2009

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1.0 Introduction and Background

1.1 Introduction

The Mariposa Woodland is a 29.5 acre component of the City of Eugene (City) owned Spencer Butte Park. The site extends along a narrow corridor approximately one-half mile in length between Willamette Street and the lower slopes of Spencer Butte (see Context Map). In addition to accommodating a key segment of the existing Ridgeline Trail, this site contains an area of unique habitat including areas of oak-pine woodland, savanna, and prairie. These habitat types have declined significantly in the Willamette Valley over the past century and are vulnerable to decline on the site as well without significant management intervention. This oak-pine woodland includes numerous large ancient Willamette Valley ponderosa pine, Oregon white oak, and California black oak as well as a high quality understory with a diversity of native grasses and forbs.

The City has identified this particular area for immediate habitat enhancement and management due to the high quality and diversity of the existing habitat and the likelihood of significant decline in quality if no management actions are taken.

In addition, because of its good public access via the Ridgeline Trail, this site is ideally situated to serve as a demonstration project of how oak-pine woodland, savanna, and prairie habitats can be enhanced and managed. Another unique feature to the site are the numerous large Willamette Valley ponderosa pine found there, some of which are thought to be nearly 500 years old (Darin Stringer, 2006) and are by far the largest and oldest ponderosa pine in Eugene Parks and Open Space ownership. In 2007, the Eugene Tree Foundation acknowledged the significance of these trees by designating the largest ponderosa pine on the site as a *Legacy Tree*.

The recently endorsed *Ridgeline Area Open Space Vision and Action Plan* (2008) highlights the importance of sites such as Mariposa Woodland for the preservation and enhancement of rare and declining habitat types; providing educational resources in close proximity to the metro area; and reducing wildfire danger on the urban fringe.

The management actions described in this plan include strategies for improving habitat conditions for heritage trees, enhancing and preserving oak-pine woodland and savanna conditions, prairie restoration, invasive species control, and recreational and access improvements. Heritage trees are a unique feature of this site; these mature, native trees, are thought to be old enough that they were likely to have been present at the time of Euro-American settlement, and indicate canopy composition at that time. The *Management Plan*



Mariposa Woodland

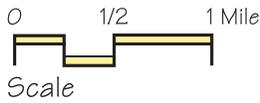
Heritage Tree

For the purpose of this report, the term *Heritage Tree* is used to refer to mature, native trees that are thought to be old enough that they would have been present at the time of Euro-American settlement. Heritage trees found on the site include specimens of ponderosa pine, Douglas-fir, California black oak, and Oregon white oak.

Legacy Tree

The Eugene Tree Foundation has designated the largest ponderosa pine on the site as a *Legacy Tree* to acknowledge its great size and age.

Mariposa Woodland Context Map



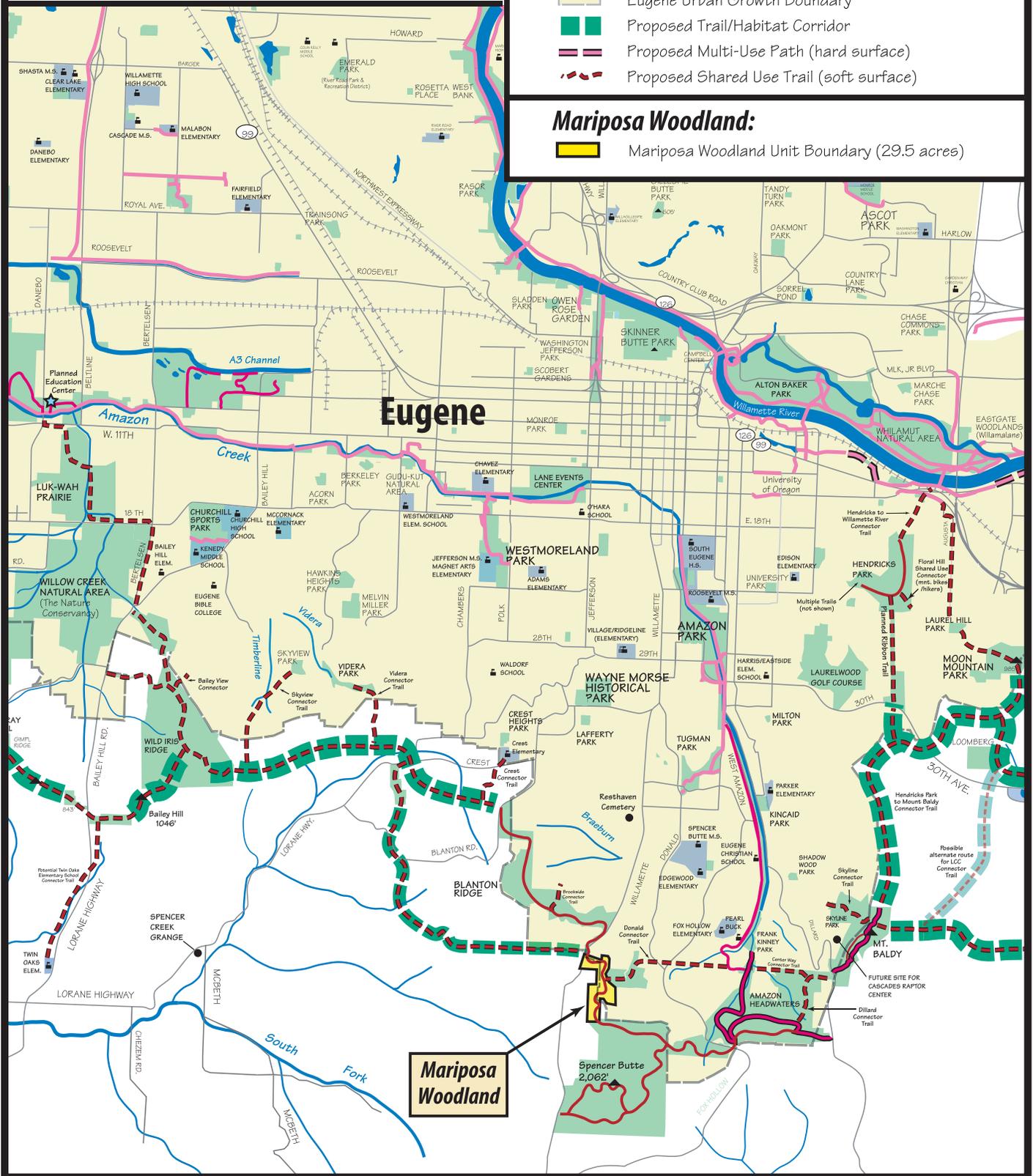
June
2008

Legend:

- Existing Park or Open Space (Public or TNC)
- Existing Multi-Use Path (hard surface)
- Existing Trail (soft surface)
- Existing Combined Hiking/Mnt. Bike Trail
- Major Waterways
- Eugene Urban Growth Boundary
- Proposed Trail/Habitat Corridor
- Proposed Multi-Use Path (hard surface)
- Proposed Shared Use Trail (soft surface)

Mariposa Woodland:

- Mariposa Woodland Unit Boundary (29.5 acres)



describes both short- and long-term actions and provides a context under which future management decisions can be made for this site and other similar sites within the Ridgeline Area. A degree of latitude has been written into the management strategies to allow flexibility for adaptive management and utilization of available funding sources.

1.2 Project Need

The City of Eugene Parks and Open Space Division is responsible for managing thousands of acres of natural area in and around the City including an increasing amount of upland prairie and oak-pine woodlands and savannas. As many as 200 species of wildlife have been reported to depend wholly or partially on Willamette Valley oak habitat or prairie (Campbell, 2004), including 45 species designated at-risk by U.S. Fish and Wildlife Service or the state of Oregon (Novick, 2002). Prairie and savanna habitats have been identified as some of the most endangered ecosystems in the United States (Noss et al, 1995) and are among the highest priority habitat types for conservation in Oregon (ODFW, 2006; TNC, 2004; ODF, 2001). Less than 1.5 % of Willamette Valley pre-European settlement savanna and prairie is estimated to be remaining today, with 98% of this remaining acreage in private ownership. In addition, a 2005 mapping effort identified only 461 acres of mixed oak-pine habitat remaining in the Willamette Valley (O'Neil et al., WV Oak Conservation Project, 2005). This habitat is quite rare on City lands. At Spencer Butte oak-pine habitat comprises only 2% of the acreage. With nearly 1/3 of the habitat at Mariposa Woodland identified as oak-pine, management for wildlife and plant communities dependent on these habitats provides an opportunity to conserve rare and declining biodiversity. The age of the stand and high quality of the understory raise the value of Mariposa Woodland as a regionally important conservation area even higher.

The dramatic decline in prairie, oak-pine savanna, and woodland in the Willamette Valley over the past 150 years has been attributed to a combination of factors including conversion of land to urban land uses and agriculture; wildfire suppression; and encroachment of exotic and native woody vegetation. Native Americans maintained these open ecosystem types through frequent low-intensity fires. In the absence of that fire regime, oaks are overtopped and shaded out by less fire resistant, but faster growing, conifers. At the same time, the native grasses and forbs are being overtaken by shade tolerant and non-native invasive species. In addition to shading, conifers such as Douglas-fir, grand fir, and cedar tend to compete for available water, weakening nearby oak and pine species and increasing their susceptibility to disease and insects. When stressed, the ponderosa pine is particularly vulnerable to beetles including the California five-spined Ips (*Ips paraconfusus*), red turpentine beetle (*Dendroctonus valens*) and western pine beetle (*Dendroctonus brevicomis*) (Stringer, 2006).



The City of Eugene Parks and Open Space Division is responsible for managing an increasing amount of prairie, woodland, and savanna habitats such as Wild Iris Ridge pictured above.

Without active management, it is believed that many of these remnant areas of savanna, woodland, and prairie found on City-owned lands such as Mariposa Woodland and elsewhere will continue to decline in extent and quality. Over the past five years, the City, TNC, Friends of Buford Park, and BLM have all gained valuable experience during habitat enhancement efforts on similar local sites including See-sil Savanna, Wild Iris Ridge, Buford Recreation Area, Hendricks Park, and Skinner Butte Park. Each of these projects included a component of heritage tree release, thinning, and invasive vegetation control, and lessons learned on these sites are being applied at Mariposa Woodland.

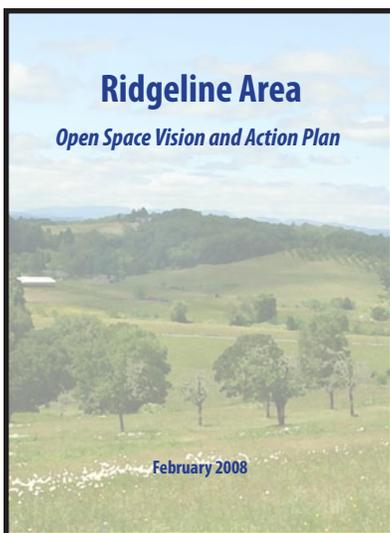
1.3 Plan and Policy Direction

In 2002, City Parks and Open Space Division staff initiated a planning process to identify a suitable publicly owned site where oak-pine savanna habitat management techniques could be implemented on a small scale as a pilot or demonstration project. This was in response to the growing quantity of savanna, prairie, and woodland habitats in City ownership and the need to determine best management practices for these areas that would both preserve habitat values and reduce the threat of catastrophic wildfire. Under this process, staff evaluated existing oak-pine habitat under City management throughout the ridgeline system and decided that Mariposa Woodland was the best suited area for the following reasons:

- It represents one of the higher quality oak-pine savanna and woodland areas remaining in Eugene's Parks and Open Space system and retains much native understory diversity;
- It includes the oldest remaining ponderosa pines in City of Eugene ownership;
- It is accessible by an existing trail, lending itself well to educational outreach;
- It is a good representative example of the kind of habitat and management issues that the City is facing in similar sites elsewhere; and
- There is an opportunity to complement the habitat enhancement work already being undertaken by an adjacent property owner to the west.

Having selected a site, City staff produced an Interim Management Plan for Mariposa Woodland in April 2006, which forms the basis for this updated management plan.

No formal Master Plan has been completed for Spencer Butte Park, in which Mariposa Woodland is located. However, in February 2008, the *Ridgeline Area Open Space Vision and Action Plan* was completed which provides a level of general policy direction and recommended management actions that can be applied to Spencer Butte Park and Mariposa Woodland. Creation of the *Ridgeline Area Vision and Action Plan* was facilitated by Lane Council of Governments (LCOG) through a partnership including the City, the U.S. Bureau of Land Management, The Nature Conservancy, McKenzie River Trust, Long Tom Watershed Council, Lane County Parks, and Willamalane Park & Recreation District and subsequently endorsed by the Eugene and Springfield City Councils, the Lane County Board of Commissioners, and Willamalane Board. Many of the specific habitat management actions included in this plan are based on this document (www.lcog.org/ridgeline).



The *Ridgeline Area Open Space Vision and Action Plan* provides general policy direction for long-term management of Mariposa Woodland.

