
THE ENCLAVE AT OAK TREE

THURSTON COUNTY, WASHINGTON

OREGON WHITE OAK HABITAT MANAGEMENT PLAN



Prepared By:

Curtis Wambach, M.S.
Senior Biologist and Principal



7 July 2023

360-790-1559

www.envirovector.com

THE ENCLAVE AT OAK TREE

OREGON WHITE OAK HABITAT MANAGEMENT PLAN

Prepared For:

The Enclave at Oak Tree

Prepared By:

Curtis Wambach, M.S.,
Senior Biologist and Principal
EnviroVector
Olympia, WA 98502

(360) 790-1559



7 July 2023

Table of Contents

1.0	Introduction	1
1.1	Purpose.....	1
1.2	Project Location	1
1.3	Property Description	1
2.0	Methodology	2
2.1	Information Review	2
2.2	Field Investigation.....	2
2.3	Wildlife Reconnaissance Methodology.....	2
2.4	WDFW Management Recommendations.....	3
3.0	Oak habitat	3
3.1	General Information	3
3.1.1	Definition of Protected Oak Habitats	4
3.2	Distribution	4
3.3	Habitat.....	4
3.4	Threats to Oregon Oak	5
4.0	Results	6
4.1	Analysis of Existing Information	6
4.1.1	DNR Oak Habitat	6
4.1.2	Thurston County Geodata Center (Soils)	6
4.2	Field Evaluation	7
4.2.1	Vegetation Communities and Habitat Types	7
4.2.2	Oregon White Oak Habitat	7
4.2.3	Oak Associated Plant Species	14
4.2.4	European Lawn Grasses	14
4.2.5	Forested Vegetation Community	15
5.0	Wildlife.....	15
5.1	Red-tailed Hawk Nest	16
6.0	Regulatory Considerations	17
6.1	Important Habitats and Species.....	17
6.2	Habitat Management Plan Buffers	17
6.3	Mitigation Requirements.....	18
6.4	Tree Protection.....	18
6.5	Vegetation Removal.....	18
7.0	Proposed Project.....	19
8.0	Summary and Conclusion.....	19
9.0	References	20

1.0 INTRODUCTION

1.1 Purpose

Development activities in oak habitat areas and within six hundred (600) feet of those habitats require a special report/habitat management plan under TCC 24.35.260. A Habitat Management Plan (HMP) has been prepared to satisfy TCC 24.25.065 (B)---*Important habitats and species*: Oregon white oak woodlands, stands, and individual trees.

This HMP will evaluate:

- 1) The existing conditions on the site,
- 2) Quality of existing oak habitat,
- 3) Potential construction impacts to oak habitat,
- 4) Opportunities to preserve, protect, or mitigate impacts, and
- 5) The implementation of Management Recommendations for Washington's Priority Habitats: Oregon White Oak Woodlands by the Washington Department of Fish and Wildlife (Larsen and Morgan, 1998).

1.2 Project Location

The 33.73-acre subject property is located on Marvin Road in Thurston County (**Figure 1; Table 1**).

Table 1. Parcels Comprising Subject Property

No#	Address	Parcel Number	Map Coordinates	Area
1	2402 MARVIN RD SE	11823430100	Section 23 Township 18 Range 1W	18.66
2	2623 WOODGROVE ST SE	11826110000		15.07
2 Parcels	Total Size			33.73 acres

Permitting jurisdiction is Thurston County.

1.3 Property Description

The 33.73-acre subject property consists of three (2) parcels. Vegetation on the western portion of the subject property primarily consist of European grasses, Scotch broom (*Cytisus scoparius*, FACU), and Himalayan blackberry (*Rubus armeniacus*, FAC) with scattered trees and native plants (**Appendix A, Photos 21-24**). The entire subject property, other than the 2.5-acre parcel, contained few trees in 1990, as seen on historical aerial photographs from Google Earth. The 2.5-acre lot was cleared around the year 2000, based on these historical aerial photographs.

Historical aerial photographs show areas of the western portion of the property occasionally mowed and repopulated by yellow-flowered Scotch broom, which can be seen on ariel photographs.

The eastern and southern portions of the subject property have reforested since clearing. Many of the logging roads remain intact throughout the subject property.

Aerial photographs show a wet area on the northern property edge. This area remained relatively unchanged since 1990 based on the historical ariel photographs. Seasonal water fluctuations are observable on these historical aerial photographs. Observing the water fluctuations is possible because no trees or shrubs were present in the wet area at least since 1990.

2.0 METHODOLOGY

2.1 Information Review

Background information was reviewed prior to field investigations and includes the following:

1. Department of Natural Recourses (DNR) Oak Stands (**Appendix B**)
2. Thurston County Geodatabase Soils (**Appendix C**)
3. Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) Database (**Appendix D**)
4. State Department of Natural Resources (DNR) Natural Heritage Database (**Appendix E**)
5. Thurston County Code (TCC)
6. Washington's Priority Habitats: Oregon White Oak Woodlands by the Washington Department of Fish and Wildlife

2.2 Field Investigation

The entire 6.69-acre subject property has been evaluated on foot. Equipment included Trimble, Garmin, diameter tape, portable camera, and field notebook. Site Evaluations were performed on 25 April 2022 and 2 May 2022. Vegetation types have been characterized and mapped on the site. Present and past land use practices were also recognized, as were significant geological and hydrological features.

2.3 Wildlife Reconnaissance Methodology

An inventory of wildlife occurrence on the subject property was compiled through the field survey and through a review of background information obtained from USFWS, WDFW, and the Department of Natural Resources (DNR) Natural Heritage Program. Information concerning amphibian and reptile species was based on Brown *et al.* (1995), Kozloff (1978), Leonard *et al.* (1993), Nussbaum *et al.* (1983), and Olson *et al.* (1997). Bird species information was based on Acorn and Baron (1997), Hunn (1982), Johnsgard (1990), and Kozloff (1978). Information concerning birds' nests, nesting cavities, woodpecker feeding stations, animal tracks, scats, and other wildlife indicators was based on Harrison (1979) and Murie (1974). Background information about mammals was based on Forey and Fitzsimons (1987), King County (1987), and Whitaker (1996).

2.4 WDFW Management Recommendations

Management recommendations are designed to maintain and enhance the integrity of Oregon white oak woodlands, reverse the trend of oak habitat loss, and promote the protection of oak habitat that is presently in good condition. Encroaching conifers within oak groves should be thinned, and conifers adjacent to these stands should be retained for wildlife. An alternative to removing trees is to leave them standing as snags.

Specific WDFW Management Recommendations include but are not limited to the following:

- Allow low-impact recreation.
- Thin encroaching conifers in oak woodlands.
- Retain large, dominant oaks and standing dead and dying trees.
- Create snags when thinning conifers instead of removing trees.
- Leave fallen trees, limbs, and leaf litter for foraging, nesting, and denning sites.
- Retain contiguous aerial pathways.

Other WDFW Management Recommendations for oak enhancement include the following:

- Planting Oregon white oak acorns and seedlings.
- Moving toward the elimination of grazing on oak woodlands.
- Designating contiguous oak and oak/conifer stands as critical areas.

3.0 OAK HABITAT

3.1 General Information

Oregon white oak (*Quercus garryana*) is Washington's only native oak. Oaks and their associated flora communities comprise distinct woodland ecosystems. The various plant communities and stand age mixtures within oak forests provide habitat that contributes to wildlife diversity statewide. In conjunction with other forest types, oak woodlands provide a mix of feeding, resting, and breeding habitat for many wildlife species. Oak woodlands provide habitat for more than two hundred (200) vertebrate species and a profusion of invertebrate species (Larsen & Morgan, 1998). Acorns, leaves, and wood provide food, shelter, and cavities to support wildlife species.

Conifer encroachment is a significant threat to oak habitat and is aggravated by fire suppression, timber conversion, and cattle grazing. Grazing, a primary use of oak woodlands, reduces species richness of ground cover, increases soil moisture, compacts soils, and disturbs sod, all of which may promote conifer growth and encroachment.

Fire suppression has contributed to the decline of Oregon white oak woodlands. Natural fires and those intentionally set by Native Americans historically played a paramount role in oak forest ecology, especially natural oak regeneration. Frequent low-intensity fires curbed conifer encroachment, controlled stand density, and initiated oak sprouting.

3.1.1 Definition of Protected Oak Habitats

Oak habitat is defined under TCC 24.03.010---*Definitions*, as follows:

"Oak habitat" means stands of Oregon white oak (*Quercus garryana*) or Oregon white oak/conifer associations where canopy coverage of the oak component of the stand is twenty-five percent or more ($\geq 25\%$); or where total canopy coverage of the stand is less than twenty-five percent ($< 25\%$), but oak accounts for at least fifty percent ($< 50\%$) of the canopy coverage. The latter is often referred to as oak savanna. Oak habitat includes oak savannas and oak woodlands.

"Oak savanna" means an oak habitat with a community of widely spaced Oregon white oak trees (*Quercus garryana*) where total canopy coverage is less than twenty-five percent ($< 25\%$) but where Oregon white oak accounts for at least fifty percent of the canopy coverage above a layer of native prairie grasses and forbs. The spacing of these trees is widely scattered so that there is no closed canopy and groups of trees. In degraded habitat, trees may be more widely spaced above a layer of non-native vegetation on developed property.

