

**Tualatin Hills Park & Recreation District's
Oak Management Plan**

*Preserving And Restoring Oregon White Oak
Woodlands And Savanna*



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TABLE OF CONTENTS

Goals and Objectives	3
Executive Summary	4
Overview of White Oak Habitat	5
Oak Biology	5
History of Oregon Oaks	6
Habitat Value of Oregon White Oak	6
Oak Savannah Preservation/Restoration	7
Oak Woodland Preservation/Restoration	7
Site Assessment	7
Oak Management	8
Site Monitoring	9
Public Agency Review	9
Conclusion	9
Oak Plan Goals, Objectives, and Tasks	11
Oak Decision Tree	16
Glossary	19
Peer Review	22
Literature Cited	22

OAK PLAN GOALS AND OBJECTIVES

VISION:

Improve the health of Oregon white oak trees and woodland sites within park properties of the Tualatin Hills Park & Recreation District (THPRD).

Definitions

Goals: Desired future condition

Objectives: Measurable or clearly observable steps toward the goals

Tasks: On-the-ground actions to complete the objectives

Goal I: Protect large specimens of Oregon white oak.

Objectives:

- A. Identify large Oregon white oak trees present in THPRD parks and assess viability potential.
- B. Identify threats to the health of these large oaks, and assess potential for release*.
- C. Establish timeline and process for release of appropriate trees.
- D. Identify monitoring schedule and maintenance activities to retain release activities.

Goal II: Protect Oregon white oak woodlands.

Objectives:

- A. Identify existing Oregon white oak woodlands present in THPRD parks.
- B. Identify threats to the health of the woodlands, and assess potential for restoration.
- C. Establish timeline and process for restoration of appropriate woodlands.
- D. Identify monitoring schedule and maintenance activities to retain restoration activities.

Goal III: Establish future Oregon white oak savanna.

Objectives:

- A. Identify potential future Oregon white oak savanna sites.
- B. Establish timeline and process for oak planting and/or preservation.
- C. Identify monitoring schedule and maintenance activities to protect sites.

(Please see page 11 for a complete list of the tasks outlined to complete these goals and objectives.)

** Oregon white oak trees do not tolerate shade, and will decline and die when overtopped by faster-growing tree species such as Douglas fir and Oregon ash. Release is the removal of these faster-growing trees to allow oak trees to survive and attain the most rapid possible growth.*

Oak Management Plan

EXECUTIVE SUMMARY: Oregon white oak woodlands and savannas are a high priority conservation target in much of Oregon's Willamette Valley. Yet, there have not been major restoration activities within the Tualatin Basin that are geared to oak preservation. This plan will be the first in our area to improve the health of white oak trees and woodland sites.

The Oak Management Plan will identify and assess significant oak trees and oak groves within the Tualatin Hills Park & Recreation District, and propose practical restoration activities. The value of a site for oak preservation will be weighed against the current and projected use of the site by patrons and staff in order to establish reasonable priorities to apportion staff time and monetary resources.

The Oak Management Plan includes a list of goals, objectives, and on-the-ground tasks to achieve the goals. It also includes two Decision Trees for determining site priorities. Decision Tree I focuses on general site considerations to assess whether or not a park is an appropriate restoration site. Decision Tree II focuses on specific site needs based on three priorities for release of oak trees, and will determine threats to oak trees and justify restoration activities required to restore habitat health.

Oak restoration activities will vary according to the site needs. If a site qualifies for Goal 1 (Protect large specimens), it is likely that some native trees will need to be topped, girdled, or cut down in order to save the older, more valuable oak trees. If a site qualifies for Goal 2 (Protect oak woodlands), some thinning of densely growing oaks may be needed in addition to the removal of other native and non-native trees. If a site is selected for Goal 3 (Establish future savanna), this area is to be planted with Oregon white oak. City of Beaverton, Washington County, and Clean Water Services regulations will provide oversight for any permits required. Advanced communication to inform, educate, and seek feedback is essential. Public notification will follow the accepted practices of Tualatin Hills Park & Recreation District.

OVERVIEW OF WHITE OAK HABITAT: Oregon white oak woodlands and savannas were a major component of the Willamette Valley landscape, but now they are among the most endangered ecological communities in the Pacific Northwest. Since 2000, oak savanna and oak woodlands have been identified as one of three conservation priorities by The Nature Conservancy (Graham Oaks, 2004), and as one of four broad scale wildlife conservation priorities in the State of Oregon (Campbell, 2004). Considering the diminishing presence of oak woodlands in Oregon, and the value placed on these habitats by conservation organizations, it is an opportune time for the Tualatin Hills Park & Recreation District to identify all potential preservation sites that exist within District boundaries. Restoration of declining oak woodlands and savanna (where appropriate) will add biological diversity, wildlife habitat, and expanded features for District patrons. The **Oak Management Plan** identifies park sites where oaks already exist and outlines steps for preservation and restoration of oak woodland stands and significant single oak trees. It also identifies park sites where oaks might be planted to create future savanna situations, and outlines steps to promote THPRD management of Oregon white oak resources. A set of goals and objectives has been created to focus efforts and outline specific tasks to attain those goals.