Key recommendations from this Vision and Action Plan that relate to the site include:

- *Protect, manage, and enhance unique native habitat types within the Ridgeline Area including at risk plant and wildlife communities with special attention given to rare or declining habitats such as prairie, oak-pine savanna; oak woodland; headwater forests; and older coniferous forests (see Habitat Conservation and Management Goal 1) .*
- *Focus habitat conservation efforts on preserving large blocks of high quality habitat that are contiguous to existing conservation areas (see Habitat Conservation and Management Goal 1, Section C).*
- *Develop detailed management plans for public and land trust properties to help guide long-term site maintenance and enhancement activities and budgeting for those activities. Management plans should include documentation of key site attributes; conservation issues and threats; habitat management goals; and a schedule of routine and long-term management actions. (see Habitat Conservation and Management Goal 2, Section A).*
- *Use a variety of management techniques to enhance and preserve habitat quality including weed management; enhancement of native vegetation; maintenance of habitat structure; and management of specific habitat features for special status species (see Habitat Conservation and Management Goal 2, Section C).*
- *Implement habitat management demonstration projects to test and showcase management approaches (see Habitat Conservation and Management Goal 2, Section D).*
- *Provide direct trail connections between the existing and planned Ridgeline Trail system and adjacent neighborhoods; schools; parks and open spaces; and key community attractions (see Recreation Goal 3).*
- *Donald Connector: Provide a trail connection from the existing headwaters trail, westward along the BPA power corridor and through the upper Donald Road neighborhood to the existing Ridgeline Trail (see Recreation Goal 3, Section A).*
- *Design and site new trails and upgrade existing trails in a way that creates an exceptional trail experience; avoids direct visual access to nearby roadways, homes, and other urban features; minimizes damage to natural resources; limits potential for trespass on adjacent private properties; and provides adequate surfacing for all-season use (see Recreation Goal 4, Section A).*
- *Improve security of trails and trailheads (see Recreation Goal 5).*
- *Utilize the natural and cultural resources of the Ridgeline Area as an educational resource (see Recreation Goal 11).*
- *Work to reduce the risk of damaging wildfires in the Ridgeline Area (see Urban-Rural Transition Goal 2).*

1.4 Independent Technical Review

In March 2009, the City requested independent technical review of this Management Plan by over twenty research scientists and land managers representing federal, state, and non-profit organizations within the Willamette Valley. The input provided by this technical review team has been incorporated into the plan.

2.0 Site History and Existing Conditions

2.1 Mariposa Woodland Site Description

Mariposa Woodland is a component of the larger City-owned Spencer Butte Park. Totalling 29.5 acres, the site extends from Willamette Street on the south along a narrow corridor, following a well defined ridgeline



The Spencer Butte summit is approximately one mile north of Mariposa Woodland and is visible from the Ridgeline Trail as it passes through the site's prairie.

toward the lower slopes of Spencer Butte. The site transitions through a series of habitat types including prairie, oak-pine savanna and woodland, and closed canopy forest. The wide range of habitat types found on this relatively small site contributes to the great diversity of plant and animal species found here. The segment of the Ridgeline Trail that crosses the site provides an interesting user experience as visitors pass through various habitats. Of particular interest from both a habitat and trail user perspective are the numerous large Oregon white oak, California black oak, Douglas-fir, and Willamette Valley ponderosa pine found in close proximity to the trail.

2.2 Site History

Historic vegetation mapping (Christy et al. 1999 based on the General Land Office surveys of the 1850s) shows that the area was historically dominated by oak-pine savanna with transitional pockets of prairie and Douglas-fir woodland. It is important to acknowledge the transitional characteristics of the site so that management strategies can be developed that capture this dynamic and the associated plant and animal diversity. It is widely believed that the native Americans practiced regular burning of understory vegetation in the area in order to improve conditions for hunting, gathering, and possibly travel. These frequent fires were the major disturbance factor that helped maintain savanna and prairie condition by limiting the invasion of less fire resistant conifer species (Thilenius 1968, Taylor and Boss 1975, Kertis 1986, Agee 1990). As Euro-American settlers moved into the valley beginning in the mid 1800s and began suppressing fires, savannas and prairie began a steady decline as the closed canopy forests expanded and as land was converted to agricultural and urban uses.

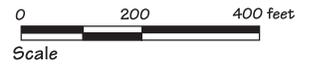
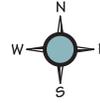
The oldest known historic aerial photo of the area around the site is from 1940 (see photo). This photo shows the site in a relatively open condition at that time with a mix of widely scattered trees (primarily pine and oak), open agricultural land or pasture, and a small orchard. The very southern edge of the site appears to be more densely forested and includes some mature conifers. Comparison of this aerial photo with current site conditions shows that conifer encroachment into this area

Mariposa Woodland

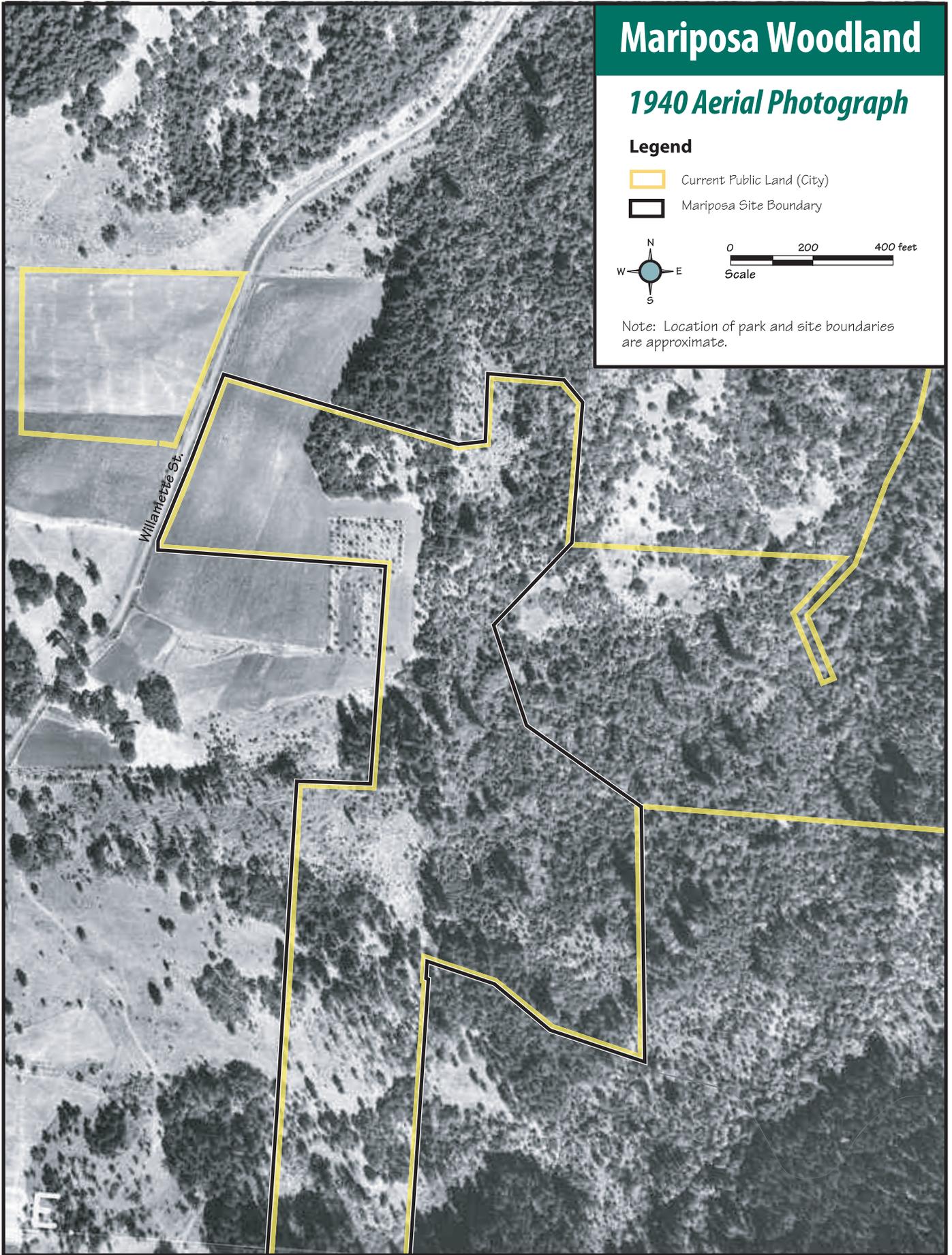
1940 Aerial Photograph

Legend

-  Current Public Land (City)
-  Mariposa Site Boundary



Note: Location of park and site boundaries are approximate.





2008 management activities included fence removal, exotic vegetation control, mowing in the prairie (above), and parking area improvements (above in the distance).

has been significant over the past several decades. The most recent major change to the site occurred approximately five years ago with the logging of 1.5 acres along the western edge of the site, prior to City acquisition.

2.3 Recent Management Activities

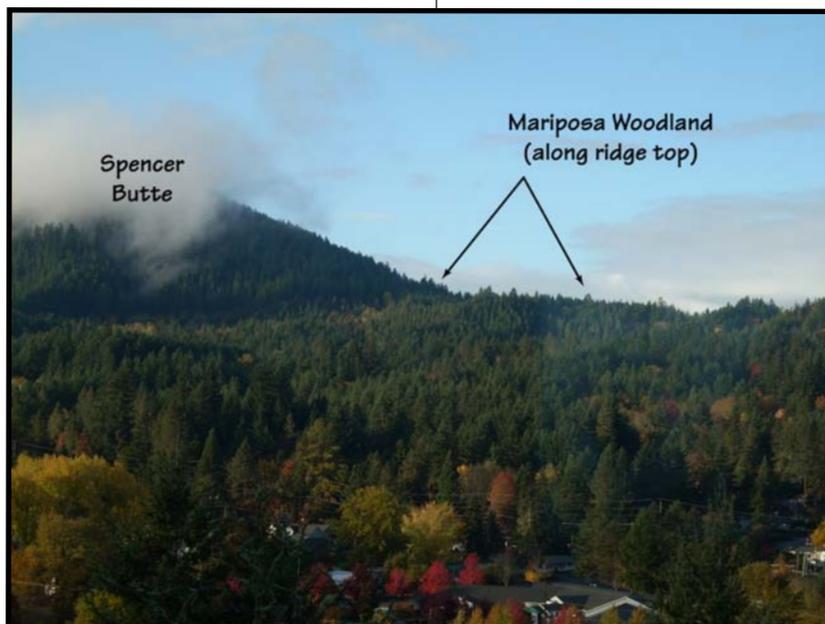
Management activities on the site have been fairly limited in the area. Recent management and maintenance activities on the site have included:

- Annual or bi-annual mowing of prairie areas near parking area to control exotic and woody vegetation.
- Parking lot improvements including gravel surfacing, drainage, and planting.
- Installation of a kiosk and trail route make adjacent to parking area.
- Spot weed control, primarily isolated pockets of false brome and tall oat grass.
- Trail improvements including gravel surfacing and water bar installation to improve wet season use.

2.4 Topography and Surface Hydrology

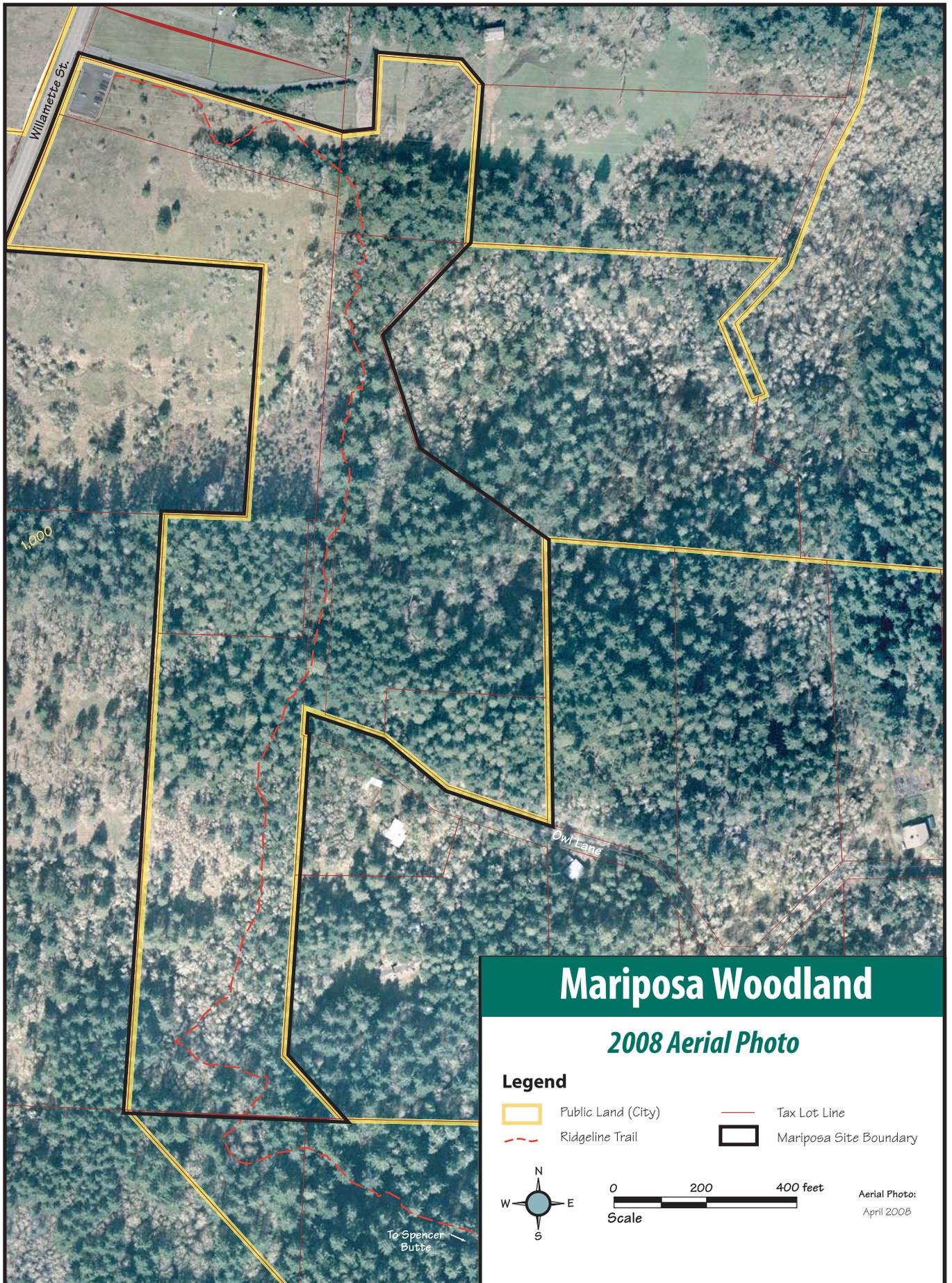
Mariposa Woodland is located on the slopes below Spencer Butte, straddling a ridgeline that separates the Spencer Creek and Amazon