"Oak woodlands" means those stands of Oregon white oak (*Quercus garryana*) or Oregon white oak/conifer associations where the crown cover of the Oregon white oak component of the stand is greater than or equal to twenty-five percent ($\geq 25\%$). In degraded habitat, the Oregon white oak component of the stand may be less than twenty-five percent ($< 25\%$), or the canopy coverage may be less than fifty percent ($< 50\%$).

3.2 Distribution

Oak habitat originally became established during a warm and dry period about six thousand (6,000) years ago, when oak stands had reached their most widespread distribution in Washington State. The subsequent trend toward cooler and moister climatic conditions favored conifer establishment and has probably contributed to the diminished extent of Oregon white oak today (Larsen and Morgan, 1998). The current distribution of Oregon white oak woodlands in Washington is limited primarily to the Puget Trough, Washington's south-central counties, along the Columbia Gorge, and northward along the east side of the Cascade Range.

3.3 Habitat

Oregon oak is a component of several different plant community types within its range and often occupies a narrow sub-zone between prairies and conifer forests. It is found in open savannas, in pure stands, and intermixed with conifers and other deciduous trees, but it is usually confined to drier microsites within conifer zones.

In Washington, oak stands typically occur within the sixty-three (63) to one hundred two (102) cm (25-40 in) rainfall zone. Most important is a ten (10) to twenty-five (25) cm (4-10 in) range for rainfall during the growing season that occurs between April and September. Stands that receive more than twenty-five (25) cm (10 in) of rainfall during the growing season typically encounter greater competition from faster growing coniferous tree species (Sprague and Hansen, 1946; Larsen and Morgan, 1998).

Oregon white oak is tolerant of a broad array of soil types. It is frequently found in well-drained, gravelly soils, but in the Pacific Northwest it reaches optimum development in the deep loams of southwestern Washington and the Willamette Valley in Oregon.

In the moist, Douglas-fir dominated Puget Trough, Oregon white oaks are associated with subzones between prairie and conifer forest. Typical oak woodland understory shrub associates include ocean spray, high-bush cranberry, beaked hazelnut, serviceberry, common snowberry, trailing blackberry, Oso berry plum, poison oak, tall Oregon grape, and Scot's broom. Forb species may include western bittercress, American vetch, western wood strawberry, spring beauty, chickweed, balsamroot, and lupine. Some grasses found are velvet grass, bluebunch wheatgrass, long-stoloned sedge, red fescue, Idaho fescue, western ryegrass, orchard grass, and Kentucky bluegrass.

Like oaks in Washington, western gray squirrels were probably more widely distributed in prehistoric times, and their decline parallels that of the Oregon white oak. However, it should be noted that the decline of this squirrel species is also attributed to factors not related to the Oregon white oak. Introduction of non-native species, diseases transmitted from those species, and competition from these non-native species in a rapidly changing human-dominated landscape, have contributed to the decline of the species. Eastern gray squirrels are more tolerant of human disturbance and have invaded urbanizing areas within western gray squirrel range and can more easily adapt to alternative food sources.

3.4 Threats to Oregon Oak

Thurston County contains about ten thousand (10,000) acres of oak and mixed oak stands (WDFW, 1998). The decline of Oregon white oak in Washington has been accelerated by a number of human activities. Stand thinning and land conversion for conifer production, agriculture, fuel wood cutting, cattle grazing, and other human land uses are all considered significant contributors to the current decline of Oregon white oak. The suppression of wildfires, along with continued cattle grazing and timber conversion, are thought to contribute to encroachment by Douglas fir in sites historically dominated by Oregon white oak.

Douglas fir encroachment may be the most significant and widespread threat to the existence of Oregon white oak communities within its western range. Douglas fir grows at a rate three (3) to five (5) times that of Oregon white oak (Sprague and Hansen, 1946), and oak seedlings and saplings can be quickly outcompeted by faster growing conifers. Shade tolerance is higher in the juvenile stage than mature stages of Oregon white oak. Once oak trees become overtopped by Douglas-fir, they are unable to withstand the subsequent low light intensities.

4.0 RESULTS

4.1 Analysis of Existing Information

4.1.1 DNR Oak Habitat

A large portion of the subject property has been mapped as ‘oak-conifer forest or woodland canopy’ by the State Department of Natural Resources (DNR) Oaks and Grasslands database (**Figure 7**). The western border and southwestern corner of the subject property is mapped as ‘oak-dominant forest or woodland canopy’. ‘Urban Oak Canopy’ is mapped north of the subject property and on the southeastern corner of the subject property extending east of the subject property.

4.1.2 Thurston County Geodata Center (Soils)

Six (6) soil types are mapped on the subject property by the Thurston County Geodata Center (**Appendix C; Table 2**).

Table 2. Summary of Thurston County Soils

Soil Unit	Comments
Spana gravelly loam	Mapped on northwestern edge of subject property
Cagey loamy sand	Mapped on northwestern portion of subject property
Mukilteo muck, drained	Mapped on northern portion of subject property in wet area
Alderwood gravelly sandy loam, 3 to 15% slopes	Mapped on northeastern portion of subject property
Indianola loamy sand, 15 to 30% slopes	Mapped on northeastern property edge
Indianola loamy sand, 0 to 3% slopes	Mapped on southwestern portion of subject property
Indianola loamy sand 3 to 15% slopes	Mapped on majority of subject property

4.1.3 WDFW PHS Database

No oak endemic species have been mapped on the subject property by the Washington department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) Database (**Appendix D**).

One (1) fresh water emergent wetland is mapped on the northern edge of the subject property.

Mountain quail (*Oreortyx pictus*) presence is documented on the eastern portion of the subject property in October 1993. Mountain quail is not a State or Federally-listed species that has been introduced to Western Washington for the purpose of hunting. This is a highly managed species where populations have declined in their native range, which includes Asotin, Garfield, and Columbia Counties.

The big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*) and Yuma myotis (*Myotis yumanensis*) are mapped in the township.

4.1.4 DNR Natural Heritage Database

No rare plants and nonvascular species of high conservation value were identified on the subject property of within one thousand (1,000) feet of the subject property by the DNR Natural Heritage Database (**Appendix E**).

4.2 Field Evaluation

4.2.1 Vegetation Communities and Habitat Types

Three (3) major vegetation types occur on the subject property including:

1. Douglas Fir Forest

Vegetation of the eastern and southern portions of the subject property consist of Douglas fir (*Pseudotsuga menzeisii*) dominated forest excluding oak trees. The understory vegetation includes salal (*Gaultheria shallon*), snowberry (*Symphoricarpos albus*), Osoberry (*Oemleria cerasiformis*), and dense shrub understory.

2. European Lawn Forbes/ Grasses, Scotch Broom, & Himalayan blackberry

Vegetation on the western and central portions of the subject property consist of European lawn grasses, scotch broom, Himalayan blackberry, and associated lawn herbs.

3. Oak Woodland Habitat

Vegetation on the northwestern portion of the subject property consists of Oak woodland with individual oak trees occurring along northern and eastern borders of the subject property (**Figure 2; Appendix A, Photos 3 & 11**). Understory oak woodland associations including beaked hazelnut, ocean spray, and serviceberry are present at the site. Invasive scotch broom is present throughout the subject property. Some individual oak trees occur on the north-central portion of the subject property.

4.2.2 Oregon White Oak Habitat

A total of two hundred nine (209) Oregon white oak trees were identified, tagged using metal tree tags, and mapped on the subject property as a part of this study. These oak trees have been GNSS located using a Trimble Geo 7x with sub-foot accuracy and plotted on AutoCAD (**Table 4, Figures 2-5; Appendix A, Photos 1-16**).

An additional thirty-two (32) oak trees located offsite or on the western property line were identified, tagged, labeled, and GNSS located as part of a study performed by EnviroVector on a neighboring property located west of the southern portion of the subject property under a different applicant. The results of this neighboring study were incorporated into this report.

All of the oak trees on the subject property and the additional oak trees from the previous study have been GNSS located using a Trimble Geo 7x with sub-foot accuracy and plotted on AutoCAD (**Table 5, Figures 2-5; Appendix A, Photos 1-16**).