OAK BIOLOGY: Oregon white oak (also known as Garry oak from the scientific name, *Quercus garryana*) is a long-lived, native hardwood tree. It has a limited range in the United States, occurring mostly west of the Cascade Mountains from lower British Columbia south to central California. The range of Oregon white oak also extends eastward along the Columbia River and in a few other places east of the Cascades.

Oregon white oak is common to many areas in Western Oregon and Washington, although agricultural and urban development has reduced oak woodlands and savanna by 80% in the last 150 years (Campbell, 2004). The suppression of fire has allowed shrubs and trees, especially Douglas fir and Oregon ash, to encroach on former prairie and oak savanna. The faster-growing fir and ash are able to overtop the much slower-growing and shade-intolerant oak trees, which then decline in vigor and die due to lack of sunlight.

Oaks that grow individually in an open prairie setting develop a full, mushroom-shaped crown, the classic savanna oak shape. Oak savanna is characterized by these mature, open canopy trees and by minimal tree density (less than 30% tree cover). Oaks that grow in a woodland setting in close proximity to other trees, even other oaks, develop a narrower, vase-shaped profile. Oak woodlands can be characterized by higher tree density (30-60% tree cover) (Campbell, 2004). All oaks provide habitat for animals and plants that is very different from that provided by conifer or riparian forests. Many species of wildlife are dependent on Oregon white oak, and many plant species will only grow in the type of open grassland associated with oak savanna.

Oregon white oak is a shade-intolerant tree, preferring to grow in full sun and where summer conditions include heat and drought. The species grows very slowly, less than one foot in height each year, and expands from 0.1 inch to 0.4 inches per year in diameter (Gumtow-Farrior, 1997). Oaks that grow in wetter mesic sites often grow faster than oaks found on drier xeric sites. Oregon white oak functions as both a seral (transitional) species, moving into available grassland when not restricted by agricultural practices, and as a climax species, most often where fire, mowing, or grazing limit the growth of other tree species. The greater ability of oak to establish

itself and live in areas where yearly and /or seasonal precipitation is sparse, where soils are shallow and dry, or where fire is a repeated occurrence, entitles oak to rank as a climax species (Stein). Oregon white oak and Ponderosa pine have been identified as compatible partners in Willamette Valley wetlands (Franklin, 1988), and very large oaks are often found growing in the company of Ponderosa pine in the Tualatin Basin.

Photo to right: Canopy of a large Oregon white oak.



HISTORY OF OREGON

OAKS: Oregon white oak savannas were a widespread, prominent feature of the Willamette Valley before European settlement in the mid-1800s. Native Americans used oak acorns as a food source, and also gathered other plants that favor the open prairies associated with big oaks. Many tribes

maintained the prairies and open savannas for hunting and food gathering through yearly burning cycles. Large savanna oaks and the accompanying grasslands were able to withstand fires, since oak bark is thick enough to be burn-resistant and grassland plants simply regrow the following year. Regular burns kept conifers, deciduous trees, and heavy brush from becoming established. Even oak saplings would burn, thus preserving the open nature of the savanna.

After pioneers settled the area, suppression of fire allowed woody vegetation to encroach into grasslands. Douglas fir trees spread over former prairies, overtopping the slower-growing oaks. Since oaks are shade-intolerant, these trees have died or declined severely. In other areas, oaks were cut for firewood or cleared for development. Where oaks remained, the absence of fire allowed many oak acorns and other tree seeds to sprout, creating dense woodlands instead of prairie. Few large savanna oaks survive except in protected or managed sites and few oaks have been planted as either ornamental or shade trees because of their slow growth.

HABITAT VALUE OF OREGON WHITE OAK: Oak woodlands and oak savanna sites in the Willamette Valley and the Tualatin Basin are utilized by over 200 species of native wildlife. Many of these animals are listed as sensitive species by the Oregon Department of Fish and Wildlife, including the northern flying squirrel and the western gray squirrel, western bluebird, western meadowlark, grey fox and red fox, northern pigmy owl, acorn woodpecker, long-eared myotis bat, red-legged frog, sharptail snake, and the endangered Fender's blue butterfly (Willamette Subbasin Plan, 2004). Raptors and other birds use oak trees for shady roosts and hunting perches, while cavities in larger trees provide nest sites for birds and mammals. Smaller

animals hide in leaf litter on the ground, and search in oak debris for insects for food. Acorns from Oregon white oaks provide an important food source for squirrels, woodpeckers, deer, and wild turkeys. Dead and decaying logs and branches provide moist cover for snakes, frogs, salamanders, small mammals and many invertebrates. Certain insects will feed or reproduce only on Oregon white oak trees.