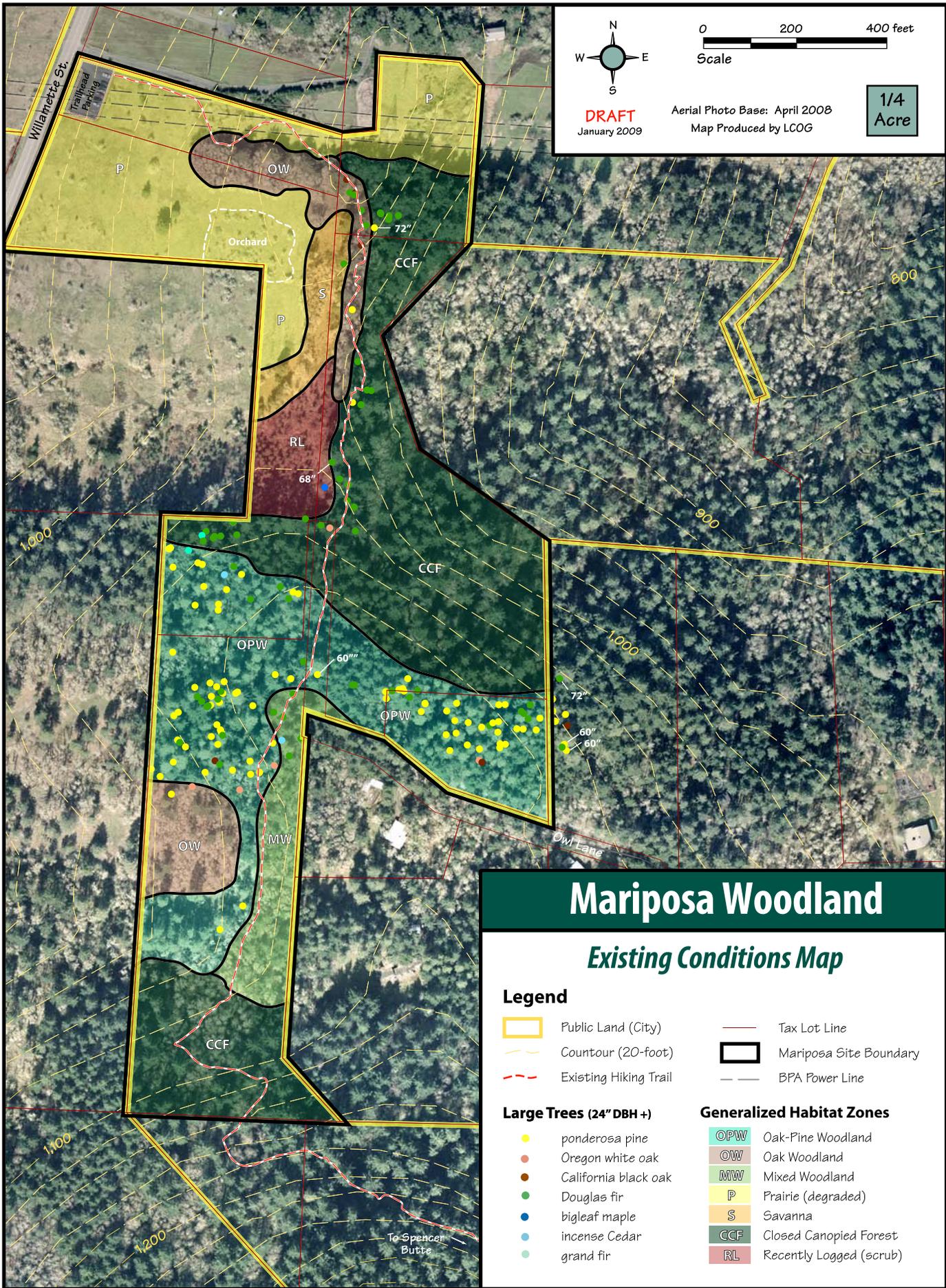
Creek watersheds. The site's elevation ranges from 956 feet at the north end (on Willamette Street) to approximately 1,164 feet at the southern end, with an average slope of approximately 10% and with a few flatter areas along the ridge top. Because the site sits atop the ridgeline, about half of the area has slopes that are generally westward facing, and the other half with slopes that are generally eastward facing. The west facing slopes tend to experience relatively dry summer conditions, while the east facing slopes remain cooler and wetter. This has resulted in the development of denser closed canopy forests on the east, with more open woodland, savanna, and prairie habitats persisting on the west.



The ridge top in Mariposa Woodland can be seen from the distance (photo taken from the northeast)

Because of its location near the ridge top, there are no significant waterways or seeps located on the site and based on soil surveys data and field observation, no wetlands are present.





N
 W — E
 S

0 200 400 feet
 Scale

DRAFT
 January 2009

Aerial Photo Base: April 2008
 Map Produced by LCOG

1/4 Acre

Mariposa Woodland

Existing Conditions Map

Legend

 Public Land (City)	 Tax Lot Line
 Contour (20-foot)	 Mariposa Site Boundary
 Existing Hiking Trail	 BPA Power Line

Large Trees (24" DBH +)

- ponderosa pine
- Oregon white oak
- California black oak
- Douglas fir
- bigleaf maple
- incense cedar
- grand fir

Generalized Habitat Zones

 OPW	Oak-Pine Woodland
 OW	Oak Woodland
 MW	Mixed Woodland
 P	Prairie (degraded)
 S	Savanna
 CCF	Closed Canopied Forest
 RL	Recently Logged (scrub)

2.5 Soils

The majority of the site is mapped by the Lane County Soil Survey (1987) as having the soil classification [43C-E] Dixonville-Philomath-Hazelair complex. This is the soil type that is also dominant on the City-owned Wild Iris Ridge site approximately three miles to the west, which contains similar habitat types. This soil type is described as being shallow to moderately deep (12-40 inches to bedrock), well drained, and having a high potential for erosion due to rapid runoff. The site also contains an area of [41C-F] Dixonville silty clay loam along the steeper southern edge of the site. This soil has a depth to bedrock of about 20 to 40 inches with slow rate of permeability, with exposed bedrock evident in some locations.

2.6 Vegetation Communities

As previously mentioned, this area has long functioned as a transitional zone between habitat types and this is still the case. The site now contains a diverse mix of vegetation communities, which have resulted from of the site's varied orientation to the sun and previous management activities such as logging, agriculture, and fire suppression. Even though the habitat types have been mapped, it should be noted that in most cases there is a gradual transition between these areas. In addition to the habitat types, the locations of approximately 170 of the larger trees (over 24" dbh) have been mapped including several pine and fir in excess of five feet in diameter. The location and species composition of these larger trees is a key factor for interpreting site history and helping determine management actions. It is important to note that size is not a true indication of age, because not all species grow at the same rate. For example, a 24 inch dbh Oregon white oak may be nearly 150 years old, while the same diameter Douglas-fir may be only 50 years old. Understanding the patterns of these trees on the site informs interpretation of historic conditions and changes in the canopy since European settlement.



Savanna edge and prairie with orchard trees (left)

The following habitat types are currently found on the site:

2.6.1 Upland Prairie

The northern end of the site contains approximately eight acres of prairie habitat, located in the area adjacent to Willamette Street and under the BPA power lines. This portion of the site is dominated primarily by a non-native grass and forb community, though some native species remain. Young trees, Armenian blackberry, and Scot's broom are beginning to colonize the area, and the remnants of a small apple and pear orchard are also present.

2.6.2 Oak-Pine Savanna

Within the Willamette Valley, savanna can be described as areas of widely scattered open grown trees such as California black oak

(*Quercus kelloggii*), Oregon white oak (*Quercus garryana*), and Ponderosa pine (*Pinus ponderosa*) with an understory of grasses and forbs similar to that found in an upland prairie habitat. Scattered shrubs are also a common component of a savanna. Tree canopy cover in a savanna typically ranges between 5% and 30% (Campbell, 2004).



Recently logged area

Savanna habitat on the site is limited to a narrow band approximately 1.3 acres in size, immediately adjacent to the prairie areas. Trees in this area have grown to maturity in this open landscape setting and exhibit an open-grown canopy due to the ample access to sunlight. As is the case with the adjacent prairie habitat, the grass and forb component of this savanna is quite degraded, although native species are present in small quantities.

2.6.3 Recently Logged Area (Scrub)

An area of approximately 1.5 acres along the western edge of the site (see Existing Conditions Map) was logged in recent years prior to City acquisition and was replanted with a densely spaced stand of ponderosa pine. In addition to the pine, the area contains numerous young bigleaf maples that have sprouted from the stumps and dense thickets of Armenian blackberry, Scot's broom, and other exotic vegetation.



Oak-pine woodland

2.6.4 Woodland

Woodlands are characterized by an open to moderately closed canopy generally dominated by Oregon white oak, often with a component of ponderosa pine, California black oak, and/or Douglas-fir. In general, the understory of a woodland is relatively open with shrubs, grasses and wildflowers. The tree canopy of an oak woodland typically obscures between 30% and 70% of the sky as one looks up (Oregon Conservation Strategy, ODFW, 2006). Woodland is one of the most common habitat types present on the site, with three distinctive variations present:

Oak-Pine Woodland: Once common, but now quite unique in the Willamette Valley, approximately 8.0 acres of oak-pine woodland are present on the central portion of the site. This area contains a large number of mature Ponderosa pine, many in excess of three feet in diameter and several in excess of five feet in diameter. It is estimated that the larger pine in this area are nearly 500 years old. The area also includes a number of other large mature tree species including Oregon oak, California black oak, Douglas-fir, grand fir, and incense cedar. Portions of the oak-pine woodland also contain dense stands of young Douglas-fir and grand fir, which will likely threaten the long-term survival of the oak and pine in this area over time. Douglas-fir, which grows five times faster than oak,

tend to overtop the oaks and pine, competing for sunlight and water. In addition, the dense thickets of young trees tend to create a wildfire hazard, which could threaten the heritage pine, fir, and oak as well as homes on the urban fringe.

The understory in this area is also quite unique in terms the diversity of native grasses and forbs and lack of exotic vegetation. Examples of some of the more unique forbs found in this area include *Nemophila douglassii*, *Lomatium utriculatum*, *Achillea millifolium*, *Eriophyllum lanatum*, *Wyethia angustifolia*, *Fragaria virginiana*, *Calochortus tolmeii* and others. There are healthy populations of several native grasses as well, including *Festuca roemerii*, *Festuca californica*, *Elymus glaucus*, and *Danthonia californica*.

The two major threats to the long-term survival of this native grass and forb community are increased shading from Douglas-fir and invasion by aggressive exotic species into the understory. Isolated pockets of very aggressive invasive species have been noted in the area and include orchard grass (*Dactylis glomerata*), lemon balm (*Mellisa officinalis*), geranium (*Geranium lucidum* and *Geranium robertianum*), and false brome (*Brachypodium sylvaticum*) and will become a major threat to the native species if allowed to spread.

Oak Woodland: Two quite distinctive patches of oak woodland, totaling approximately 1.8 acres, are present on the site. These areas differ from the oak-pine woodland described above in that they are dominated by Oregon white oak and California black oak and contain very few Ponderosa pine. The oak woodland patch that is located near the site's northern end lies immediately adjacent to the Ridgeline Trail. This area contains numerous open grown oaks, interspersed with small and medium sized Douglas-fir and is surrounded by prairie. The understory in this area is a mix of native and non-native species. The second patch of oak woodland is located in the northwest portion of the site and contains mostly younger oak with a very diverse understory of mostly native grass and forb species, very similar to that found in the adjacent oak-pine woodland. Soils in this area are quite thin, with areas of exposed basalt evident. This area is immediately adjacent to a private property to the west that has been managed for oak habitat value in recent years.



The southern patch of oak woodland habitat, pictured above, contains mostly younger oaks and an understory containing a diversity of native grasses and forbs.

Mixed Woodland: Found primarily along the ridge top on the eastern edge of the site, the mixed woodland area contains an assortment of oak, maple, pine, fir, vine maple, and hawthorn, with an understory containing more shade tolerant species such as sword fern, hazelnut, snowberry, ocean spray, and Oregon grape.



Closed canopied forest

2.6.5 Closed canopy Forest

Closed canopy forest consists of dense tree cover that obscures most sunlight from reaching the forest floor. The closed canopy forest on the site totals approximately 9 acres and is dominated by dense stands of Douglas-fir and bigleaf maple with the typical suite of shade tolerant understory species such as vine maple, sword fern, licorice fern, and Oregon grape. The closed canopy forest on the site is located primarily on the shadier north and east facing slopes and is typical of the habitat found across most of Spencer Butte Park.