Table 4. Tagged Oak Trees and Measurements Onsite

Tree Tag #	Dbh (inches)	Dripline (feet)	Species	On-site/offsite	Comments
1	27 in	22 ft	Oregon white oak	Onsite	Galls on branches/Oak Woodland
2	13.5 in	42 ft	Oregon white oak	Onsite	Acorns by base of the tree
3	1.25 in	2 ft	Oregon white oak	Onsite	Small individual oak tree
4	21 in	25 ft	Oregon white oak	Onsite	Acorns by base of the tree
16	15 in	25 ft	Oregon white oak	Onsite	Oak Woodland
17	10.25 in	27 ft	Oregon white oak	Onsite	
18	8 in	27 ft	Oregon white oak	Onsite	
19	11 in	8 ft	Oregon white oak	Onsite	
20	20 in	38 ft	Oregon white oak	Onsite	
21	12.5 in	18 ft	Oregon white oak	Onsite	
22	<1 in	2.5 ft	Oregon white oak	Onsite	
23	1.5 in	4 ft	Oregon white oak	Onsite	
24	12 in	12 ft	Oregon white oak	Onsite	
25	15.5 in	26 ft	Oregon white oak	Onsite	
26	11.5 in	19 ft	Oregon white oak	Onsite	
27	12.25 in	21 ft	Oregon white oak	Onsite	
28	5 in	9 ft	Oregon white oak	Onsite	
29	2.25 in	5 ft	Oregon white oak	Onsite	
30	8.75 in	18 ft	Oregon white oak	Onsite	
31	6 in	15 ft	Oregon white oak	Onsite	
32	14 in	23 ft	Oregon white oak	Onsite	
33	3.25 in	8.5 ft	Oregon white oak	Onsite	
34	4.83 in	4 ft	Oregon white oak	Onsite	
35	8.25 in	18 ft	Oregon white oak	Onsite	
36	12.5 in	19 ft	Oregon white oak	Onsite	
37	2.83 in	8 ft	Oregon white oak	Onsite	
38	7.25 in	17 ft	Oregon white oak	Onsite	
39	7.83 in	20 ft	Oregon white oak	Onsite	
40	11 in	23 ft	Oregon white oak	Onsite	
41	3 in	7 ft	Oregon white oak	Onsite	
42	6.25 in	7 ft	Oregon white oak	Onsite	
43	11 in	29.5 ft	Oregon white oak	Onsite	
44	6.5 in	14.5 ft	Oregon white oak	Onsite	
45	10.5 in	18 ft	Oregon white oak	Onsite	
46	5.5 in	8.5 ft	Oregon white oak	Onsite	
47	6.5 in	12 ft	Oregon white oak	Onsite	
48	7 in	10.5 ft	Oregon white oak	Onsite	
49	7.75 in	10 ft	Oregon white oak	Onsite	
50	18.75 in	30.5 ft	Oregon white oak	Onsite	
51	2.83 in	9 ft	Oregon white oak	Onsite	
52	16.83 in	24 ft	Oregon white oak	Onsite	
53	13 in	24 ft	Oregon white oak	Onsite	
54	1.5 in	5 ft	Oregon white oak	Onsite	
55	20.5 in	23 ft	Oregon white oak	Onsite	
56	22 in	24 ft	Oregon white oak	Onsite	

Table 4. Tagged Oak Trees and Measurements Onsite (Continued)

Tree Tag #	Dbh (inches)	Dripline (feet)	Species	On-site/offsite	Comments
57	12.6 in	20.5 ft	Oregon white oak	Onsite	Oak Woodland
58	13.7 in	13 ft	Oregon white oak	Onsite	
59	7.8 in	25 ft	Oregon white oak	Onsite	
60	7.3 in	13 ft	Oregon white oak	Onsite	
61	14.5 in	22 ft	Oregon white oak	Onsite	
62	15.5 in	15 ft	Oregon white oak	Onsite	
63	4.5 in	7 ft	Oregon white oak	Onsite	
64	11.5 in	28 ft	Oregon white oak	Onsite	
65	12.7 in	11 ft	Oregon white oak	Onsite	
66	5.2 in	10 ft	Oregon white oak	Onsite	
67	6.5 in	14 ft	Oregon white oak	Onsite	
68	4.5 in	3 ft	Oregon white oak	Onsite	
69	10.5 in	21 ft	Oregon white oak	Onsite	
70	11 in	19 ft	Oregon white oak	Onsite	
71	13.5 in	21 ft	Oregon white oak	Onsite	
72	11.25 in	24 ft	Oregon white oak	Onsite	
73	11.5 in	16 ft	Oregon white oak	Onsite	
74	11.9 in	17 ft	Oregon white oak	Onsite	
75	12.7 in	17 ft	Oregon white oak	Onsite	
76	<1 in	5 ft	Oregon white oak	Onsite	
77	9.7 in	14 ft	Oregon white oak	Onsite	
78	9.3 in	14 ft	Oregon white oak	Onsite	
79	16 in	2.6 ft	Oregon white oak	Onsite	
80	10 in	21 ft	Oregon white oak	Onsite	
81	11.7 in	14 ft	Oregon white oak	Onsite	
82	12.5 in	19 ft	Oregon white oak	Onsite	
83	6.5 in	7 ft	Oregon white oak	Onsite	
84	13 in	27 ft	Oregon white oak	Onsite	
85	<1 in	9 ft	Oregon white oak	Onsite	
86	<1 in	9 ft	Oregon white oak	Onsite	
87	<1 in	9 ft	Oregon white oak	Onsite	
88	<1 in	9 ft	Oregon white oak	Onsite	
89	2.5 in	9 ft	Oregon white oak	Onsite	
91	2 in	25 ft	Oregon white oak	Onsite	
92	<1 in	8.5 ft	Oregon white oak	Onsite	
93	2.5 in	7 ft	Oregon white oak	Onsite	
94	12 in	28 ft	Oregon white oak	Onsite	Galls
95	19.5 in	29 ft	Oregon white oak	Onsite	Oak Woodland
96	10 in	25 ft	Oregon white oak	Onsite	
97	6.5 in	12 ft	Oregon white oak	Onsite	Galls
98	14.2 in	23 ft	Oregon white oak	Onsite	Oak Woodland
99	7 in	17 ft	Oregon white oak	Onsite	

Table 4. Tagged Oak Trees and Measurements Onsite (Continued)

Tree Tag #	Dbh (inches)	Dripline (feet)	Species	On-site/offsite	Comments
100	7.5 in	10 ft	Oregon white oak	Onsite	Oak Woodland
101	21.5 in	36 ft	Oregon white oak	Onsite	
102	18.9 in	25 ft	Oregon white oak	Onsite	
103	6.8 in	8.5 ft	Oregon white oak	Onsite	
104	30.8 in	51 ft	Oregon white oak	Onsite	
105	14.4 in	23.5 ft	Oregon white oak	Onsite	
106	12 in	39 ft	Oregon white oak	Onsite	
107	14.6 in	23.5 ft	Oregon white oak	Onsite	
108	8 in	22 ft	Oregon white oak	Onsite	
109	5 in	14 ft	Oregon white oak	Onsite	
110	11.4 in	25 ft	Oregon white oak	Onsite	
111	7 in	14 ft	Oregon white oak	Onsite	
112	6.8 in	16 ft	Oregon white oak	Onsite	
113	10.2 in	28 ft	Oregon white oak	Onsite	
114	15 in	24 ft	Oregon white oak	Onsite	
115	11.3 in	11 ft	Oregon white oak	Onsite	
116	13.6 in	19 ft	Oregon white oak	Onsite	
117	7.3 in	12 ft	Oregon white oak	Onsite	
118	15.1 in	23 ft	Oregon white oak	Onsite	
119	7.9 in	21 ft	Oregon white oak	Onsite	
120	5.2 in	10 ft	Oregon white oak	Onsite	
121	8.8 in	27 ft	Oregon white oak	Onsite	
122	6.8 in	15.5 ft	Oregon white oak	Onsite	
123	6.2 in	11.5 ft	Oregon white oak	Onsite	
124	11.2 in	18 ft	Oregon white oak	Onsite	
125	7 in	6.5 ft	Oregon white oak	Onsite	
126	11 in	14.5 ft	Oregon white oak	Onsite	
127	7.2 in	14.5 ft	Oregon white oak	Onsite	
128	11.5 in	18 ft	Oregon white oak	Onsite	
129	7.4 in	10 ft	Oregon white oak	Onsite	
130	10.1 in	11 ft	Oregon white oak	Onsite	
131	9.3 in	14 ft	Oregon white oak	Onsite	
132	6.2 in	6 ft	Oregon white oak	Onsite	
133	5 in	5.5 ft	Oregon white oak	Onsite	
134	11.4 in	16 ft	Oregon white oak	Onsite	
135	13.4 in	34 ft	Oregon white oak	Onsite	
136	8.2 in	11 ft	Oregon white oak	Onsite	
137	15.3 in	14 ft	Oregon white oak	Onsite	
138	6.8 in	25 ft	Oregon white oak	Onsite	
139	15.3 in	32 ft	Oregon white oak	Onsite	
140	10.8 in	25 ft	Oregon white oak	Onsite	
141	7.9 in	11 ft	Oregon white oak	Onsite	

Table 4. Tagged Oak Trees and Measurements Onsite (Continued)