OAK SAVANNA PRESERVATION/RESTORATION: Park sites where large oaks currently exist will be evaluated for savanna tree potential. Preservation or restoration of oak savanna, characterized by mature, open canopy trees and minimal tree density (less than 30% tree cover) may require removal or girdling of other tree and shrub species in order to maintain open space around the oaks. It also may require thinning of the oaks themselves. For this reason, potential oak savanna sites within Tualatin Hills Park & Recreation District are those sites currently containing large, established oak trees, or other sites that are currently bare of any significant trees. Selected sites will be preserved, or designed, planted, and maintained as oak savanna for future generations.

OAK WOODLAND PRESERVATION/RESTORATION: Park sites where significant stands of Oregon white oak trees exist will be evaluated for woodland preservation or restoration. Although characterized by higher tree density (30-60% tree cover), most existing woodlands will still require some selective thinning of oaks to ensure that the remaining oaks develop properly. In some areas, removal of fast-growing Douglas fir and Oregon ash may be necessary in order to preserve the much older and more valuable Oregon white oak. Where appropriate, culled trees will be utilized by THPRD or project partners in local stream and wetland enhancement projects.



Photo to left: Oregon white oak woodland.

SITE ASSESSMENT: All park sites are being assessed for oak restoration potential and existing habitat value using the Oak Management Plan Decision Tree I. If a park site is selected for the oak plan, existing oak trees will be inventoried and mapped. Tree height will be estimated, tree diameter at breast height (dbh) will be measured, and an attempt will be made to estimate tree age for historic and interest value. Oak sites will be assigned to one of three groups: Savanna Oaks (SAO), Woodland Oaks (WDO), or Future Savanna Oaks (FSAO). Threats to oak survival

will be noted at each site and an oak management plan designed for that particular park. Threats may include overtopping by large Douglas fir or Oregon ash trees, encroachment by small saplings of any variety, overly dense stands of Oregon white oak trees, or invasive weed populations. Specific site needs will be assessed using the Oak Management Plan Decision Tree II. The management plan for each park site will include a proposal for dealing with threats to the oaks, specifics on any proposed tree removals, and justification for the proposals.

Not all park sites that have oak trees will be selected for preservation or restoration practices. The habitat mosaic that mixed forests create has been determined by ecological science to be an important aspect of natural vegetation communities. Mixed forests include several to many tree species and a wide variety of shrubs and herbaceous plants. These all provide different sources of food and shelter for wildlife, and contribute different nutrients back to the soil. Existing processes of tree growth and dominance will be allowed to proceed in most forested sites.

It is not possible for all selected oak plan sites to be treated immediately. The assessment process will determine which sites contain the most valuable oak trees, and which oaks are under the most serious threats. A priority list will be created to apportion staff time and funding in the most productive manner.

OAK MANAGEMENT: Accepted oak management practices call for the “release” of valuable oaks by removing or girdling the surrounding trees (Campbell, 2004). Girdling is the method of choice in areas where standing dead trees will not present a hazard to people or structures, and where tree removal is not acceptable. Snags created by girdling are less of a fire hazard than a quantity of small wood on the ground. According to forest ecologist, David Vesely: “Large snags and logs scattered widely . . . do not create as serious a fire hazard as a continuous ground cover of fine woody debris.” (Vesely, 2004) Certain tree species, such as Oregon ash, will resprout from the stump when the tree is girdled; therefore, herbicide application is recommended to kill the tree in these cases.

In some areas, oak trees have grown so densely that they are a threat to themselves through overcrowding. These areas are sometimes referred to as dog-hair woodlands. There are established guidelines for thinning such stands, including complete removal of a portion of the stand, cutting very deteriorated oaks to the ground to allow resprouting, and topping of oaks to create snags for wildlife.

Oregon white oak savannas have historically been kept free of other tree species through burning regimes. Controlled burning is often an impractical control method within urban areas, but it may be utilized where laws and site conditions allow. In most cases, oak savanna conditions will be created or maintained via regular mowing and the removal of unwanted tree and shrub species.

An issue parallel to oak restoration is restoration of the surrounding habitat. Although most invasive weed species are not a threat to the oaks themselves, they prevent appropriate native savanna or woodland plant species from becoming established. Natural systems rely on interactions between plants and animals, and non-native plants disrupt these interactions. One goal of the oak plan is to promote development of natural systems to benefit both native plants

and wildlife. Restoration of oak sites will include removal of non-native trees and shrubs, and replanting of native vegetation to enhance the plant community and provide food and shelter for wildlife.