2.7 Adjacent Land Uses

Mariposa Woodland is located in the transitional area between the urban and rural landscape along the south edge of Eugene and straddles the metropolitan urban growth boundary (UGB). City park lands border the site on the south and east and are primarily in closed canopy coniferous forest cover. The western edge of the site is abutted by several home sites on large lots (accessed from Willamette Street) and the eastern edge is abutted by some additional homes (accessed from Owl Road). The BPA power corridor and transmission lines cross the northern edge of the site and pass directly over the parking area.



The Ridgeline Trail as it passes through Mariposa Woodland

2.8 Site Access

The site can currently be accessed by the public for recreational purposes via the existing Ridgeline Trail which crosses the site from north to south, connecting Spencer Butte with the Willamette Street trailhead. The trailhead includes a gravel parking area, which can accommodate approximately 15 vehicles. Additional public access onto the site in the future may also include a connector trail from the Donald Street area, which has been proposed to provide better neighborhood connectivity.

The primary point for accessing the site for management and maintenance purposes is from the Willamette Street trailhead area, where access can be provided by foot via the existing trail or across the prairie area for vehicles during the summer months. This is a key access point for routine mowing and other vegetation management activities onto much of the site. Two additional options exist for accessing the site for future management activities. The first would be from Owl Lane and the associated public right-of-way, which could provide access the eastern portion of the site for vegetation management as needed. The second option would be across private property from the west. This access could be utilized for management activities in the southwestern portion of the site, but would require property owner approval.

3.0 Issues and Opportunities

3.1 Habitat

Issues:

- Invasive exotic species such as Armenian blackberry, Scot's broom, Canada thistle, lemon balm, shining geranium, and false brome are present in varying quantities across the site.
- Without management, the recently logged area has become heavily colonized by exotic vegetation.
- Relatively little quantitative baseline vegetation data has been gathered for the site.
- Most of the prairie and savanna areas are dominated by exotic grasses.
- A lack of fire or disturbance has resulted in the gradual conversion of oak-pine savanna and woodland habitat to more heavily forested habitat dominated by Douglas-fir.
- The canopy density in much of the oak-pine and oak woodland is gradually becoming denser, allowing less light through. Some sunlight is key for long-term survival of many of the native understory grass and forb species currently present.
- A small population of *Eucephalus vialis* (listed as *threatened* Oregon), is located along the trail and is currently in decline, likely due to excessive shading.

Opportunities:

- Mariposa Woodland serves as an ecotone between several habitat types due to its unique topographic location. These types of natural transition zones are characterized by high plant and wildlife diversity.
- Remnant patches of oak-pine woodland exist in several locations on the site. The native grass and forb component in much of this area is very diverse.
- At least 170 trees that are 24 inches in diameter (dbh) or larger have been identified on the site. These larger trees are primarily ponderosa pine and Douglas-fir, but also include California black oak, Oregon white oak, grand fir, bigleaf maple, and incense cedar. The largest of these trees include ponderosa pine of 62 and 72 inches in diameter and Douglas-fir measuring 68 inches in diameter. Some of the larger pines are estimated to be nearly 500 years old (Darin Stringer, 2006). Two 60 inch diameter pine and a 72 inch diameter fir are located on private property just to the east of the site boundary.
- An adjacent property owner to the west of the site is managing their property as savanna habitat and has recently completed significant thinning, leaving larger oak and pine. This area also contains relatively high quality grass and forb composition.
- Ponderosa pine planted in the recently logged area are the variety native to the Willamette Valley and can be managed as savanna habitat between the oak-pine woodland to the south and prairie to the north.
- The site contains patches of upland prairie, savanna, and oak-pine woodland, all increasingly rare habitat in the Willamette Valley.
- The grass and forb component present in the woodland/savanna areas along the south and west edge of the site has very good native composition and diversity, benefiting native wildlife.
- The site provides diverse and relatively high quality habitat for a variety of wildlife species. Although no formal wildlife surveys have been conducted for the site, abundant native bird populations have been noted.
- Mariposa Woodland contains habitat features for several species of conservation concern, including Western gray squirrel, white-breasted nuthatch, and acorn woodpecker.
- Pileated Woodpeckers have been observed nesting in the oak-pine savanna areas and likely move back and forth between the savanna, woodland and forested habitats.
- The site's west facing slopes, shallow soils, and exposed bedrock provide good habitat for reptiles.
- The site lies immediately adjacent to a large permanently protected natural area including Spencer Butte Park and the Ridgeline Trail system, totaling nearly 1,000 acres.
- The site functions as an important wildlife corridor in the Ridgeline Area.

3.2 Access

Issues:

- Vehicle access onto the site for maintenance and management activities is difficult or not possible in some areas. Seasonal access utilizing public land is currently feasible from the Willamette Street parking area and the Owl Lane public right-of-way. Access to the western edge of the site may also be possible from private land with property owner approval.
- The Ridgeline Trail in this area tends to be fairly wet in the winter, resulting in trail braiding in areas.
- The trail segment located under the power lines has a relatively steep grade and is very close to the private property to the north.

Opportunities:

- Trail access is available to much of the site.
- A feasible alternative trail alignment exists for potential re-alignment of the Ridgeline Trail segment, which is now located under the power lines and immediately adjacent to a neighboring property.
- The Owl Road right of way could be utilized for a trail connection from that neighborhood in the future.

3.3 Recreation and Education

Issues:

- Recreational users could negatively impact sensitive vegetation in this area if they venture off the main trail.
- Auto break-in and vandalism have been a significant problem at the Willamette Street trailhead in recent years. Parking area safety has been expressed as a concern of area neighbors.

Opportunities:

- Opportunities are abundant for environmental education and interpretation focused on savanna restoration, native vegetation, and the historic Willamette Valley ecosystem.
- A trail connection is feasible between the Ridgeline Trail and Donald Street. This connection would provide direct access to the Ridgeline Trail for the Donald Street neighborhood.

3.4 Maintenance

Issues:

- Access onto much of the site by maintenance vehicles is limited.
- Prescribed burning may be a useful management tool for the site, especially for savanna and prairie habitats, but would need to be weighed against risks to proximate structures, the Ridgeline Trail, and Willamette Street.

Opportunities:

- The BPA power corridor could be maintained as prairie habitat, which would be consistent with BPA's need to limit tree and shrub growth below the power lines and the City's desire to minimize wildfire hazard. BPA maintenance crews could assist with this maintenance task as has been done at Wild Iris Ridge.

4.0 Desired Future Condition

The Vision for Mariposa Woodland

The long-term vision for Mariposa Woodland can best be described from the perspective of a visitor passing through the site along the popular Ridgeline Trail. Beginning at the Willamette Street trailhead, a visitor will begin their hike in an area of restored native prairie, with an abundance of native grasses and forbs including an eye catching display of wildflowers in the spring and early summer. This area will showcase successful prairie restoration techniques and provide open views of Spencer Butte, their destination for the day. The song of Oregon's state bird, the Western Meadowlark, may be heard in the distance. The trail will follow its new alignment, moving gradually uphill through the prairie and past the remnants of a long abandoned orchard, a testament to former uses of this land. From here, the trail will continue through a savanna edge containing large widely spaced oaks with open spreading canopies. The rustle and chatter of Western gray squirrels and the call of songbirds such as the White-breasted Nuthatch and Western Bluebird will mark this transition from prairie to savanna. As the trail continues south along a well defined ridge top, the user will note the dense forested area on the shadier side of the ridge (east facing slope) and the more open wooded area on the sunnier side of the ridge (west facing slope). Along this trail segment, numerous large specimens of pine, oak, and fir are present, several of which are in excess of five feet in diameter. As the visitor continues up the ridgeline, the area on the trail will begin to open up into a pine-oak woodland with a diversity of native grasses and wildflowers present throughout this area. The visitor may hear the distinct call of the Pileated Woodpecker moving back and forth through this valuable ecotone. Finally, the call of the winter wren will guide the visitor up the trail as they pass back into a dense coniferous forest dominated by fir, maple, and sword fern as they continue on toward Spencer Butte.



5.0 Management Goals

The management actions described in this plan are intended to help the site achieve the vision described above and will serve as a model for other similar sites in the region. Because necessary funding to achieve the full vision as described is currently limited, higher priority actions have been identified to focus immediate action. Lower priority actions will be implemented over time as additional funding is secured.

The purpose of this *Management Plan* is to provide direction for the short- and long-term management of the site's plant communities,

habitats, and facilities. A series of goals have been developed to direct these activities under the following categories:

- Habitat Management;
- Monitoring and Mapping;
- Public Access and Recreation;
- Neighborhood Interface;
- Access and Maintenance; and
- Adaptive Management.

Each goal is supported by a set of objectives, which describe how the goal will be attained. Each of the objectives includes indicators that will be used to help assess when objectives have been met. Due to the range in condition of this site's habitats, a degree of latitude has been written into the plan to allow for flexibility that responds to localized condition.

5.1 Habitat Management Goals

The oak-pine woodland will be managed to preserve large oaks and pine and native woodland understory.



A total of six distinctive habitat types can be found on the site. Each of these areas will be managed differently to achieve the long-term goals for the site. In the short-term, the preservation of the site's numerous heritage trees and diverse woodland and savanna understory are the top priority actions for the site, along with the control of invasive species. A longer term habitat goal for the site will be the enhancement of the native

composition in the prairie areas and expansion of the savanna habitat. The mixed woodland and closed canopy forest areas will remain largely unchanged, with control of invasive species being the primary action there. The following habitat goals, objectives, and indicators are organized by habitat type in order of priority:

Goal 1: Oak-Pine Woodland

Enhance oak-pine woodland habitat structure, placing priority on preserving large ponderosa pine (*Pinus ponderosa*) and oak (*Quercus garryana* and *Quercus kelloggii*) and preserving the existing diverse native understory.

Objective 1a. Maintain and enhance the structure of existing oak-pine woodland. This will be achieved by selective tree removal and thinning. Thinning will focus on younger trees, exotic trees, and conifers, leaving some of the younger oak and pine to serve as *replacement* trees as appropriate. Some of the larger trees targeted for removal may be girdled and left in place to function as habitat snags. [Refer to area coded as OPW on the *Management Plan* map]

Indicator: 100% of the non-native tree species are removed.

Indicator: Douglas-fir, grand fir, and bigleaf maple combined do not exceed more than 25% of the total tree cover within this habitat. To achieve this, approximately 75% of the existing younger Douglas-fir, grand fir, and bigleaf maple (6 inches

or less in diameter) will be removed and approximately 50% of the medium sized Douglas-fir, grand fir, and bigleaf maple (between 6 and 24 inches in diameter) will be removed or girdled. Trees 18-24 inches in diameter that are girdled will be left as standing snags, providing cavity nesting habitat for oak-associated bird species. The larger (> 24 in. DBH) Douglas-fir, grand fir, and incense cedar will be left as a component of the woodland.

Objective 1b. Ensure the long-term health and survival of the large heritage trees located in this area. This will be achieved through thinning and removal of the younger trees that area in close proximity to the heritage trees to limit competition.

Indicator: No seedlings or saplings of tree species other than oak or pine are located within the drip-line of the larger pine and oak in this area. Saplings of oak and pine may occur at low densities in these areas, but should not compete with the mature oak and pine.

Indicator: Conifers directly competing with oaks or pines for sunlight and water will be prioritized for treatment. Crown contact is a valuable indicator of competition as noted by PNW Research Station data.

Indicator: The Ridgeline Trail is located at least fifteen feet from the base of the Eugene Tree Foundation designated *Legacy ponderosa* pine. It is currently very close and is likely causing soil compaction, so would need to be relocated slightly to the west.

Objective 1c. Manage the oak-pine woodland understory to protect the high native species composition and diversity that currently exists in much of this area. This will be achieved through a combined approach of invasive species control, mowing, burning, supplemental grass and forb planting (plugs and seed), and tree thinning to allow adequate light to reach the ground (see objectives 1a and 1b).

Indicator: The understory is dominated by native plant species (relative percent cover). Areas dominated by non-native species are stable or decreasing in extent.

Indicator: Native species diversity is stable or increasing.

Indicator: Aggressive non-native species are treated annually or as appropriate by species. This includes Armenian blackberry, Scot's broom, shining geranium, English ivy, lemon balm, and false brome.

Indicator: No new exotic species are establishing.

Indicator: Native grass and forb species are seeded into 100% of the area where ground disturbance occurs during forest thinning to help limit the risk of invasive species colonizing these areas.



Narrow-leaf mule's ears
(*Wyethia angustifolia*)



Oak woodlands will be managed to enhance habitat structure, control exotic vegetation, and improve native understory composition.



Royal rein orchid
(*Piperia transversa*)

Goal 2: Oak Woodland

Enhance oak woodland habitat structure to ensure long-term survival of the oak and enhance and preserve the native understory condition.

Objective 2a. Maintain and enhance the structure of existing oak woodlands.

This will be achieved by limiting new tree growth within these areas and selective tree removal and thinning. Thinning will focus on younger trees, exotic trees, and conifers, leaving some of the younger oak and pine to serve as *replacement* trees as appropriate. [Refer to areas coded as O1 and O2 on the *Management Plan* map]

Indicator: Douglas-fir, grand fir, and bigleaf maple combined do not exceed more than 10% of the total tree cover within this area.

Indicator: Conifers directly competing with oaks or pines for sunlight and water will be prioritized for treatment. Crown contact is a valuable indicator of competition as noted by PNW Research Station data.

Indicator: 100% of the non-native tree species are removed.