Tree Tag #	Dbh (inches)	Dripline (feet)	Species	On-site/offsite	Comments
142	8.5 in	13 ft	Oregon white oak	Onsite	Oak Woodland
143	12.1 in	22 ft	Oregon white oak	Onsite	
144	10.5 in	9.5 ft	Oregon white oak	Onsite	
145	23.3 in	36 ft	Oregon white oak	Onsite	
146	5.8 in	11 ft	Oregon white oak	Onsite	
147	5.5	2 ft	Oregon white oak	Onsite	
148	12.3 in	36 ft	Oregon white oak	Onsite	
149	7.4 in	10 ft	Oregon white oak	Onsite	
150	10.7 in	18.5 ft	Oregon white oak	Onsite	
151	8.9 in	14 ft	Oregon white oak	Onsite	
152	5.8 in	19 ft	Oregon white oak	Onsite	
153	12.7 in	18.5 ft	Oregon white oak	Onsite	
154	7.8 in	15.5 ft	Oregon white oak	Onsite	
155	6 in	18 ft	Oregon white oak	Onsite	
156	13.4 in	29 ft	Oregon white oak	Onsite	
157	20.1 in	30 ft	Oregon white oak	Onsite	
158	9.7 in	9 ft	Oregon white oak	Onsite	
159	8.7 in	11 ft	Oregon white oak	Onsite	
160	15.3 in	24 ft	Oregon white oak	Onsite	
161	8.3 in	15 ft	Oregon white oak	Onsite	
162	9.5 in	24.5 ft	Oregon white oak	Onsite	
163	8.5 in	25 ft	Oregon white oak	Onsite	
164	12.8 in	26 ft	Oregon white oak	Onsite	
165	8.6 in	23.5 ft	Oregon white oak	Onsite	
166	10 in	17 ft	Oregon white oak	Onsite	
167	8.9 in	21 ft	Oregon white oak	Onsite	
168	6.8 in	16 ft	Oregon white oak	Onsite	
169	10.3 in	26 ft	Oregon white oak	Onsite	
170	10.2 in	28 ft	Oregon white oak	Onsite	
171	10.7 in	24 ft	Oregon white oak	Onsite	
172	4.9 in	11 ft	Oregon white oak	Onsite	
173	9.9 in	19.5 ft	Oregon white oak	Onsite	
174	10.6 in	18 ft	Oregon white oak	Onsite	
175	11.3 in	23 ft	Oregon white oak	Onsite	
176	6.1 in	20 ft	Oregon white oak	Onsite	
177	11.4 in	22 ft	Oregon white oak	Onsite	
178	9.7 in	25.5 ft	Oregon white oak	Onsite	
179	10.3 in	20 ft	Oregon white oak	Onsite	
180	10.6	23 ft	Oregon white oak	Onsite	
181	7.5 in	20 ft	Oregon white oak	Onsite	
182	10.5 in	26 ft	Oregon white oak	Onsite	
183	10 in	25 ft	Oregon white oak	Onsite	

Table 4. Tagged Oak Trees and Measurements Onsite (Continued)

Tree Tag #	Dbh (inches)	Dripline (feet)	Species	On-site/offsite	Comments
184	4.1 in	20 ft	Oregon white oak	Onsite	Oak Woodland
185	6.8 in	8.5 ft	Oregon white oak	Onsite	
186	5.9 in	8 ft	Oregon white oak	Onsite	
187	6.4 in	13 ft	Oregon white oak	Onsite	
188	10.5 in	12 ft	Oregon white oak	Onsite	
189	10.2 in	21 ft	Oregon white oak	Onsite	
190	11.2 in	34 ft	Oregon white oak	Onsite	
191	13.6 in	30.5 ft	Oregon white oak	Onsite	
192	10.3 in	28.5 ft	Oregon white oak	Onsite	
193	<1 in	7 ft	Oregon white oak	Onsite	
194	1 in	9 ft	Oregon white oak	Onsite	
195	3.6 in	4 ft	Oregon white oak	Onsite	
196	3.6 in	5 ft	Oregon white oak	Onsite	
197	3 in	5 ft	Oregon white oak	Onsite	
198	<1 in	4 ft	Oregon white oak	Onsite	
199	<1 in	5 in	Oregon white oak	Onsite	
200	<1 in	5 in	Oregon white oak	Onsite	
201	<1 in	5 in	Oregon white oak	Onsite	
202	<1 in	5 in	Oregon white oak	Onsite	
203	2.5 in	5 in	Oregon white oak	Onsite	
204	<1 in	1 ft	Oregon white oak	Onsite	
205	7.4 in	12 ft	Oregon white oak	Onsite	
206	5.7 in	8.5 ft	Oregon white oak	Onsite	
207	<1 in	2 ft	Oregon white oak	Onsite	
208	<.5 in	1 ft	Oregon white oak	Onsite	
209	<1 in	3 ft	Oregon white oak	Onsite	

Table 5. Tagged Trees Mostly Offsite or on Property Line

Tree tag #	Dbh (inches)	Dripline (feet)	Species	On-site/offsite	Comments
1	15.5 in	28 ft	Oregon white oak	Onsite	
2	19 in	29.5 ft	Oregon white oak	Onsite	
3	8.75 in	6 ft	Oregon white oak	Onsite	
4	17.5 in	27.25 ft	Oregon white oak	Onsite	
5	10.5 in	16 ft	Oregon white oak	Offsite	
6	16 in	17 ft	Oregon white oak	Offsite	
7	6.75 in	9 ft	Oregon white oak	Offsite	
8	6.75 in	9 ft	Oregon white oak	Offsite	
9	13.5 in	24 ft	Oregon white oak	Offsite	
10	10 in	14 ft	Oregon white oak	Offsite	
11	9.5 in	22 ft	Oregon white oak	Offsite	
12	2.5 in	8.75 ft	Oregon white oak	Offsite	
13	0.5 in	7 ft	Oregon white oak	Offsite	
14	25 in	35 ft	Oregon white oak	Offsite	
15	13 in	15 ft	Oregon white oak	Offsite	
16	15 in	25 ft	Oregon white oak	Offsite	
17	12 in	20 ft	Oregon white oak	Onsite	
18	8 in	19 ft	Oregon white oak	Onsite	
19	11 in	29 ft	Oregon white oak	Onsite	
20	20 in	29 ft	Oregon white oak	Onsite	
21	18 in	30 ft	Oregon white oak	Onsite	
22	11.25 in	12 ft	Oregon white oak	Onsite	Downed Oak, still alive
23	18 in	22 ft	Oregon white oak	Onsite	Downed Oak, still alive
24	39 in	39 ft	Oregon white oak	Onsite	Oak Woodland
25	13.5 in	32 ft	Oregon white oak	Onsite	
26	18.75 in	33 ft	Oregon white oak	Onsite	
27	14.9 in	25 ft	Oregon white oak	Offsite	
28	~3 in	~2 ft	Oregon white oak	Offsite	
39	~4 in	~2 ft	Oregon white oak	Onsite	
30	~4 in	~2 ft	Oregon white oak	Onsite	
31	~4 in	~2 ft	Oregon white oak	Onsite	
32	~5 in	~3 ft	Oregon white oak	Onsite	

4.2.3 Oak Associated Plant Species

Other plant species identified that are associated with onsite oak trees include:

- Douglas fir (*Pseudotsuga menziesii*)
- Big-leaf maple (*Acer macrophyllum*)
- Pacific madrone (*Arbutus menziesii*)
- Ocean spray (*Holodiscus discolor*)
- Serviceberry (*Amelanchier alnifolia*)
- Tall Oregon grape (*Mahonia aquifolium*)
- Beaked hazelnut (*Corylus cornuta*)
- Osoberry (*Oemleria cerasiformis*)
- Snowberry (*Symphoricarpos albus*)
- Trailing blackberry (*Rubus ursinus*)
- Scotch broom (*Cytisus scoparius*)

4.2.4 European Lawn Grasses

European grasses that are typically associated with lawns occur on the central portion of the subject property.

Dominant lawn plant species include:

- Orchard grass (*Dactylis glomerata*)
- Red fescue (*Festuca rubra*)
- Sweet vernal grass (*Anthoxanthum odoratum*)
- Reed canary grass (*Phalaris arundinacea*)
- English plantain (*Plantago lanceolata*)
- Hairy cat's ear (*Hypochaeris radicata*)
- Common vetch (*Vicia sativa*)
- Common chickweed (*Stellaria media*)
- Subterranean clover (*Trifolium subterraneum*)

4.2.5 Forested Vegetation Community

A forested area containing a complete canopy dominated by Douglas fir is located on the southern portion of the Subject property. Dominant plant species in this forested area include:

- Douglas fir (*Pseudotsuga menziesii*)
- Big-leaf maple (*Acer macrophyllum*)
- English holly (*Ilex aquifolium*)
- Bitter cherry (*Prunus emarginata*)
- Osoberry (*Oemleria cerasiformis*)
- Snowberry (*Symphoricarpos albus*)
- Salal (*Gaultheria shallon*)
- Beaked hazelnut (*Corylus cornuta*)

5.0 WILDLIFE

No endemic oak-associated species, such as the western gray squirrel (*Sciurus griseus*), were observed on the subject property during the site evaluation. No squirrel nests were observed on the site that were likely constructed by the western gray squirrel. A list of wildlife species identified on the subject property can be found in **Table 5**.

Wildlife observed during the field investigations is typical of rural/suburban adapted species (**Table 5**). A red-tailed hawk nest was identified during on-site evaluation (**Appendix A, Photos 17 & 18**).

No mountain quail (*Oreortyx pictus*) were observed on the subject property during the site evaluation.

Other species adapted to rural/suburban areas may inhabit or visit the site for food and shelter. No evidence of State-listed, Federally-listed or priority species were identified on the subject property during the site evaluation.