Continuing research will be undertaken to ensure that the most current science is being used in the process of releasing, preserving, and restoring oak habitat. Targeted park sites will be mapped using GPS receivers (when available) to pinpoint restoration areas and significant trees. A step-by-step program will also be used to focus financial and staffing resources for the best outcome. Grant monies will be pursued for additional financing.

SITE MONITORING: A monitoring schedule will be designed for all restoration, preservation, and planting sites, as outlined in the Oak Management Plan objectives. Since the focus is to preserve existing significant oak trees and woodlands, and to plant new oaks with an eye to the future, it will be important to document both current conditions and changes achieved at each site. Monitoring information will indicate any need for changes to a particular oak management plan.

PUBLIC AGENCY REVIEW: Activities in Park District natural areas may be subject to review by the City of Beaverton, Washington County. Activities that may impact water quality or aquatic habitat resources may be subject to review by Clean Water Services and/or the Oregon Department of State Lands (DSL). Washington County Land Use Codes do not require a permit for habitat restoration when not associated with a development process.

Under the City of Beaverton's Tree Plan, no Tree Plan permit is necessary for "Enhancement activities conducted by a public agency for the sole purpose of improving the ecological health of forest and water resources." The City of Beaverton will be supplied with a copy of the Oak Management Plan after it has been approved by the THPRD Management Team. The City will also be notified of specific sites and timelines with regard to oak restoration.

A permit for removal of native vegetation will be needed from Clean Water Services (CWS) when vegetation is removed from sensitive natural areas or resource buffer sites. CWS will be supplied with a copy of the Oak Management Plan as well as details on restoration sites and timelines.

CONCLUSION: Implementation of the Oak Management Plan, including monitoring and other follow-up activities, will provide THPRD with a continuing legacy of big trees and oak woodlands in our parks. Many of the parks within Tualatin Hills Park & Recreation District have mature Oregon white oak trees growing within their boundaries that are threatened by overtopping Oregon ash and Douglas fir trees. In several other parks, significant stands of oak woodland are threatened by overcrowding as well as overtopping. Although the Park District currently does not have oak savanna sites, there are opportunities to plant Oregon white oak to create future savanna.

Preservation and restoration of these significant park resources inspires the three goals of the Oak Management Plan:

- First, to protect large specimens of Oregon white oak.

- Second, to protect Oregon white oak woodlands.
- Third, to establish future Oregon white oak savanna.

The Oak Management Plan is a long-term program designed to improve the health of Oregon white oak trees and woodland sites within the Park District through a careful process of assessment, restoration and monitoring activities. Staff anticipates working on only a few parks each year in order to effectively distribute resources. Suggested: As oak restoration sites are identified, Natural Resources staff will work with other departments to clarify any site issues. Park neighbors and patrons will be notified according to the accepted practices of the park district.



Photo above: A mature Oregon white oak with classic mushroom-shaped crown.

OAK PLAN GOALS, OBJECTIVES, AND TASKS

Goal I: Protect large specimens of Oregon white oak.

Objective A: Identify large Oregon white oak trees present in THPRD parks and assess viability potential.

Tasks:

1. Visit park sites to identify areas with large oaks, and accurately map locations of big trees. Measure dbh and estimate height. Assess health of these trees using live canopy and bole measures at the time of mapping.
2. Construct spreadsheet to record oak information. Construct GIS map if technology allows.

Objective B: Identify threats to the health of these large oaks, and assess potential for release.

Tasks:

1. Record presence of encroaching or overtopping trees within 30 feet of trunk of target tree, including other oaks. Identify these tree species if other than oak. Also record associated native and invasive/non-native plant species within 30 feet of tree.
2. Record presence and species of tree seedlings/saplings within 30 feet of trunk of target tree.
3. Assess park site with regard to cutting/girdling of trees that pose a threat to Oregon white oaks. Is this a good site for release? Are there physical constraints that may restrict release (near a trail, steep slope, abundance of poison oak, sensitive water quality area, etc.)? Will there be political or social considerations that would curtail oak release?

Objective C: Establish timeline and process for release of large, viable trees.

Tasks:

1. Use the Natural Resources Oak Management Plan decision matrix to determine priority status for large oak release sites.
2. Determine any permitting needs for work in natural areas (City of Beaverton, Clean Water Services).
3. Outline tree removal process for release, weed control needed, and any replanting or mitigation that needs to be done. Include species, sizes, and number of trees to be removed. Include removal of tree seedlings/saplings.
4. Schedule release tasks. Notify the THPRD Management Team and City of Beaverton of sites, dates, and scope of work proposed. Arrange for public notification as appropriate.

Objective D: Identify monitoring program and maintenance activities to maintain release efforts.

Tasks:

1. List those tree species that have been removed in order to monitor seedling recurrence, and remove seedlings before they attain tree height.
2. List native shrubs or herbs planted and survival percentages to be maintained.
3. List non-native/invasive plants or trees removed or still existing on the site, and the best management practices to keep those species curtailed.
4. Outline a monitoring schedule for a 10-year period.