Indicator: No seedlings or saplings of tree species other than oak or pine are located within the drip-line of the larger pine and oak in this area. Saplings of oak and pine may occur at low densities in these areas, but should not compete with the mature oak and pine.

Objective 2b. Manage the understory within the oak woodland on the western edge of the site to protect the high native species composition and diversity that currently exists in this area. This will be achieved through a combined approach of weed control; mowing; burning; supplemental grass and forb planting (plugs and seed); and tree thinning to allow adequate light to reach the ground. [Refer to area coded as O1 on the *Management Plan* map]

Indicator: The understory is dominated by native plant species (relative percent cover). Areas dominated by non-native species are stable or decreasing in extent.

Indicator: Native species diversity is stable or increasing.

Indicator: Non-native composition is stable or decreasing.

Indicator: Aggressive non-native species are treated annually or as appropriate by species. This includes Armenian blackberry, Scot's broom, shining geranium, English ivy, lemon balm, and false brome.

Indicator: No new exotic species are establishing.

Indicator: Native grass and forb species are seeded into 100% of the area where ground disturbance occurs during forest thinning to help limit the risk of invasive species colonizing these areas.

Objective 2c. Manage the understory of the oak woodland located on the north end of the site to control exotic vegetation. This would be achieved by a combined approach of cutting and herbicide application. [Refer to area coded as O2 on the *Management Plan* map]

Indicator: Non native trees and shrubs such as cherry, pear, Armenian blackberry, English hawthorn, Scot's broom, laurel, and holly are removed and comprise of no more than 10% cover.

Indicator: Highly invasive species such as false brome, Harding grass, English ivy, and shining geranium are eradicated if found in this area.

Indicator: Native grass and forb species are seeded into 100% of the area where ground disturbance occurs during forest thinning to help limit the risk of additional invasive species colonizing these areas.

Goal 3: Savanna

Preserve and expand the savanna area and enhance the understory condition. Total savanna area will be expanded from approximately 1.3 acres to 3.8 acres over the long-term.

Objective 3a. Retain the savanna structure within the existing narrow band of mapped savanna located on the northwest edge of the site. [Refer to area coded as S1 on the *Management Plan* map]

Indicator: Oaks and pines are retained at a target savanna density of between 5 and 20 trees per acre in this area (5-50% cover).

Indicator: 100% of the non-native tree species are removed.

Indicator: Conifers directly competing with oaks or pines for sunlight and water will be prioritized for treatment. Crown contact is a valuable indicator of competition as noted by PNW Research Station data.

Indicator: No seedlings or saplings of tree species other than oak or pine are located within the drip-line of the larger pine and oak in this area.

Indicator: Saplings of oak and pine occur at low densities in the oak savanna.



The savanna will be allowed to expand into the adjacent prairie over time.

Objective 3b. Allow the existing savanna to expand into the adjacent prairie area by approximately one acre over time. [Refer to area coded as S2 on the *Management Plan* map]

Indicator: Selected oak and pine seedlings that are sprouting in this area are identified and allowed to grow. These trees will be marked in the field in a way that will prevent accidental mowing.

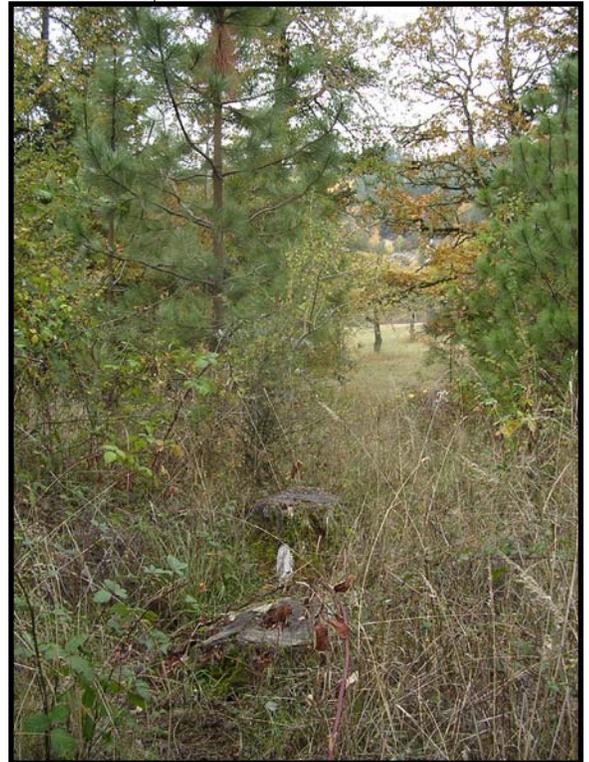
Indicator: Oaks and pine are allowed to grow at a target savanna density of between 5 and 10 trees per acre in this area (5-25% cover to drip line when mature). A higher number of trees per acre may be retained initially and thinned over the long-term.

Objective 3c. Convert recently logged area to a savanna condition by removing young pine, maple, and exotic vegetation (Armenian blackberry and Scot's broom). Selected pine and oak will be retained at savanna densities. [Refer to area coded as S3 on the *Management Plan* map]

Indicator: Average target tree density in savanna areas should be approximately 5-10 trees per acre (5-25% cover to drip line).

Indicator: No seedlings or saplings of tree species other than oak or pine are located within this area.

Indicator: 100% of the disturbed area is seeded with native grasses and forbs.



The recently logged area will be thinned to savanna density and exotic vegetation will be controlled.

Objective 3d. Over the long-term, restore a native grass, forb, and shrub component to highly degraded savanna areas. This will be achieved through a combination of broadcast herbicide application (possibly grass specific in areas), spot herbicide application, mowing, burning, and introduction of native grasses and forbs (plugs and seed) and native shrubs (bare root or container). [Refer to areas coded as S1, S2, and S3 on the *Management Plan* map]



Indicator: The understory is dominated by native plant species (relative percent cover). Areas dominated by non-native species are stable or decreasing in extent.

Indicator: Native species diversity is stable or increasing.

Indicator: Aggressive non-native species are treated annually or as appropriate by species. This includes Armenian blackberry, Scot's broom, shining geranium, English ivy, lemon balm, and false brome.

Indicator: No new exotic species are establishing.

Indicator: Clusters of native shrubs are present and cover approximately 5-10% of the savanna area on average (Campbell, 2004) and do not exceed tree cover.

Periodic mowing of the site's prairies will limit colonization by woody vegetation and invasive species such as Armenian blackberry and Scot's broom. Over the long-term, the native grass and forb composition will be improved.

average (Campbell, 2004) and do not exceed tree cover.

Goal 4: Prairie

Maintain and enhance upland prairie where it currently exists (approximately 8 acres). [Refer to areas coded as P1 and P2 on the *Management Plan* map].

Objective 4a. Control woody species encroachment into the areas of established prairie. This will be achieved through a combination of rough-mowing (late summer or fall) on an annual or biannual basis and burning on a 3-5 year rotation if feasible.

Indicator: All trees, saplings, and shrubs are removed from the interior prairie, with the exception of selected open grown oak, pine, and orchard trees.

Indicator: The total amount of prairie habitat is maintained at approximately 7 acres (approximately 1 acre of existing prairie will be converted to savanna over the long-term).

Objective 4b. Control the spread of non-native invasive species. This will be achieved through a combination of mowing, pulling, and herbicide application.

Indicator: Armenian blackberry and Scot's broom occupies less than 5% cover (combined).

Indicator: Other invasive species including thistle and lemon balm occupy less than 5% cover (combined). These species are eradicated where possible.

Indicator: Highly invasive species such as false brome, Harding grass, and shining geranium are eradicated if established.

A portion of the orchard will be retained as a point of interest and an educational resource.



Objective 4c. Over the long-term, restore a native grass and forb component to the prairie. This will be achieved through a combination of broadcast herbicide application (possibly grass specific in areas), spot herbicide application, mowing, burning, and introduction of native grasses and forbs (plugs and seed). Note: Most of the existing prairie is currently in a degraded condition, so this objective will be phased over time, with experimental techniques tested on smaller areas and other sites initially.

Indicator: The understory is dominated by native plant species (relative percent cover). Areas dominated by non-native species are stable or decreasing in extent.

Indicator: Native species diversity is stable or increasing.

Indicator: Aggressive non-native species are treated annually or as appropriate by species. This includes Armenian blackberry, Scot's broom, shining geranium, English ivy, lemon balm, and false brome.

Indicator: Where small, seasonally wet areas occur in the prairie, re-seed after management with native species appropriate to wet prairie habitat.



The closed canopied forest and mixed woodlands will remain largely unchanged. Exotic vegetation control being the primary management objective in those areas.

Objective 4d. Retain a portion of the abandoned orchard that is currently located within the prairie, but thin to a lower tree density to allow for easier maintenance of the prairie. The orchard is an important component of the site from an historic landscape preservation and educational perspective. Removal of the orchard trees will be considered over the long-term if future assessment of the public lands along the Ridgeline Trail system identifies other sites that are better suited for this purpose. [Refer to area coded as P2 on the *Management Plan* map].

Indicator: Orchard trees area spaced no closer than 15 feet to allow mower access to the area. Removal will focus on younger trees which have seeded into the area in recent years.

Indicator: Apple trees will remain at their current density.

Goal 5: Mixed Woodland and Closed canopy Forest

Maintain and enhance native composition of mixed woodland and closed canopy forest. [Refer to areas coded as CM on the *Management Plan* map]

Objective 5a. Control non-native invasive species in understory of mixed woodland and closed canopy forest areas. This would be achieved through a combination of cutting, pulling, and herbicide application.

Indicator: Non-native trees and shrubs such as cherry, pear, English hawthorn, laurel, and holly are removed with a target reduction of 50%. Native species seeded into 100% of treatment areas to limit re-colonization by exotic species.



Nectar producing species such as rosy checkermallow (*Sidalcea virgata*) will be introduced in areas to improve butterfly habitat.

Indicator: Understory is comprised of no more than 10% non-native Armenian blackberry and less than 10% cover by all other invasive shrub species.

Objective 5b. Where specimens of large oak and pine exist within the mixed woodland areas, selectively remove or girdle smaller trees and conifers within their drip line to ensure long-term survival of these trees.

Indicator: 50% of large oak and pine within the mixed woodland areas are released.

Indicator: No seedlings or saplings of tree species other than oak or pine are located within the drip-line of each tree/tree cluster. Oak seedlings may be allowed at low densities.

Indicator: 100% of the girdled trees are dead within two years of treatment.

Goal 6: Wildlife Habitat Enhancement

Enhance habitat conditions for native wildlife species.

Objective 6a. To better facilitate movement of larger mammals through the site, remove un-needed fencing from the interior of the site and replace perimeter fencing, where needed, with wildlife friendly fencing over time.

Indicator: All interior site fencing is removed.

Indicator: Perimeter fencing is converted to wildlife friendly fencing over time, especially where wildlife movement is evident (game trails and tracks). The fencing along the north property boundary should be retained to define the edge of the public land.

Objective 6b. Provide habitat snags in various locations across the site to improve bird habitat (standing snags are inhabited by cavity nesting species and provide food for a wide range of birds including owls and woodpeckers). New snags will be created by leaving select dead and dying trees standing and by girdling or topping selected larger trees during the planned thinning.

Indicator: The overall number of habitat trees on the site is stable or increasing.

Indicator: The habitat snags that are present are of a variety of sizes and levels of decay.

Objective 6c. Improve butterfly habitat conditions in prairie and savanna habitats by enhancing nectar producing plant species such as cat's ear (*Calochortus tolmiei*), great camas (*Camassia leichtlinii* var. *suksdorfii*), rosy checkermallow (*Sidalcea virgata*), Hooker's onion (*Allium acuminatum*), Menzie's larkspur (*Delphinium menziesii*), and wooly sunflower (*Eriophyllum lanatum*) to the prairie and savanna habitats. Work with butterfly experts to determine a comprehensive list of appropriate nectar and host species for butterflies known to be present in this area. Augment existing plant populations or, if appropriate, introduce new ones (e.g. spurred lupine; (*Lupinus laxiflorus*)) through supplemental planting of selected forbs and appropriately timed burning and rough mowing that favors these plant species.

Indicator: Populations of host and nectar producing plant species are increasing in prairie and savanna areas.

Indicator: Native butterfly populations are increasing across the site.

5.2 Monitoring and Mapping

Goal 7: Plant and Wildlife Surveys and Mapping

Provide baseline data on site vegetation and wildlife.

Objective 7a. Conduct a rare plant survey.

Indicator: Locations of rare plant populations and other plant species of interest are identified and mapped using GPS. Coordinates are recorded. (initial surveys have been conducted by City botanist).

Objective 7b. Identify the locations of large trees on the site (24" or larger dbh).

Indicator: Locations of heritage trees are mapped using GPS. Coordinates are recorded (initial survey completed September 2008).

Objective 7c. Identify areas of the site with particularly high native grass and forb diversity and composition so that these patches can be managed and enhanced in a way that protects that valuable resource.

Indicator: Locations of high quality habitat with particularly high native grass and forb composition are mapped using GPS.

Objective 7d. Survey the site for invasive plant species and create a map.

Indicator: All populations of highly invasive species such as false brome, Harding grass, lemon balm, shining geranium, and English ivy are mapped.

Indicator: Large concentrations of more widespread invasive species such as Armenian blackberry and Scot's broom are mapped.

Objective 7e. Conduct wildlife surveys on the site, focusing on key wildlife species. This could include breeding bird surveys, butterfly surveys, and identification of Western gray squirrel nest trees. Surveys could possibly utilize local volunteers such as Lane County Audubon, the local chapter of the North American Butterfly Association, University of Oregon, Southeast Neighbors, Lane Community College, and the Rachel Carson High School.