Table 5. Observed Wildlife Occurrence

Common Name	Scientific Name	Status	Habitat	Observation	Comments
BIRDS					
Red tailed hawk	<i>Buteo jamaicensis</i>	None	Various	In trees/ flight	Nesting on Douglas fir
American robin	<i>Turdus migratorius</i>	None	Various	Visual- Throughout site	Common
American crow	<i>Corvus brachyrhynchos</i>	None	Urban/ Suburban	Throughout site	Observed in trees
Spotted towhee	<i>Pipilo maculatus</i>	None	Brush	In brushes	Throughout property
Western scrub-Jay	<i>Aphelocoma californica</i>	None	Urban/ Suburban	In trees	Observed in trees
MAMMALS					
Eastern gray squirrel	<i>Sciurus carolinensis</i>	None	Urban/ Suburban	In Trees	Several observed in mixed forest
Black-tailed deer	<i>Odocoileus hemionus</i>	None	Urban/Forests, clearings, transition areas	Forests, clearings, transition areas	Observed in forest, footprints and scats
AMPHIBIANS					
Bull frog	<i>(Lithobates catesbeianus)</i>	Invasive	Wetland/ ponded water	Along the wetland	
REPTILES					
None					
EX: Extirpated FE: Federal Endangered FT: Federal Threatened FSC: Federal Species of Concern FC: Federal Candidate		SE: State Endangered ST: State Threatened SC: State Candidate SS: State Sensitive SM: State Monitor		None: No listing status None*: This species has no state listing status, but it is classified as protected wildlife. EX: Extirpated	

5.1 Red-tailed Hawk Nest

A red-tailed hawk (*Buteo jamaicensis*) and its nest were identified onsite in a Douglas fir tree located in the northeast corner of the subject property (**Figure 2; Appendix A, Photos 17 & 18**). The red-tailed hawk is no longer a state listed or priority species of concern; therefore, no habitat regulations are required during site plan and construction. However, the Red-tailed hawk is protected under the Migratory Bird Treaty Act (MBTA).

Prohibitions of the MBTA make it unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, or kill migratory birds, or attempt to engage in any of those actions. These apply only to actions directed at migratory birds, their nests, or their eggs. Injury to or mortality of migratory birds that results from, but is not the purpose of, an action (*i.e.*, incidental taking or killing) is not prohibited by the MBTA.

If the proposed land use action involves removal of the Douglas fir tree, contact the U.S. Fish and Wildlife Service to receive updated information on inactive nest removal or to obtain the permits required to remove an active nest.

Under the MBTA, a permit is not needed to destroy inactive bird nests, provided the nest is destroyed and not kept. An inactive bird nest is one without eggs or chicks present. The Nest Destruction Migratory Bird Permit Memorandum (MBPM-2; April 15, 2003) provides additional guidance on nest destruction.

Removal of the tree must take place outside of the active red-tailed hawk nesting season unless a permit is obtained through the U.S. Fish and Wildlife Service. A permit is required to destroy an active bird nest (one with eggs or chicks present). Active red-tailed hawk nesting may occur March through September.

The MBTA specifically protects migratory bird nests from possession, sale, purchase, barter, transport, import, and export, and take. The other prohibitions of the MBTA - capture, pursue, hunt, and kill - are inapplicable to nests. The regulatory definition of take, as defined by 50 CFR 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt hunt, shoot, wound, kill, trap, capture, or collect. Only collect applies to nests.

While destruction of a nest by itself is not prohibited under the MBTA, nest destruction that results in the unpermitted take of migratory birds or their eggs, is illegal and fully prosecutable under the MBTA.

6.0 REGULATORY CONSIDERATIONS

6.1 Important Habitats and Species

Under TCC Chapter 24.25.065---*Important habitats and species*, ‘Important Habitats’ include Oregon white oak (*Quercus garryana*) woodlands, stands, and individual trees meeting the following criteria are subject to this section:

- a. Oak woodlands, as defined in Chapter 24.03 TCC.
- b. Oak Savanna, as defined in Chapter 24.03 TCC.
- c. Individual oak trees and stands of oak or oak conifer associations less than one acre in size that are located within one-half mile of a stand meeting the criteria in this subparagraph.

All proposals for land development activities, including land clearing, in an area that could be classified as oak habitat under this chapter, or are within six hundred (600) feet of this habitat, shall be subject to the preparation of a Habitat Management Plan under 24.35.260---*Critical area reports required*.

6.2 Habitat Management Plan Buffers

Under TCC Chapter 24.25.075 - *Important habitats and species—Identification and buffers* Subsection A, applications for uses and activities on sites containing a habitat or species subject to this section, including the Oregon white oak (*Quercus garryana*), shall include a Critical Area Report (see Chapter 24.35 TCC) prepared by a qualified professional that evaluates the potential impacts of the proposed use or activity on the habitat and/or species, as applicable.

6.3 Mitigation Requirements

Under TCC Chapter 24.01.037---*Mitigation Sequencing*, mitigation actions associated with development proposals impacting critical areas shall adhere to the following mitigation sequence:

- A. Avoiding the impact altogether by not taking a certain action or parts of an action;
- B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;
- C. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- D. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- E. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or
- F. Monitoring the impact and taking appropriate corrective measures.

TCC Chapter 24.35.015---*Mitigation Sequencing*, is identical to TCC Chapter 24.01.037, other than stating that the redesign, reconfiguration, or relocation of a proposal to avoid impacts shall be preferable to submittal of a mitigation proposal.

6.4 Tree Protection

Under TCC Chapter 24.25.070---*Tree protection* Subsection A, a tree protection area extending a minimum of five (≥ 5) feet beyond the dripline of Oregon white oak (*Quercus garryana*) shall be established and protected from disturbance during site development. The approval authority may require that the protection area be extended for oak trees if necessary to ensure the trees' survival, based upon a recommendation of an arborist or urban forester.

Temporary fencing at least thirty (≥ 30) inches tall shall be erected in areas of activity along the perimeter of the tree protection areas prior to the initiation of any clearing or grading. The fencing shall be posted with signage clearly identifying the tree protection area.

6.5 Vegetation Removal

Under TCC Chapter 24.25.370 - *Vegetation removal—Oak woodlands*, removal of Douglas fir trees within oak woodlands and thinning of oaks within oak savanna habitat is allowed subject to county approval based on a critical area report (e.g., Habitat Management Plan) that demonstrates that these activities will enhance the habitat.

7.0 PROPOSED PROJECT

No proposed project is presented in this report.

Regulated oak habitat and individual trees are located on the subject property.

Under TCC 24.25.065---*Important habitats and species*, Subsection 3, individual oak trees that are located within one-half ($\leq 1/2$) mile of an important oak habitat, including an oak woodland or oak savanna, are regulated as ‘oak habitat.’ The individual trees are located within one-half ($\leq 1/2$) mile of oak habitat mapped by the DNR Oaks and Grasslands database (**Appendix B**). Thereby, the individual trees would be regulated as oak habitat under TCC 24.25.065---*Important habitats and species*, Subsection 3.

Individual oak trees located on the subject property or where their drip lines extend onto the subject property would require a buffer extending a minimum of five (≥ 5) feet beyond the dripline under TCC Chapter 24.25.070---*Tree protection*, Subsection A (**Figure 6**). Mitigation actions associated with development proposals impacting oak trees shall adhere mitigation sequencing where the priority is avoidance. If impacts are unavoidable to achieve the project goals, the applicant can propose minimizing impacts and proposing mitigation for the impacts. Mitigation may include replacing impacted trees at a 3:1 ratio and planting understory vegetation associated with oak habitat. Mitigation could occur in required openspace or landscaping areas.

8.0 SUMMARY AND CONCLUSION

The purpose of this HMP is to identify, map, and calculate buffers for the Oregon white oaks identified on the subject property. This Habitat Management Plan has been prepared to satisfy Thurston County reporting requirements.

A total of one hundred ninety-eight (198) Oregon white oak trees were identified, tagged using metal tree tags, and surveyed on the subject property and have been GNSS located using a Trimble Geo 7x with sub-foot accuracy and plotted on AutoCAD (**Table 4, Figures 2-5; Appendix A, Photos 1-16**). A regulatory analysis was performed, and buffers were determined and plotted on AutoCAD (**Figure 6**).

No proposed project is presented in this report.