OAK PLAN GOALS, OBJECTIVES, AND TASKS (continued)

Goal II: Protect Oregon white oak woodlands.

Objective A: Identify existing Oregon white oak woodlands present in THPRD parks.

Tasks:

1. Visit park sites to identify areas with established oak woodlands, and accurately map locations of these woodlands. Record percentage of Oregon white oak trees compared to presence of other tree species. Assess health of the woodland as a whole.
2. Record oak woodland information on oak spreadsheet, and add oak woodland information to GIS map, if technology allows.

Objective B: Identify threats to the health of the woodlands and assess potential for restoration.

Tasks:

1. Record presence of Douglas fir, Oregon ash, or big-leaf maple trees within oak woodlands. Assess threat by these species to the oaks. Are they merely companion forest components, or will they eventually damage the oaks by overtopping?
2. Assess density of oaks. Does this woodland need to have oaks thinned?
3. Record presence and species of tree seedlings/saplings.
4. Assess park site with regard to preservation of the woodland as an Oregon white oak site. Are there physical constraints that may restrict release (near a trail, steep slope, abundance of poison oak, sensitive water quality area, etc.)? Will there be political or social considerations that would curtail oak release?

Objective C: Establish timeline and process for restoration of appropriate woodlands.

Tasks:

1. Use the Natural Resources Oak Management Plan decision matrix to determine priority status for oak woodland restoration sites.
2. Determine any permitting needs for work in natural areas (City of Beaverton, Clean Water Services).
3. Outline process for preservation, including any needed tree removal, weed control, and any replanting that needs to be done. Include species, sizes, and number of trees to be removed. Include any removal of tree seedlings/saplings.
4. Schedule release tasks. Notify the THPRD Management Team and City of Beaverton of sites, dates, and scope of work proposed. Arrange for public notification as appropriate.

Objective D: Identify monitoring program and maintenance activities to retain restoration efforts.

Tasks:

1. List those tree species that have been removed in order to monitor seedling recurrence, and remove seedlings before they attain tree height.
2. List native shrubs or herbs planted and survival percentages to be maintained.
3. List non-native/invasive plants or trees removed or still existing on the site, and the best management practices to keep those species curtailed.
4. Outline a monitoring schedule for a 10-year period.

OAK PLAN GOALS, OBJECTIVES, AND TASKS (continued)

Goal III: Establish future Oregon white oak savanna.

Objective A: Identify potential future Oregon white oak savanna sites in THPRD parks.

Tasks:

1. Visit park sites to identify open areas with either existing young oaks or a lack of trees. Assess 50-year potential for protection of young oaks. Consider these issues: Is there a development plan for the site? Is the area mowed regularly? Would there be objections to a large tree or trees dominating the site in the future? Are there other young trees that eventually would shade out the oaks? Are there California black oak trees (*Quercus kelloggii*) or other non-native oaks that could be replaced with Oregon white oak?
2. Record future oak savanna information on oak spreadsheet, and add future savanna information to GIS map if technology allows.

Objective B: Establish timeline and process for oak planting and/or preservation.

Tasks:

1. Use the Natural Resources Oak Management Plan decision matrix to determine priority status for planting or preserving future oak savanna sites.
2. Determine any permitting needs for work in natural areas (City of Beaverton, Clean Water Services).
3. Outline process for planting or preservation, including any needed tree removal, weed control, and oak protection devices (cages, stakes, signage, etc.) that might be needed. Schedule meeting with Planning and Maintenance Departments to discuss proposal and potential conflicts.
4. Schedule planting/preservation tasks. Notify the THPRD Management Team and City of Beaverton of sites, dates, and scope of work proposed. Arrange for public notification as appropriate.

Objective C: Identify monitoring program and maintenance activities to protect sites.

Tasks:

1. List those tree species that have been removed in order to monitor seedling recurrence, and remove seedlings before they attain tree height.
2. List native shrubs or herbs planted and survival percentages to be maintained.
3. List non-native/invasive plants or trees removed or still existing on the site, and the best management practices to keep those species curtailed.
4. Determine an appropriate watering schedule for a 2-year period for newly planted oak trees.
5. Outline a monitoring schedule for a 10-year period. Continue conversations with other departments to ensure acceptance, understanding and support for future oak savanna.

OAK PLAN DECISION TREE

The Oak Management Plan Decision Tree consists of two parts. **Decision Tree I** focuses on general site considerations, and offers a guide to distinguish between potential oak savanna preservation sites, potential oak woodland preservation sites, potential future savanna planting sites, and those sites which are not suitable for any oak restoration efforts. **Decision Tree II** focuses on specific site restoration or preservation needs, and organizes potential release sites into three priorities for release. Site explanations are listed below.