Indicator: Baseline wildlife surveys are conducted across the site prior to implementation of enhancement efforts.

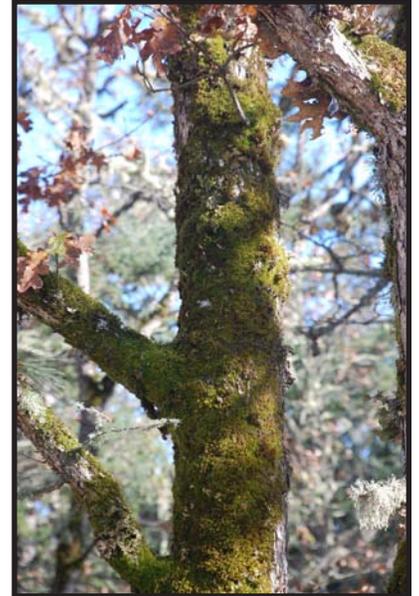
Indicator: Wildlife surveys are conducted in the years subsequent to enhancement efforts using similar methodology to the baseline surveys so that success can be gauged.

Goal 8: Pre- and Post Project Monitoring

Provide adequate vegetation and wildlife data to inform management decisions and gauge effectiveness of enhancement efforts.

Objective 8a. Develop and implement a cost effective monitoring program to document changes to the site's vegetation communities over time.

Indicator: Baseline vegetation data has been collected in areas proposed for enhancements prior to implementation of major enhancement actions. This will range from the establishment of photo-points in areas where structural



enhancements such as thinning are proposed to quantitative monitoring in areas where enhancements to the vegetation community are proposed. Pre- and post-implementation monitoring will be utilized to gauge success.

5.3 Public Access and Recreation Goals

Goal 9: Public Access

Maintain and improve the existing Ridgeline Trail as it passes through the site.

Objective 9a. Maintain and improve the trail surfacing and drainage

Indicator: The trail is passable (free from significant mud and fallen limbs) throughout the year.

Objective 9b. Re-route the lower portion of the trail that currently follows the power line corridor to improve the grade and aesthetic and to situate further from the private property to the north. The preferred route would pass through the prairie area, the orchard, and along the savanna edge before re-joining the existing trail (see Action Plan map for general proposed route).

Indicator: The new trail is sited in a way that limits negative impact to significant natural resources such as rare plant populations and significant trees.

Indicator: The new trail segment is passable (free from significant mud and fallen limbs) throughout the year.

Objective 9c. Construct a connector trail between the Ridgeline Trail and Donald Street to provide direct trail access from the neighborhood in that area. This trail will function as a neighborhood connector trail and will not include parking facilities (see Action Plan map for general proposed route).

Indicator: All-season trail access will exist from Donald Street to the Ridgeline Trail.

Objective 9d. Prevent the trailhead from becoming an entry point for invasive plant species.

Indicator: Provide educational signage and a boot scrubber at the trailhead.

Indicator: Remove invasive species from trailside locations (e.g., herb Robert (*Geranium robertianum*)).

Goal 10: Signage

Provide way-finding and informational signage at all trailheads and at key locations on the site.

Objective 10a. Provide park boundary signage at key locations around the perimeter of the site to limit accidental trespass (some signage is in place, but additional signs are needed, especially along the western edge of the site and on the south end of the prairie above the parking lot).



The newly installed trail map is located at the parking area.

Indicator: Park visitors are not inadvertently wandering onto adjacent private property.

Objective 10b. Provide interpretive signage at locations within Mariposa Woodland such as at the trail-head kiosk on Willamette Street and at other areas appropriate to illustrate key ecological, historical, and management concepts.

Indicator: Un-guided visitors are able to learn some basic information about the area such as the site history, wildlife, habitat types, invasive species, and management practices.

Objective 10c. Provide way-finding signage and trail map at the Willamette Street parking area (a Ridgeline Trail map has recently been installed).

Indicator: Visitors are able to plan their site visit from the trailhead.

Indicator: Visitors are able to determine where they are and possible return routes.

Goal 11: User Safety

Provide a safe environment for visitors.

Objective 11a. Improve safety at the Willamette Street trailhead parking lot, which is currently experiencing significant problems with auto break-ins. This may be achieved by creation of a *neighborhood watch* or similar program where nearby residents are enlisted to help monitor and report illegal activities; additional policing; and/or possible installation of a security camera.

Indicator: Car break-ins and vandalism is reduced at the trailhead parking lot.

Objective 11b. Provide a consistent level of supervisory presence on the site to deter, identify and resolve any public safety issues (this applies to the Ridgeline Trail system and Spencer Butte Park in general).

Indicator: City Parks and Open Space staff and/or Eugene Public Safety staff visit the site on a regular basis and address any public safety concerns as soon as possible.

Indicator: Docents or other volunteers are recruited to patrol the site on a periodic basis to report illegal activities, maintenance needs, and other problems and to provide visitors with information.



The proposed vegetation management actions such as thinning, slash removal, mowing, and exotic vegetation control will help reduce wildfire danger.

5.4 Neighborhood Interface

Goal 12: Wildfire Risk Reduction

Reduce the risk to heritage trees and adjacent properties and structures posed by potential catastrophic fires.

Objective 12a. Manage the site for fuel reduction as described under the savanna and woodland management goals and objectives. This will be achieved through a combination of thinning, exotic species control, and possibly small scale prescribed burning to reduce fuels.

Indicators: See goals 1-3.



The property owner to the west of Mariposa Woodland recently completed a woodland and savanna enhancement project (shown above).

Objective 12b. Manage vegetation on the site to reduce ladder fuels and dog hair tree stands.

Indicator: Wildfire danger on the site is reduced to acceptable levels (will be based on assessment by a qualified wildfire prevention expert)

Objective 12c. Remove slash (cut trees and limbs) that is generated during the planned thinning operation from the site.

Indicator: Slash will be removed from the site following the planned thinning operations, with the exception of a limited amount of logs and/or tree limbs that may be left in some areas to serve as wildlife habitat.

Objective 12d. Provide educational signage at all trailheads warning of potential wildfire danger.

Indicator: Fire education signage is posted at trailhead kiosks, especially during the wildfire season.

Goal 13: Coordinating with Adjacent Property Owners

Coordinate management efforts with adjacent property owners to minimize potential negative impacts, while maximizing overall habitat benefits.

Objective 13a. Coordinate planned oak-pine woodland and savanna enhancement efforts with the property owners adjacent to the site. This could result in a much larger and more viable patch of similar habitat.

Objective 13b. Provide technical assistance to interested adjacent property owners to help maintain the existing oak-pine woodland habitat and ensure the long-term survival of the large heritage trees in the area, including two ponderosa pine (both approximately 60 inches diameter trees) and Douglas-fir (approximately 72 inches in diameter) just to the east of the site.

Indicator: Competing trees are removed from the area immediately below the heritage pine and oak (subject to voluntary property owner participation)

Objective 13c. Coordinate ongoing invasive species control efforts with neighboring property owners as needed to ensure exotic species don't spread from the City property to neighboring properties and vice-versa.



Indicator: Invasive species are not spreading between properties.

Objective 13d. Implement planned management activities in a way that minimizes negative visual or structural impacts on adjacent private properties.

Indicator: Major vegetation management activities such as tree thinning will not occur any closer than 50 feet from the edge of private properties along Owl Lane without permission of the property owner (see Management Plan Map).

Indicator: Tree thinning is done in a way that minimizes potential risk of blow-down on adjacent private properties (based on assessment of a qualified forester).

Objective 13e. Prevent accidental trespass onto adjacent properties through use of signage; natural obstructions such as plantings, logs, and boulders; and possibly fencing.

Indicator: Park boundary signage is posted to clarify location of private property.

Indicator: Natural obstructions or fencing (wildlife friendly and aesthetically pleasing) will be placed on the park boundary where trespass becomes a continual problem.

5.5 Access and Maintenance Goals

Goal 14: Access for Planned Management Activities

Provide adequate access onto the site for planned management and maintenance activities.

Objective 14a. Provide adequate access for equipment needed for the planned habitat management actions including tree thinning and removal. The primary access routes onto the site will be via the Willamette Street parking area and through the prairie and from the Owl Lane public right-of-way from the east. These two approaches will provide access to much of the site. Additional access through the private property to the west of the site may also be possible on a temporary basis with owner permission. Utilizing this access point could greatly reduce the hauling distances from portions of the site and therefore reduce associated site impacts.

Indicator: Temporary access routes are clearly sited and marked to avoid impacts to sensitive areas.

Indicator: All disturbed areas are seeded with a native seed mix to limit weed colonization, with follow-up weed management scheduled if needed.

Objective 14b. To better facilitate movement of maintenance vehicles such as mowers, remove un-needed fencing from the interior of the site.

Indicator: All interior site fencing is removed.

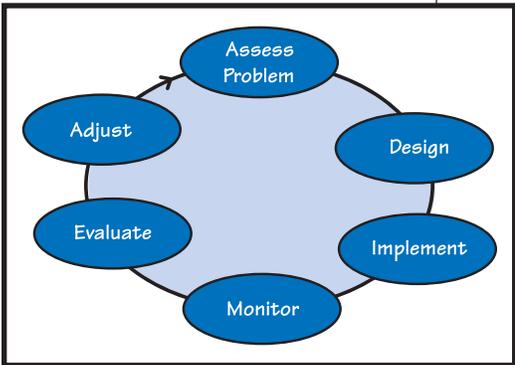
Goal 15: Ecological Burns

Consider using ecological burns on a small scale as a management tool for fuel reduction and habitat enhancement. Due to the site's close proximity to urban land uses, it may not be practical to routinely utilize ecological burns as a management tool.

Objective 15a. Ensure any ecological burns that are scheduled for the site do not pose a threat to adjacent properties.

Indicator: A fire plan will be developed and approved by the Oregon Department of Forestry and burning will be done with extreme caution, within an area contained by fire breaks, and under direction by trained personnel.

5.6 Adaptive Management Goal



The diagram shows a six-step cycle that is typical of an adaptive management approach.

Goal 16: Adaptive Management

Utilize an adaptive management model at Mariposa Woodland to gauge the success of enhancement activities and adjust future management actions.

Objective 16a. Document major enhancement and management efforts and activities as they occur.

Indicator: Geographic extent of management activities is recorded using GPS

Indicator: Management and enhancement activities such as tree removal, exotic vegetation control techniques, species planted, and seeding rates are recorded as they occur.

Indicator: Monitoring strategies are put in place that will help demonstrate the relative success of various management efforts over time.

Indicator: The monitoring data is utilized to inform future management and enhancement decisions.

Desired Future Condition and Management Actions Map Key:

Prairie

- Ⓟ1 Maintain as prairie and enhance native composition over time.
- Ⓟ2 Maintain prairie and enhance native composition over time. Retain select orchard trees in this area.

Savanna

- Ⓟ1 Maintain existing savanna structure and enhance native grass and forb composition over time.
- Ⓟ2 Allow trees (oak and pine) to expand into this area at savanna densities.
- Ⓟ3 Convert recently logged area to savanna by thinning dense young pine to savanna density and controlling exotic vegetation.

Oak-Pine Woodland

- ⓅPW Enhance habitat structure, preserve native understory, and control exotic vegetation.

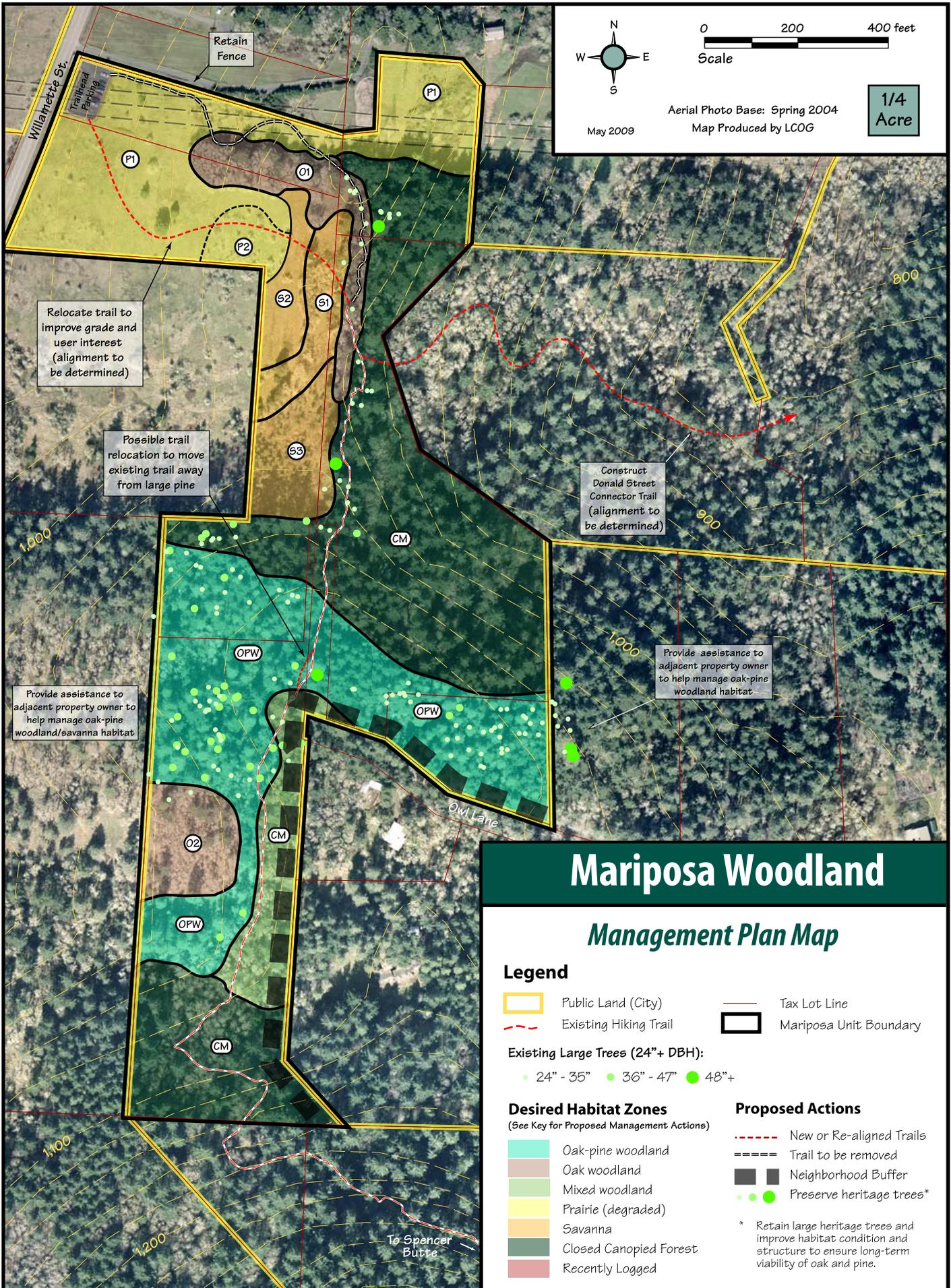
Oak Woodland

- ⓅO1 Enhance oak woodland. Control exotic vegetation, remove conifers, and selectively thin areas around large open grown oaks.
- ⓅO2 Manage habitat structure and preserve native understory.