9.0 REFERENCES

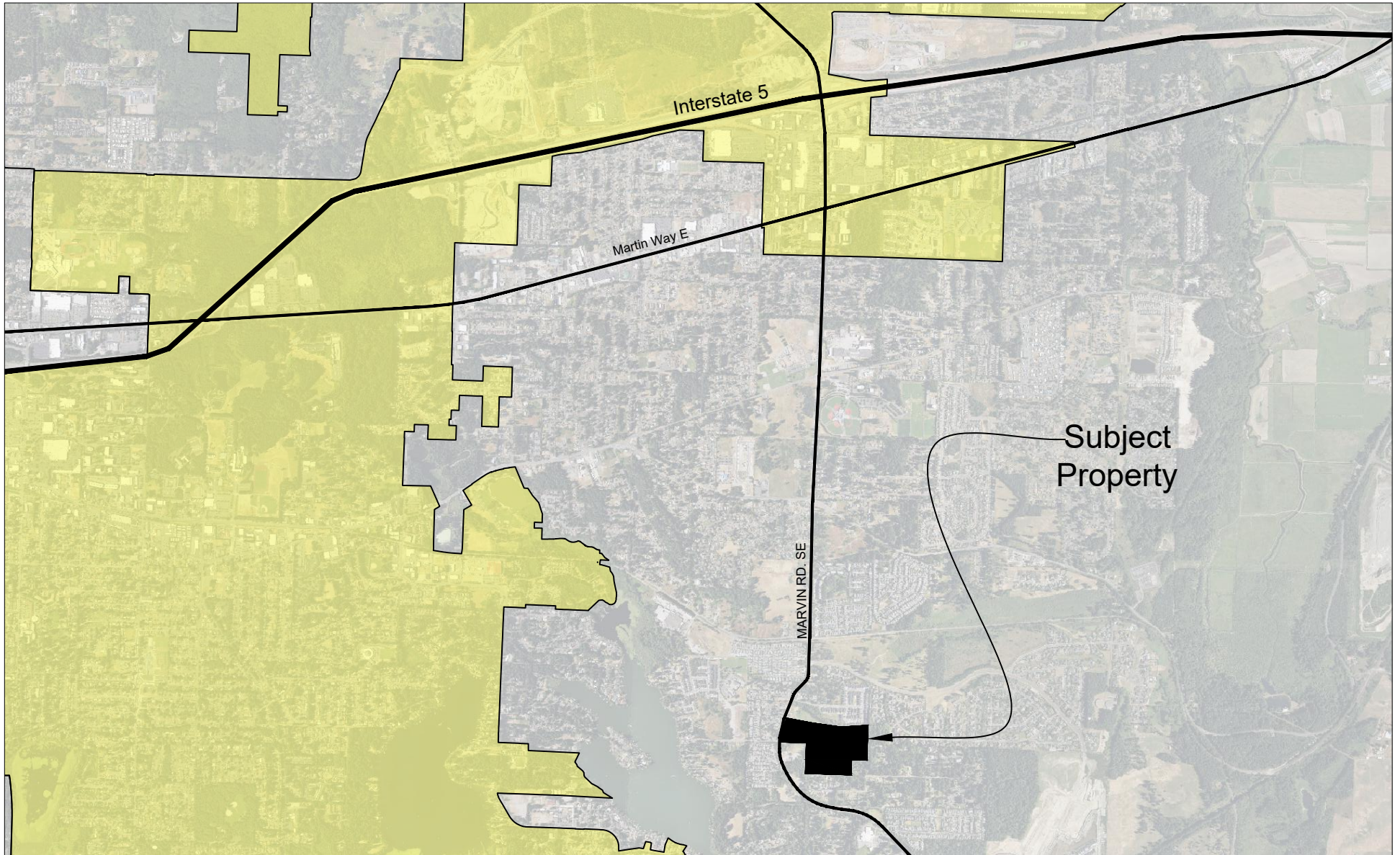
- Baron, N. and J. Acorn, 1997, *Birds of the Pacific Northwest Coast*, Lone Pine Publishing, Renton, Washington.
- Bornkamm R., 1987, Allochthonous Ecosystems, *Landscape Ecology* Vol. 1 No. 2, pp 119-122, 1987.
- Brown, H. A., R. M. Storm, W. P. Leonard, 1995, *Reptiles of Washington and Oregon*, Seattle Audubon Society, Seattle, Washington.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, Department of the Interior. FWSOBS-70/31.
- Corkran C. C. and C. Thoms, 1996, *Amphibians of Oregon, Washington, and British Columbia: A Field Identification Guide*, Lone Pine Publishing, Renton, Washington.
- Devine, Warren D. and C.A. Constance. 2010. Planting native oak in the Pacific Northwest. Gen. Tech. Rep. PNW-GTR-804. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR. 25 pp.
- Gary Oak Ecosystems Recovery Team. 2011. *Restoring British Columbia's Garry Oak Ecosystems: Principles and Practices*. Gary Oak Ecosystems Recovery Team, Victoria, British Columbia. 514 pp. Available at: http://www.goert.ca/gardeners_restoration/restoration.php
- Forey, P. and C. Fitzsimons, 1987, *An Instant Guide to Mammals*, Random House Publishing.
- Harrington, C. A. and W. D. Devine. 2006. A Practical Guide to Oak Release. Gen. Tech. Rep. PNW-GTR-666. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR. 24 pp.
- Harrison, H. H., 1979, *A Field Guide to Western Birds' Nests of 520 Species Found Breeding in the United States West of the Mississippi River*, Houghton Mifflin, Boston.
- Hinman, Curtis. 2012. *Low Impact Development: Technical Guidance Manual for Puget Sound*. Publication number PSP 2012-3. Washington State University Extension and Puget Sound Partnership, Tacoma, WA. 346 pp. Available at: http://www.psp.wa.gov/LID_manual.php
- Hitchcock, C.L., and A. Cronquist. 1973. *Flora of the Pacific Northwest*. University of Washington Press. 730 pp.
- Hunn, E. S., 1982, *Birding in Seattle and King County*, Seattle Audubon Society, Seattle, Washington.
- Johnsgard, P. A., 1990, *Hawks, Eagles, & Falcons of North America: Biology and Natural History*, Smithsonian Institution Press, Washington, DC.
- King County, 1987, *Wildlife Habitat Profile*, King County Open Space Program, Parks, Planning, and Resources Department.

- Kozloff, E.N., 1978, *Plants and Animals of the Pacific Northwest: An Illustrated Guide to the Natural History of Western Oregon, Washington, and British Columbia*, University of Washington Press, Seattle, Washington.
- Larsen, E. M., and J. T. Morgan. 1998. *Management recommendations for Washington's priority habitats: Oregon white oak woodlands*. Washington Department of Fish and Wildlife, Olympia. 37pp.
- Leonard, W. P., 1993, *Amphibians of Washington and Oregon*, Seattle Audubon Society, Seattle, Washington.
- Munsell Color. 1988. *Munsell Soil Color Charts*. Kollmorgen Instruments Corp., Baltimore, Maryland.
- Murie, O. J., 1974, *A Field Guide to Animal Tracks*, Houghton Mifflin, Boston.
- Olson, D. H., W. P. Leonard, and R. B. Bury, 1997, *Sampling Amphibians in Lentic Habitats: Methods and Approaches for the Pacific Northwest*, Society for Northwestern Vertebrate Biology, Olympia, Washington.
- Sprague, F.L. and H.P. Hansen. 1946. Forest succession in the McDonald Forest, Willamette Valley, Oregon. *Northwest Science* 20:89-98
- Thurston County Geodata center <http://www.geodata.org/online.html>
- U.S. Department of Agriculture, Soil Conservation Service. June, 1991. *Hydric Soils of the United States*.
- U.S. Department of Agriculture, Soil Conservation Service. 1973. *Thurston County Area Soil Survey*.
- U.S. Fish and Wildlife Service. 1973. *National Wetlands Inventory Map, Issaquah Quadrangle*.
- Vesley, D. and G. Tucker. 2004. *A Landowner's Guide for Restoring and Managing Oregon White Oak Habitats*. U.S. Department of the Interior, Bureau of Land Management, Salem District, Salem, OR. 65 pp. Available at: http://www.blm.gov/or/districts/salem/files/white_oak_guide.pdf
- Washington State Department of Natural Resources. 1994. *Endangered, Threatened and Sensitive Vascular Plants of Washington*.
- Washington State Department of Fish and Wildlife. 1999. *Species of concern: State candidate species*. WDFW. Olympia, WA.
- Washington State Department of Health. 2002. *Glendon Biofilters; Recommended standards and guidance for performance, application, design, and operation & maintenance*. Office of Environmental Health and Safety. Olympia, WA.

Washington State Department of Fish and Wildlife, 1999, Species of Concern: State Candidate Species, Olympia, Washington.

Whitaker, J. O., 1996, National Audubon Society Field Guide to North American Mammals, Random House Publishing, New York.