Oregon White Oak Savanna Sites (SAO) and Future Savanna Sites (FSAO)

Savanna sites are identified as either planting sites or release sites:

Planting sites do not currently have Oregon white oak trees, but sufficient open natural area exists where habitat and site uses would be conducive to the survival of young oaks. Sufficient open area would allow each oak to exist without other trees within 100 feet. The understory of such a site may contain a few native shrubs, but would mostly consist of either wet prairie or upland meadow native herbaceous species, or existing brush could be cleared to the appropriate density. Low-growing grasses would also be acceptable.

Release sites are those areas that currently have either immature Oregon white oak trees or mature oaks with a more or less mushroom-shaped crown, either as the only tree species or intermixed with other species, in an area where thinning of the oaks and/or removal of other trees would be effective and appropriate. An effective thinning site would result in an attractive open savanna, with less than 30% oak tree cover, where native prairie could be established.

Oregon White Oak Woodland Sites (WDO):

Woodland sites have existing stands of mature and/or immature oaks with a more or less vase-shaped crown, although trees with broader canopies may be included in the stand. Oaks may be the only tree species, or they may be intermixed with other species. Effective restoration would remove Douglas fir, Oregon ash, and bigleaf maple from the stand, and thin the Oregon white oak to a density of 30-60%.

Release Priorities:

First Priority for Release identifies sites with large, mature, viable Oregon white oak trees that are threatened by overtopping. These oak trees typically will have a diameter larger than 20 inches, with a more or less mushroom-shaped crown that has greater than 50% living branches. Removal of overtopping Douglas fir and Oregon ash is an important step in preventing death of the oaks.

Second Priority for Release identifies future Oregon white oak savanna (FSAO). These sites may be currently oak woodland suitable for thinning, or an open area with small oaks to be encouraged in their growth. It may also be an open area without many trees where oaks could be planted for future savanna. Removal of potential threats to the oaks will be considered.

Third Priority for Release identifies Oregon white oak woodlands that are threatened by overcrowding and overtopping (WDO). Some thinning of the oaks may be necessary to allow them to attain the best possible growth. Removal of overtopping Douglas fir and Oregon ash is an important step in preservation of oak woodlands. ***Third Priority for Release*** also pertains to large, mature Oregon white oaks with crowns that are 20-40% live. These are still valuable trees for preservation, but of lesser priority than those with more viable crowns.

OAK PLAN DECISION TREE: Decision Tree I

General Site Considerations: Is this an appropriate site for Oak Restoration?

Aa Oregon white oak trees (*Quercus garryana*) are present in the parkD

Ab Oregon white oaks are not present in the parkB

Ba Sufficient open natural area exists to consider the site as future oak savannaC

Bb The park does not have sufficient open natural area.....*This park will not be part of the Oak Management Plan.*

Ca The park situation (site and uses) is conducive to survival of young oaks, if planted (see criteria): ***This park is a potential Oregon white oak savanna planting site (FSAO).***

Cb The park situation is not conducive to survival of young oaks, if planted *This park will not be part of the Oak Management Plan.*

Da Oregon white oaks on site are not mature (< 12 ft tall and < 3” dbh)E

Db Mature Oregon white oak trees exist on site (\geq 12 ft in height and \geq 3” dbh)F

Ea Immature Oregon white oaks are scattered with few species other than oak, or are intermixed with other tree species, in an area where trees could be thinned without severe political repercussions.... ***This park is a potential Oregon white oak savanna release site (FSAO).***

Eb Immature Oregon white oaks exist in an area where they cannot or will not be protected from encroachment by other tree species..... *This park will not be part of the Oak Management Plan.*

Fa Mature oaks on site have developed a more or less mushroom-shaped crown (**SAO**).....G

Fb Mature oaks on site have a narrow, more or less vase-shaped crown (**WDO**).....H

G Mature oaks with more or less mushroom-shaped crowns are scattered rather than densely-growing, intermixed with few tree species other than oaks, *or* are intermixed with several tree species other than oaks***This park is a potential Oregon white oak savanna preservation or release site (SAO).***

H Mature oaks with vase-shaped crowns are growing fairly densely in a woodland situation, either mostly with Oregon white oak trees or intermixed with several tree species other than oaks***This park is a potential Oregon white oak woodland preservation or release site (WDO).***

OAK PLAN DECISION TREE: Decision Tree II
Specific Site Needs and Recommended Actions

1a Oregon white oak trees are large, with $\geq 20''$ DBH.....2
 1b Oregon white oak trees are not so large, with $< 20''$ DBH.....3

2a Large oak tree have a crown that is at least 50% live.....**First Priority for Release**10
 2b Large oaks have a crown is 20-40% live*This tree will produce a lot of acorns (desperation response), and could be released for continued acorn production. Third Priority for Release*7
 2c Large oaks have a crown is 10% live or less.....*Not a viable tree. Do not cut other native species to save it.*