Mixed Woodland and Closed Canopied Forest

- ⓅCM Control invasion species. Release select heritage pine and oak where they exist.

* See narrative for detail on management goals, objectives, and indicators.



Mariposa Woodland

Management Plan Map

Legend

- Public Land (City)
 - Existing Hiking Trail
 - Tax Lot Line
 - Mariposa Unit Boundary
- Existing Large Trees (24"+ DBH):**
- 24" - 35"
 - 36" - 47"
 - 48"+
- Desired Habitat Zones**
 (See Key for Proposed Management Actions)
- Oak-pine woodland
 - Oak woodland
 - Mixed woodland
 - Prairie (degraded)
 - Savanna
 - Closed Canopied Forest
 - Recently Logged
- Proposed Actions**
- New or Re-aligned Trails
 - Trail to be removed
 - Neighborhood Buffer
 - Preserve heritage trees*
- * Retain large heritage trees and improve habitat condition and structure to ensure long-term viability of oak and pine.

6.0 Implementation Priorities

The table below prioritizes the management objectives based on the need for immediate action versus actions which can occur in the longer-term. A number of the recommended actions will likely occur on an annual or semi-annual basis as part of an ongoing maintenance program and this has been indicated as Regular Maintenance (RM). The prioritization is intended to indicate preferred implementation sequencing. However, the order in which the recommended actions are implemented is based largely on the type of funding sources that can be obtained.

The following categories have been selected to indicate overall priorities:

- I** Short Range (highest priority): Will be undertaken as soon as possible.
- II** Medium Range: Less pressing, but will be implemented when funding is available.
- III** Long Range: Will be implemented over a longer period of time due to the complexity of the task or is dependent on other actions being completed first.
- RM** Regular Maintenance or Management Activity: Performed on an annual or bi-annual basis. Once management actions are completed, those areas will fall into the RM category for on-going maintenance.

Note: The goals and objectives listed below have been shortened for this table (refer to the Management Goals section for full narrative).

Table 1: Implementation Priorities

Habitat Management Goals and Objectives*	Priority	Notes
Goal 1: Oak-Pine Woodland. Enhance oak-pine woodland habitat structure, placing priority on preserving large ponderosa pine and oak and preserving the existing diverse native understory.		
Objective 1a. Maintain and enhance the structure of existing oak-pine woodland.	I	
Objective 1b. Ensure the long-term health and survival of the large heritage trees located in this area.	I	
Objective 1c. Manage the oak-pine woodland understory to protect the high native composition and diversity that currently exists in much of this area.	RM	
Goal 2: Oak Woodland. Enhance oak woodland habitat structure to ensure long-term survival of the oak and enhance and preserve the native understory condition.		
Objective 2a. Maintain and enhance the structure of existing oak woodlands.	I	
Objective 2b. Manage the understory that currently exists within the oak woodland on the western edge of the site to protect the high native composition and diversity that currently exists in this area.	RM	
Objective 2c. Manage the understory of the oak woodland located on the north end of the site to control exotic vegetation.	II	
Goal 3: Savanna. Preserve and expand the savanna area and enhance the understory condition.		
Objective 3a. Retain the savanna structure within the existing narrow band of mapped savanna located on the northwest edge of the site.	RM	
Objective 3b. Allow the existing savanna to expand into the adjacent prairie area by approximately one acre over time.	RM	
Objective 3c. Convert recently logged area to a savanna condition.	I	Should be implemented when trees are small to minimize cost
Objective 3d. Over the long-term, restore a native grass, forb, and shrub component to highly degraded savanna areas.	III	
Goal 4: Prairie. Maintain and enhance upland prairie where it currently exists.		
Objective 4a. Control woody species encroachment into the areas of established prairie.	II, RM	
Objective 4b. Control the spread of non-native invasive species.	I, RM	
Objective 4c. Over the long-term, restore a native grass and forb component to the prairie.	III	

Habitat Management Goals and Objectives*	Priority	Notes
Objective 4d. Retain a portion of the abandoned orchard that is currently located within the prairie, but thin to a lower tree density to allow for easier maintenance of the prairie.	II	Potential volunteer project
Goal 5: Mixed Woodland and Closed Canopy Forest. Maintain and enhance native composition of mixed woodland and closed canopy forest.		
Objective 5a. Control non-native invasive species in mixed woodland and closed canopy forest areas.	II	
Objective 5b. Where specimens of large oak and pine exist within the mixed woodland areas, selectively remove or girdle smaller trees and conifers within their drip line to ensure long-term survival of these trees.	I	
Goal 6: Wildlife Habitat Enhancement. Enhance habitat conditions for native wildlife species.		
Objective 6a. To better facilitate movement of larger mammals through the site, remove un-needed fencing from the interior of the site and replace perimeter fencing, where needed, with wildlife friendly fencing over time.	I,III	Priority I: remove un-needed fencing. Priority III: replace perimeter fencing
Objective 6b. Provide habitat snags in various locations across the site to improve bird habitat (standing snags are inhabited by cavity nesting species and provide food for a wide range of birds including owls and woodpeckers).	RM	
Objective 6c. Improve butterfly habitat conditions in the prairie, savanna, and woodland habitats by introducing larval host and nectar producing plant species	III	
Goal 7: Plant and Wildlife Surveys and Mapping. Provide baseline data on site vegetation and wildlife.		
Objective 7a. Conduct a rare plant survey.	I	
Objective 7b. Identify the locations of large trees on the site (24" or larger dbh).	I	Initial survey completed July 2008
Objective 7c. Identify areas of the site with particularly high native grass and forb diversity and composition so that these patches can be managed and enhanced in a way that protects that valuable resource.	I	Initiated 2008
Objective 7d. Survey the site for invasive plant species.	I	
Objective 7e. Conduct wildlife surveys on the site, focusing on key wildlife species. This could include breeding bird surveys, butterfly surveys, and identification of Western gray squirrel nest trees.	II	Potential volunteer project
Goal 8: Pre- and Post Project Monitoring. Provide adequate vegetation and wildlife data to inform management decisions and gauge effectiveness of enhancement efforts.		
Objective 8a. Develop and implement an effective monitoring program to document changes to the site's vegetation communities over time.	I	Monitoring protocol should be established prior to implementation of major site enhancements
Goal 9: Public Access. Maintain and improve the existing Ridgeline Trail as it passes through the site.		
Objective 9a. Maintain and improve the trail surfacing and drainage	RM	
Objective 9b. Re-route the lower portion of the trail that currently follows the power line corridor to improve the grade and aesthetic and to situate further from the private property to the north.	II	Implement as funding is secured
Objective 9c. Construct a connector trail between the Ridgeline Trail and Donald Street to provide direct trail access from the neighborhood in that area.	III	Implement as funding is secured. Needs additional scoping, outreach and one public access easement.
Goal 10: Signage. Provide way-finding and informational signage at all trailheads and at key locations on the site.		
Objective 10a. Provide park boundary signage at key locations around the perimeter of the site to limit accidental trespass.	I	
Objective 10b. Provide interpretive signage at planned trail-head kiosk on Willamette Street.	III	
Objective 10c. Provide way-finding signage and trail map at the Willamette Street parking area.	I	a Ridgeline Trail map has recently been installed
Goal 11: User Safety. Provide a safe environment for visitors.		
Objective 11a. Improve safety at the Willamette Street trailhead parking lot, which is currently experiencing significant problems with auto break-ins.	I	
Objective 11b. Provide a consistent level of supervisory presence on the site to deter, identify, and resolve any public safety issues.	II	Applies to entire ridgeline system
Goal 12: Wildfire Prevention. Reduce the risk to heritage trees and adjacent properties and structures posed by potential catastrophic fires.		
Objective 12a. Manage the site for fuel reduction as described under the savanna and woodland management goals and objectives.	I-II	Priority I: oak-pine woodland and recently logged area.

Habitat Management Goals and Objectives*	Priority	Notes
Objective 12b. Manage vegetation on the site to reduce ladder fuels and dog hair tree stands.	I-II, RM	Priority I: oak-pine woodland and around heritage trees.
Objective 12c. Remove slash (cut trees and limbs) that is generated during the planned thinning operation from the site.	RM	
Objective 12d. Provide educational signage at all trailheads warning of potential wildfire danger.	RM	Could be placed seasonally
Goal 13: Coordinating with Adjacent Property Owners: Coordinate management efforts with adjacent property owners to minimize potential negative impacts, while maximizing overall habitat benefits.		
Objective 13a. Coordinate planned oak-pine woodland and savanna enhancement efforts with the property owners adjacent to the site.	II	
Objective 13b. Provide technical assistance to interested adjacent property owners to help maintain the existing oak-pine woodland habitat and ensure the long-term survival of the large trees in the area.	I	May be implemented in conjunction with planned thinning the Mariposa Woodland site
Objective 13c. Coordinate ongoing invasive species control efforts with neighboring property owners as needed to ensure exotic species don't spread from the City property to neighboring properties and vice-versa.	II	
Objective 13d. Implement planned management activities in a way that minimizes negative visual or structural impacts on adjacent private properties.	RM	
Objective 13e. Prevent accidental trespass onto adjacent properties through use of signage and possibly fencing.	I	
Goal 14: Access for Planned Management Activities. Provide adequate access onto the site for planned management and maintenance activities.		
Objective 14a. Provide adequate access for equipment needed for the planned habitat management actions including tree thinning and removal.	RM	
Objective 14b. To better facilitate movement of maintenance vehicles such as mowers, remove un-needed fencing from the interior of the site.	I	
Goal 15: Ecological Burns. Consider using ecological burns on a small scale as a management tool for fuel reduction and habitat enhancement. Due to the site's close proximity to urban land uses, it may not be practical to routinely utilize ecological burns as a management tool.		
Objective 15a. Ensure any ecological burns that are scheduled for the site do not pose a threat to adjacent properties.	RM	Ongoing as feasible on a 3-5 year rotation
Goal 16: Adaptive Management. Utilize an adaptive management model at Mariposa Woodland to gauge the success of enhancement activities and adjust future management actions.		
Objective 16a. Document major enhancement and management efforts and activities as they occur.	RM	Ongoing

Appendix A

Ridgeline Area Open Space Vision and Action Plan Map (February 2008)

Ridgeline Area Open Space Vision and Action Plan

Vision Map

- Legend**
- Existing Parks and Open Space
 - Schools
 - Waterway or Water Body
 - Eugene-Springfield Urban Growth Boundary

- Legend:**
- Existing**
- Multi-Use Path (hard surface)
 - Existing Trail (soft surface)
 - Combined Hiking/Mt. Bike Trail with signage and/or barriers
 - On-road Bicycle Touring Route
 - Trailhead Parking (designated lot)
 - Cultural Landmark
 - Major Hill or Butte
- Potential Future**
- Approved Trail/Habitat Corridor
 - Multi-Use Path (hard surface)
 - Shared Use Trail (soft surface)
 - Equestrian Trail
 - Improved Bicycle Touring Route**
 - Trailhead Parking (designated lot)
 - Key Habitat Areas***
 - Key Waterways (enhancements)
 - Community Gateway
- Other Symbols:**
- Shared historic, like trails where feasible (mt. bike trail may run parallel to hiking trail in this case)
 - ** Technical assistance and incentives to willing land owners for voluntary habitat management and targeted acquisition of key lands
 - *** Key Habitat Areas