FIGURES



curtis@envirovector.com
www.envirovector.com
360-790-1559



City of Lacey

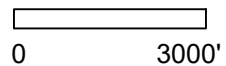
Figure 1

McAllister Springs

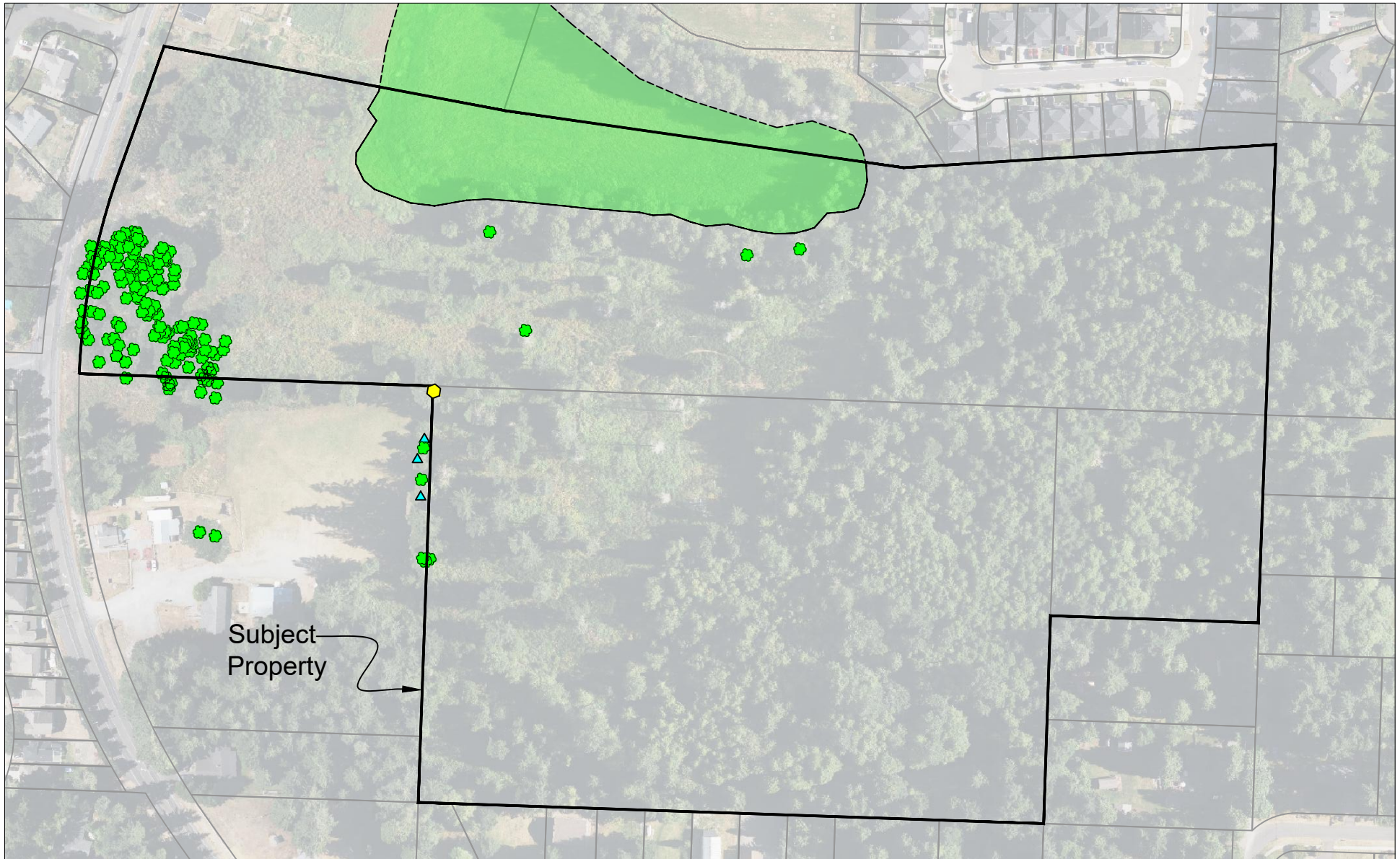
Vicinity Map



Scale: 1" = 3000'



11 June 2022

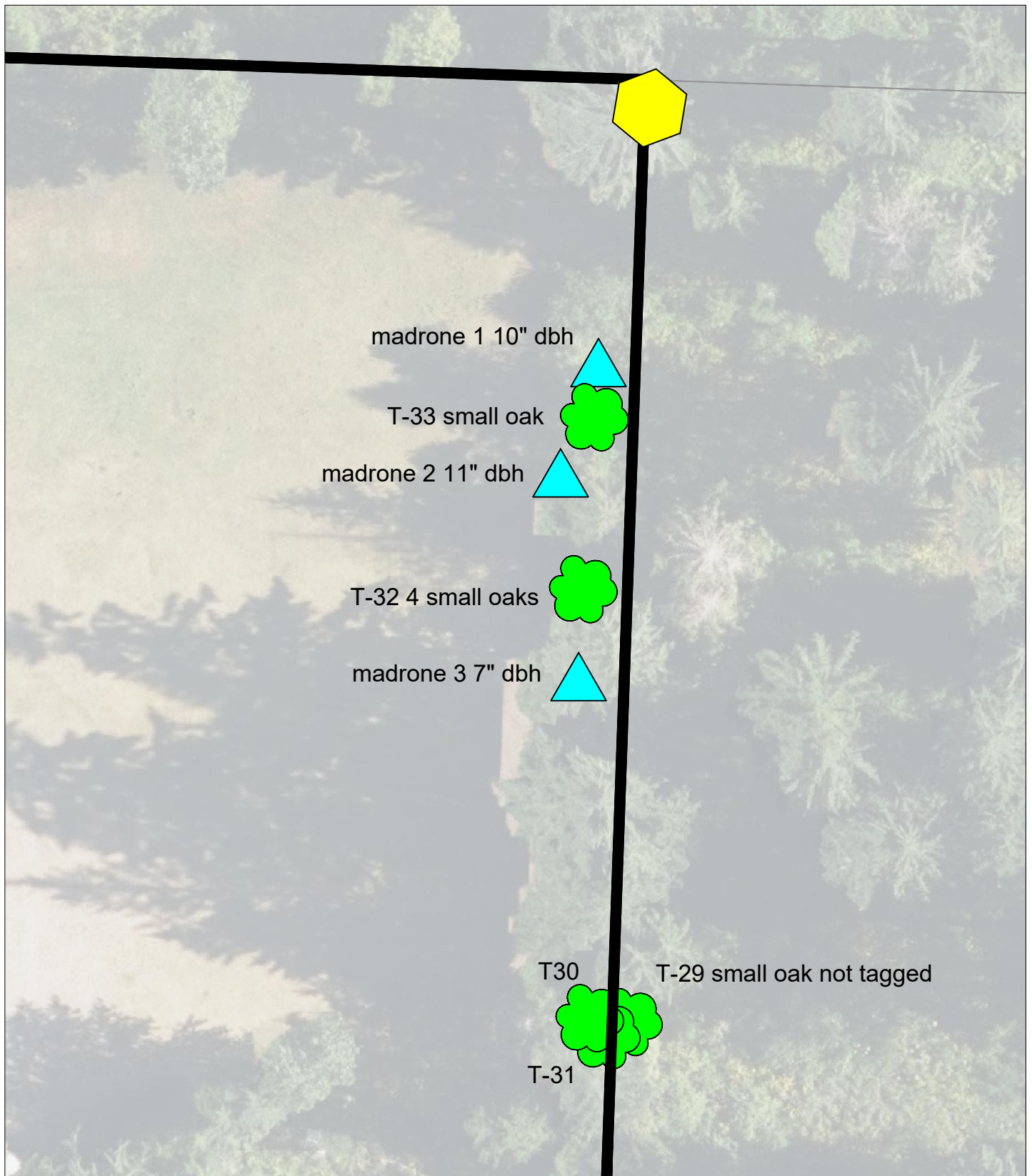




McAllister
Springs

Oak Tree Labels





Oaks Trees



Pacific Madrone

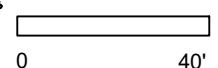


Red-tailed hawk's nest

Figure 4
 McAllister
 Springs
 Oak Tree
 Labels

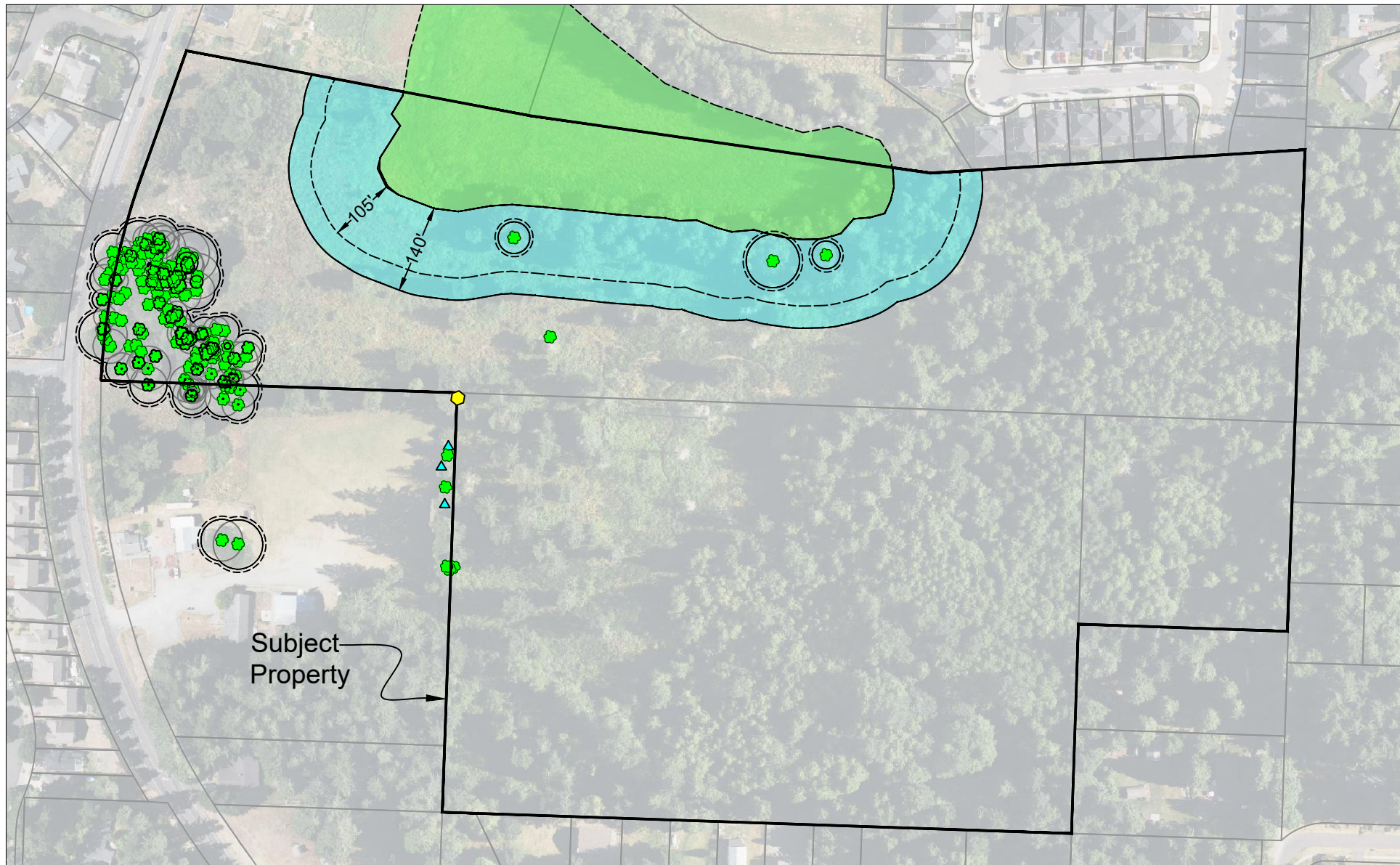





Scale: 1"= 40'