3a Oregon white oak trees have $< 20''$ DBH but are $> 10'$ tall, and there are a lot of them growing near to each other in a woodland community.....4
 3b Oregon white oak trees are small (less than 10' tall), growing in an open area pretty much by themselves, or with other trees about the same age.....8

4a Some of these woodland community oak trees with $< 20''$ DBH have developed a more or less mushroom-shaped crown.....5
 4b Woodland community oak trees with $< 20''$ DBH have developed narrow, more or less vase-shaped crowns.....7

5a This oak woodland area is a good candidate for thinning of oaks to savanna density to promote full-crown, savanna oak growth over time.....**Second Priority for Release**17
 5b Thinning of this oak woodland to create savanna would create serious difficulties. The area should remain woodland.....**Third Priority for Release**6

6a This oak woodland has Douglas fir or Oregon ash trees or seedlings/saplings growing among the oaks10
 6b No Douglas fir or Oregon ash were found among the oaks.....*Schedule monitoring.*

7a This oak area is a good candidate for thinning of oaks and removal of Douglas fir and Oregon ash to maximize growth potential as an oak woodland...**Third Priority for Release**11
 7b This oak woodland is not a good candidate for thinning of oaks or removal of other tree species.

8a This site with small oak trees can be preserved as future oak savanna by removal of all other trees besides oak, and maintenance by mowing or cutting brush on a regular basis
**Second Priority for Release**.....17b
 8b This site with small oak trees is not a good candidate for future oak savanna (for whatever reason), but the oaks can be protected from direct encroachment by other tree species
**Third Priority for Release**10

OAK PLAN DECISION TREE: Decision Tree II (continued)

Overtopping Threats:

- 10a There are Douglas fir growing within 50 ft (15 m) of the oak’s trunk, either mature or young trees, and/or saplings and seedlings.....11
- 10b There are Oregon ash growing within 50 ft (15 m) of the oaks’ trunk, either mature or young trees, and/or saplings and seedlings14

- 11a The Douglas firs are young trees (less than 10 ft tall) or saplings and/or seedlings
..... *Immediate Action! Pull or cut these right now and save a lot of work!*
- 11b The Douglas firs are mature trees, taller than 10 ft12

- 12a The Douglas fir can be removed and used in other applications
..... *Start the process to remove these trees.*
- 12b Removal of the Douglas fir is not appropriate13

- 13a The Douglas fir is a significant tree in its own right, and should remain in place.
- 13b The Douglas fir can be topped and left in place as a reduced-height snag.
- 13c The Douglas fir can be girdled and allowed to die in place, remaining as a tall snag.

- 14a The Oregon ash are young trees (less than 10 ft tall) or seedlings/saplings.....*Immediate Action! Pull these right now and save a lot of work! If they are too big to pull with the weed wrench, cut them and treat the stump with herbicide.*
- 14b The Oregon ash are mature trees, taller than 10 ft.....15

- 15a The Oregon ash tree can be removed and used in other applications. The stump must be treated with herbicide to prevent resprouting.....*Start the process to remove these trees.*
- 15b Removal of the Oregon ash is not appropriate
...16

- 16a The Oregon ash is a significant tree in its own right, and should remain in place.
- 16b The Oregon ash can be left as a standing snag. Frill the trunk and treat with herbicide to kill the tree.

- 17a Site is currently an oak woodland, with some trees expressing mushroom-shaped canopy. *Thin woodland oaks to a density of 3 to 7 trees per acre. Treat stumps of oaks to prevent resprouting. Keep native shrub cover to 10% or less of area. Remove Douglas fir and Oregon ash trees as appropriate.*

- 17b Site is currently an open area with small oaks (less than 10’ tall) growing in an open area by themselves, or with other trees about the same age.....*Remove all tree species and seedlings/saplings besides Oregon white oak. Thin oaks to 3 to 7 trees per acre. Treat the stumps of regenerative species (including oak) to prevent resprouting. Establish regular mowing/brush cutting schedule.*

GLOSSARY:

Biological diversity: The number of species in a given habitat (biodiversity).

Climax species: The main species of a community of plants and animals, which, through the process of succession, has reached an equilibrium or steady state.

Conservation priorities: Wildlife species or habitats that are defined as threatened, endangered or sensitive, for which specific efforts can be made to improve key threats to those species and their habitat needs.

Controlled burn: An intentionally ignited fire contained within a designated area. The goal is to remove highly flammable undergrowth (and thus reduce the risk of forest fire), or to clear the site in preparation for planting.

Culled: Something picked out from others, especially something rejected because of inferior quality.

dbh: Diameter of a tree at breast height, 4.5 feet above ground level.

Dog-hair woodland: An area (thicket) of dense, even-aged trees characterized by tall, slender growth. Trees are trying to outgrow their neighbors in a competition for sunlight.