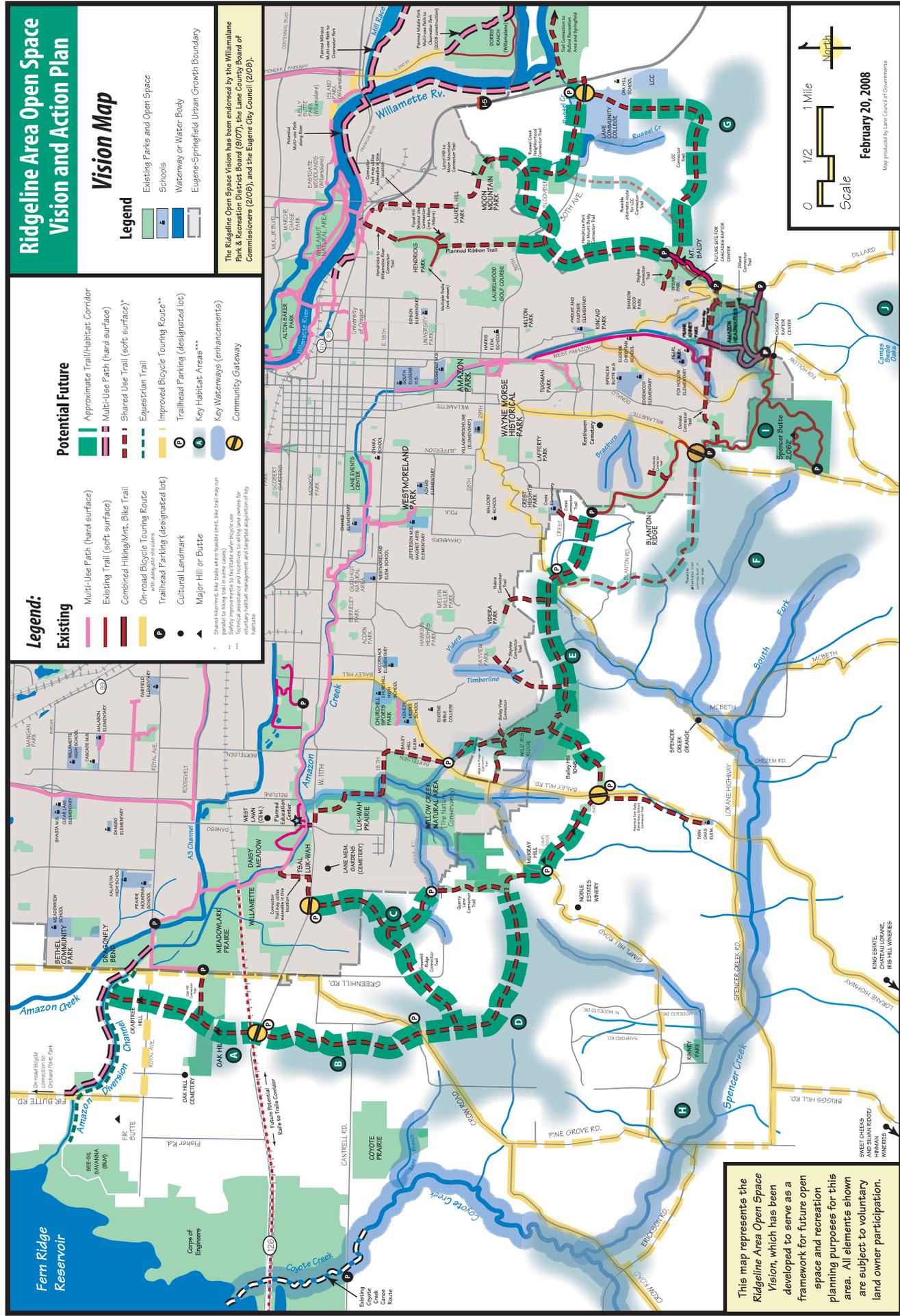
The Ridgeline Open Space Vision has been endorsed by the Willamalane Park & Recreation District Board (9/07), the Lane County Board of Commissioners (2/08), and the Eugene City Council (2/08).

0 1/2 1 Mile
Scale

North

February 20, 2008

Map produced by Lane County of Governments



This map represents the Ridgeline Area Open Space Vision, which has been developed to serve as a framework for future open space and recreation planning purposes for this area. All elements shown are subject to voluntary land owner participation.

Appendix B

Plant Species Observed at Mariposa Woodland

The following list includes *plant species* that were observed at Mariposa Woodland by City staff in 2006 and 2009. These informal surveys are an indication of *plant species diversity* on the site, but do not indicate *abundance* and were not comprehensive.

Mariposa Woodland, Oak Habitat Enhancement Project Plant List

May, June & July, 2006, April 2009

* Non-native plant species

Trees		
	<i>Abies grande</i>	Grand fir
	<i>Acer circinatum</i>	Vine maple
	<i>Acer macrophyllum</i>	Bigleaf maple
	<i>Calocedrus decurrens</i>	Incense cedar
*	<i>Crataegus monogyna</i>	English hawthorn
	<i>Crataegus suksdorfii</i>	Sukdorf's hawthorn
	<i>Fraxinus latifolia</i>	Oregon ash
	<i>Pinus ponderosa var. ponderosa</i>	Ponderosa pine
*	<i>Prunus avium</i>	Sweet cherry
*	<i>Prunus cerasifera</i>	Thundercloud plum
	<i>Prunus virginiana var. demissa</i>	Choke cherry
	<i>Pseudotsuga menziesii var. menziesii</i>	Douglas-fir
*	<i>Pyrus communis</i>	Domestic pear
	<i>Quercus garryana var. garryana</i>	Oregon white oak
	<i>Quercus kelloggii</i>	California black oak
	<i>Rhamnus purshiana</i>	Cascara buckthorn
	<i>Sambucus cerulea var. cerulea</i>	Blue elderberry
Shrubs		
	<i>Amelanchier alnifolia</i>	Serviceberry
	<i>Berberis aquifolium</i>	Tall Oregon grape
	<i>Berberis nervosa</i>	Dwarf Oregon grape
	<i>Corylus cornuta</i>	Hazelnut
*	<i>Hedera helix</i>	English ivy
	<i>Holodiscus discolor</i>	Oceanspray
*	<i>Ilex aquifolium</i>	English holly
	<i>Lonicera hispidula var. hispidula</i>	Hairy honeysuckle
	<i>Oemleria cerasiformis</i>	Osoberry
	<i>Physocarpus capitatus</i>	Pacific ninebark
	<i>Ribes sanguineum var. sanguineum</i>	Red flowering currant
*	<i>Rosa eglanteria</i>	Sweetbriar rose
	<i>Rosa nutkana var. nutkana</i>	Nootka rose
*	<i>Rubus armeniacus</i>	Armenian blackberry
	<i>Rubus ursinus var. macropetalus</i>	Pacific dewberry
	<i>Symphoricarpos albus var. laevigatus</i>	Common snowberry
	<i>Toxicodendron diversilobum</i>	Poison oak

	Forbs	
	<i>Achillea millefolium</i>	Yarrow
	<i>Adenocaulon bicolor</i>	Pathfinder
*	<i>Anthriscus caucalis</i>	Bur chervil
*	<i>Bellis perennis</i>	Lawn daisy
	<i>Brodiaea elegans ssp. hooveri</i>	Elegant brodiaea
	<i>Calochortus tolmiei</i>	Cat's ear
	<i>Calypso bulbosa</i>	Calypso orchid
	<i>Camassia quamash</i>	Small camas
	<i>Campanula scouleri</i>	Scouler's harebell
	<i>Cardamine nuttallii var. nuttallii</i>	Spring beauty
*	<i>Centaureum erythraea</i>	Common centaury
*	<i>Cerastium fontanum</i>	Common chickweed
	<i>Circaea alpina ssp. pacifica</i>	Enchanter's nightshade
*	<i>Cirsium vulgare</i>	Bull thistle
	<i>Clarkia amoena</i>	Farewell to spring
	<i>Claytonia sibirica</i>	Siberian candy flower
	<i>Comandra umbellata var. californica</i>	Bastard toadflax
	<i>Corallorhiza sp.</i>	Coralroot
	<i>Cynoglossum grande</i>	Hound's tongue
*	<i>Daucus carota</i>	Queen Anne's lace
	<i>Delphinium menziesii</i>	Menzie's larkspur
*	<i>Dianthus armeria</i>	Deptford pink
	<i>Dichelostemma congestum</i>	Ookow
	<i>Dodecatheon hendersonii ssp. hendersonii</i>	Henderson's shooting star
	<i>Epilobium densiflorum</i>	Close flowered boisduvalia
	<i>Eriophyllum lanatum var. leucophyllum</i>	Oregon sunshine
	<i>Erythronium oregonum</i>	Oregon fawnlily
	<i>Eucephalus vialis</i>	Wayside aster
	<i>Fragaria vesca ssp. bracteata</i>	Western woods strawberry
	<i>Galium sp.</i>	Bedstraw
	<i>Geranium bicknellii</i>	Bicknell's geranium
*	<i>Geranium molle</i>	Dovefoot geranium
	<i>Geranium oreganum</i>	Western geranium
	<i>Geum macrophyllum var. macrophyllum</i>	Large leaved avens
	<i>Goodyera oblongifolia</i>	Rattlesnake plantain
*	<i>Hypericum perforatum</i>	Common St. Johnswort
	<i>Iris tenax</i>	Oregon iris
*	<i>Lactuca muralis</i>	Wall lettuce
*	<i>Lapsana communis</i>	Nipplewort
*	<i>Lathyrus aphaca</i>	Yellow pea

	<i>Lathyrus sp.</i>	Sweet pea
*	<i>Lathyrus sphaericus</i>	Grass pea
*	<i>Leucanthemum vulgare</i>	Oxeye daisy
	<i>Ligusticum apiifolium</i>	Celery-leaved lovage
	<i>Listera cordata</i>	Heartleaf twayblade
	<i>Lomatium nudicaule</i>	Barestem lomatium
	<i>Madia glomerata</i>	Mountain tarweed
	<i>Madia sativa</i>	Coast tarweed
	<i>Maianthemum stellatum</i>	Starry false Salomon's seal
*	<i>Melissa officinalis</i>	Lemon balm
	<i>Nemophila menziesii</i> var. <i>atmoaria</i>	Baby blue-eyes
	<i>Nemophila parviflora</i> var. <i>parviflora</i>	Small flowered nemophila
	<i>Osmorhiza purpurea</i>	Purple sweet cicely
*	<i>Parentucellia viscosa</i>	Parentucellia
	<i>Perideridia montana</i>	Gairdner's yampah
	<i>Piperia unalascensis</i>	Alaska rein orchid
	<i>Plagiobothrys sp</i>	Popcorn flower
	<i>Plectritis congesta</i> var. <i>congesta</i>	Rosy plectritis
	<i>Polystichum munitum</i>	Sword fern
	<i>Potentilla gracilis</i> var. <i>gracilis</i>	Slender cinquefoil
	<i>Prosartes sp</i>	
	<i>Prunella vulgaris</i>	Self heal
	<i>Pteridium aquilinum</i>	Brackenfern
	<i>Ranunculus orthorhynchus</i>	Straightbeak buttercup
	<i>Ranunculus uncinatus</i> var. <i>parviflorus</i>	Little buttercup
*	<i>Rumex crispus</i>	Curly dock
	<i>Rupertia physodes</i>	California tea
	<i>Sanicula bipinnatifida</i>	Purple snakeroot
	<i>Sanicula crassicaulis</i> var. <i>crassicaulis</i>	Pacific snakeroot
	<i>Satureja douglasii</i>	Yerba buena
*	<i>Senecio jacobaea</i>	Tansy ragwort
*	<i>Sherardia arvensis</i>	Field madder
	<i>Sidalcea malviflora</i> ssp. <i>virgata</i>	Rose checkermallow
	<i>Tellima grandiflora</i>	Fringecup
*	<i>Torilis arvensis</i>	Hedge parsley
	<i>Trientalis latifolia</i>	Woodland starflower
*	<i>Trifolium dubium</i>	Least hop clover
	<i>Triteleia hyacinthina</i>	Hyacinth triteleia
	<i>Vancouveria hexandra</i>	Inside-out flower
*	<i>Vicia sativa</i>	Common vetch
	<i>Wyethia angustifolia</i>	Narrow leaf mule's ears
	<i>Zigadenus venenosus</i> var. <i>venenosus</i>	Meadow deathcamas

	Grasses, sedges, rushes	
*	<i>Anthoxanthum odoratum</i>	Sweet vernalgrass
*	<i>Brachypodium sylvaticum</i>	False brome
	<i>Bromus carinatus</i>	California brome
	<i>Bromus vulgaris</i>	Columbia brome
	<i>Carex deweyana</i>	Dewey's sedge
	<i>Carex obnupta</i>	Slough sedge
	<i>Carex hendersonii</i>	Henderson's sedge
*	<i>Cynosaurus echinatus</i>	Hedgehog dogtail
*	<i>Dactylis glomerata</i>	Orchard grass
	<i>Danthonia californica</i>	California oatgrass
	<i>Elymus glaucus</i>	Western ryegrass
*	<i>Festuca arundinacea</i>	Tall meadow fescue
	<i>Festuca californica</i>	California fescue
	<i>Festuca roemerii</i>	Roemer's fescue
*	<i>Holcus lanatus</i>	Velvetgrass
	<i>Juncus patens</i>	Spreading rush
	<i>Juncus tenuis</i>	Slender rush
	<i>Koeleria macrantha</i>	Junegrass

	Grasses, sedges, rushes	
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	<i>Elymus glaucus</i>	Western ryegrass
*	<i>Festuca arundinacea</i>	Tall meadow fescue
	<i>Festuca californica</i>	California fescue
	<i>Festuca roemerii</i>	Roemer's fescue
*	<i>Holcus lanatus</i>	Velvetgrass
	<i>Juncus patens</i>	Spreading rush
	<i>Juncus tenuis</i>	Slender rush
	<i>Koeleria macrantha</i>	Junegrass

Appendix C

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