Endangered species: A species present in such small numbers that it is at risk of extinction.

Girdling: A band made around the trunk of a tree by the removal of a strip of bark. In the case of conifers, girdling will kill the tree without the need to cut it down.

Goals: For the Oak Management Plan, the goals are the desired future conditions that realize the vision of improving the health of Oregon white oak trees and woodland sites.

GPS: Global Positioning System. This is an electronic system that uses the network of satellites to indicate position on the ground. A GPS receiver is typically a hand-held device that reads the latitude and longitude of your location.

Grassland: An area where grass or grasslike vegetation grows and is the dominant form of plant life.

Habitat mosaic: An area where a range of contiguous habitats occur in transition with one another often displaying considerable gradients and at a fairly fine scale, making the distinction between habitats somewhat difficult.

Herbaceous: A type of plant that has little or no woody tissue. Most plants grown as perennials or annuals are herbaceous, including grasses.

Herbicide application: The application of chemicals formulated to kill plants. Many herbicides are specific to certain types of plants (such as broadleaf weeds); others are effective on a variety of plants.

Invasive weed: A species of plant that has been introduced by human action to an area where it did not previously occur naturally, and where it has the potential to alter ecological relationships among native species, affecting ecosystem function, economic value of ecosystems, and human health. The species is invasive if it becomes capable of establishing a breeding population in the new location without further intervention by humans, and spreads widely throughout the new location.

Inventory: Data collection providing an assessment of site characteristics, allowing the potential of a natural area to be examined.

Mesic: A type of habitat with a moderate or well-balanced supply of moisture.

Mushroom-shaped crown: An open, broadly-spreading and many-branched tree shape, exhibited by Oregon white oak trees that have grown in open areas without any other trees very near.

Oak savanna: An oak community dominated by grasses and grass-like plants, with widely spaced oak trees. Savanna is characterized by having 5% to 30% tree cover, roughly 2 to 13 trees per acre.

Oak woodland: An oak community dominated by trees with a continuous or semi-open canopy. Woodland is characterized by having 30% to 60% tree cover, roughly 40 to 50 trees per acre.

Objectives: Measurable or clearly observably steps needed to reach a goal.

Overtopping: A situation in which a fast-growing tree species grows above and shades a slower-growing tree species.

Prairie: An extensive area of flat or rolling, predominantly treeless grassland.

Release: Refers to the removal of overtopping trees from oak savanna and woodland.

Restoration: An effort to re-establish the prairie, savanna, or wetland habitat that existed before European settlement.

Sensitive species: Any species of plant or animal that has been identified through current or predicted diminishing populations as needing special habitat requirements.

Seral species: Trees that are not true pioneers or climax species. Seral (or successional) communities or species will replace one another until a climax community is achieved.

Shade-intolerant: The inability of a tree or other plant to survive and grow in the shade of taller vegetation.

Snag: A standing dead tree. Snags are useful as wildlife habitat.

Succession: Changes in plant community composition and structure over time, directed by natural or human-influenced disturbances such as fire, flooding, logging, road-building, or pathogens such as root-rot.

Thinning: The cutting and removal of certain trees within a dense stand to create a more open woodland community or savanna, to accelerate the growth of the remaining trees.

Threat: A source of danger to an oak tree, such as a young Douglas fir or Oregon ash tree growing very closely to the oak.

Topping: Removal of the upper part of a tree. With regard to oak preservation, topping would remove that part of an overtopping tree that shades the oak.

Tree removal: Removing the entire tree by cutting at the base. The tree may be left on site or used for other purposes.

Vase-shaped profile: A narrow, non-spreading canopy profile exhibited by Oregon white oak trees that have grown in close proximity to other trees.

Viable: Alive, and capable of remaining alive.

Xeric: A type of habitat with dry conditions in which plant growth may be limited by water shortage.

PEER REVIEW:

The Oak Management Plan was written by Julie Reilly, Natural Resources Specialist, and reviewed by Bruce Barbarasch, Natural Resources Supervisor. The document in its entirety was submitted for peer review to the professionals listed below. The reviewers were pleased to hear that Tualatin Hills Park & Recreation District was initiating Oregon white oak restoration activities, and all comments were favorable with regard to the Oak Management Plan and the goals and objectives as written. One reviewer asked for permission to use the plan for the restoration efforts their organization was undertaking. Comments and suggested changes as offered by the reviewers were incorporated into the final proposal.

Lynda Boyer
Restoration Biologist, Heritage Seedlings, Inc., Salem

Bruce Campbell
Landowner Incentive Program Coordinator, Oregon Department of Fish and Wildlife, Salem

Peter Guillozet
Water Resources Project Coordinator, Clean Water Services, Hillsboro

Jonathan Soll
Willamette Basin Conservation Director, The Nature Conservancy of Oregon, Portland

Mark G. Wilson
Ecologist, City of Portland

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