13 June 2022





-  Oaks Trees
-  Oak Dripline
-  Oak Stand Buffer






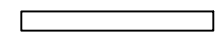
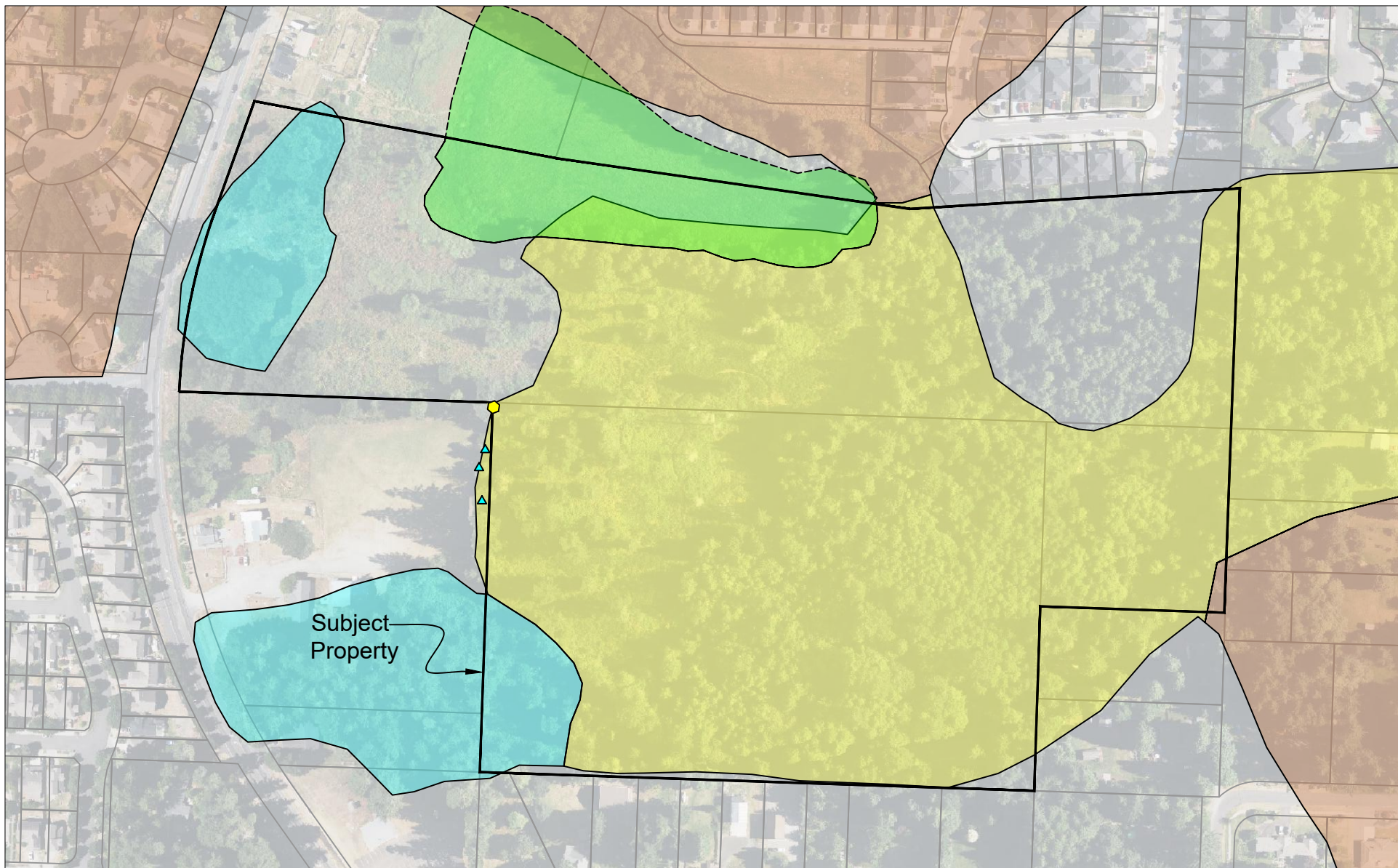
-  Wetland (Delineated)
-  Wetland (Undelineated)
-  Wetland (Unverified)
-  Red-tailed hawk's nest
-  Pacific Madrone

Figure 6
 McAllister Springs
 Oak Tree
 Setbacks



Scale: 1"= 220'

 0 220'
 11 June 2022



curtis@envirovector.com
www.envirovector.com
360-790-1559

- Oak-Conifer Forest or Woodland Canopy
- Oak-Dominant Forest or Woodland Canopy
- Urban Oak Canopy
- Wetland

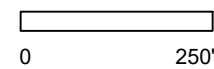
Figure 7

McAllister Springs

DNR Oaks and
Grasslands



Scale: 1"= 250'



11 June 2022

APPENDIX A

Photographs



Photo 1. Tagged oak tree



Photo 2. Oak tree T-5, measuring dbh



Photo 3. Oak stand on western portion of property



Photo 4. Measuring dbh on oak tree



Photo 5. Collecting oak data in the on-site oak stand



Photo 6. Oak tree Flag T-20, measuring dbh



Photo 7. Measuring oak tree dbh



Photo 8. Measuring oak tree dbh on oak tree T-2



Photo 9. Oka tree T-6



Photo 10. Fallen oak tree alive and tagged



Photo 11. Oak stand on western portion of property



Photo 12. Tagged oak tree in oak stand



Photo 13. Oak tree T-3



Photo 14. Oak tree T-20



Photo 15. Small oak tree on north-central portion of property

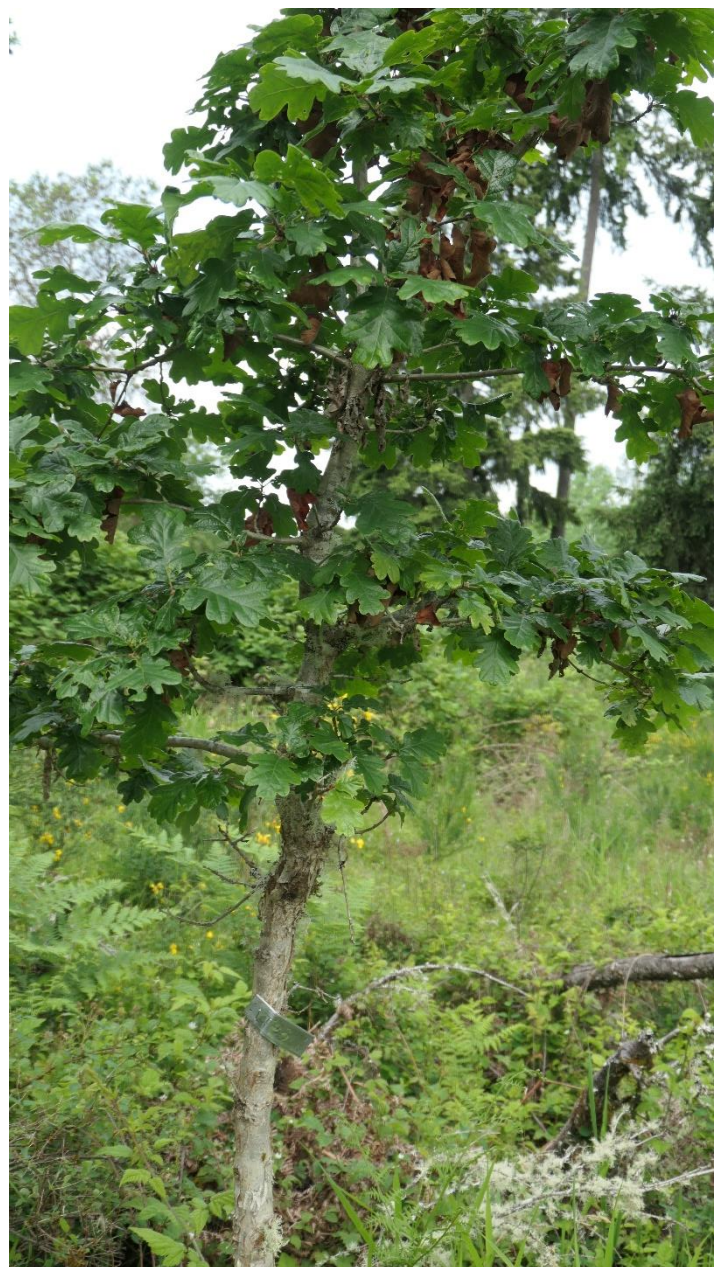


Photo 16. Small oak tree tagged



Photo 17. Oak stand on western portion of property



Photo 18. Red-tailed hawk nest on Douglas fir



Photo 19. Western scrub jay (*Aphelocoma californica*)

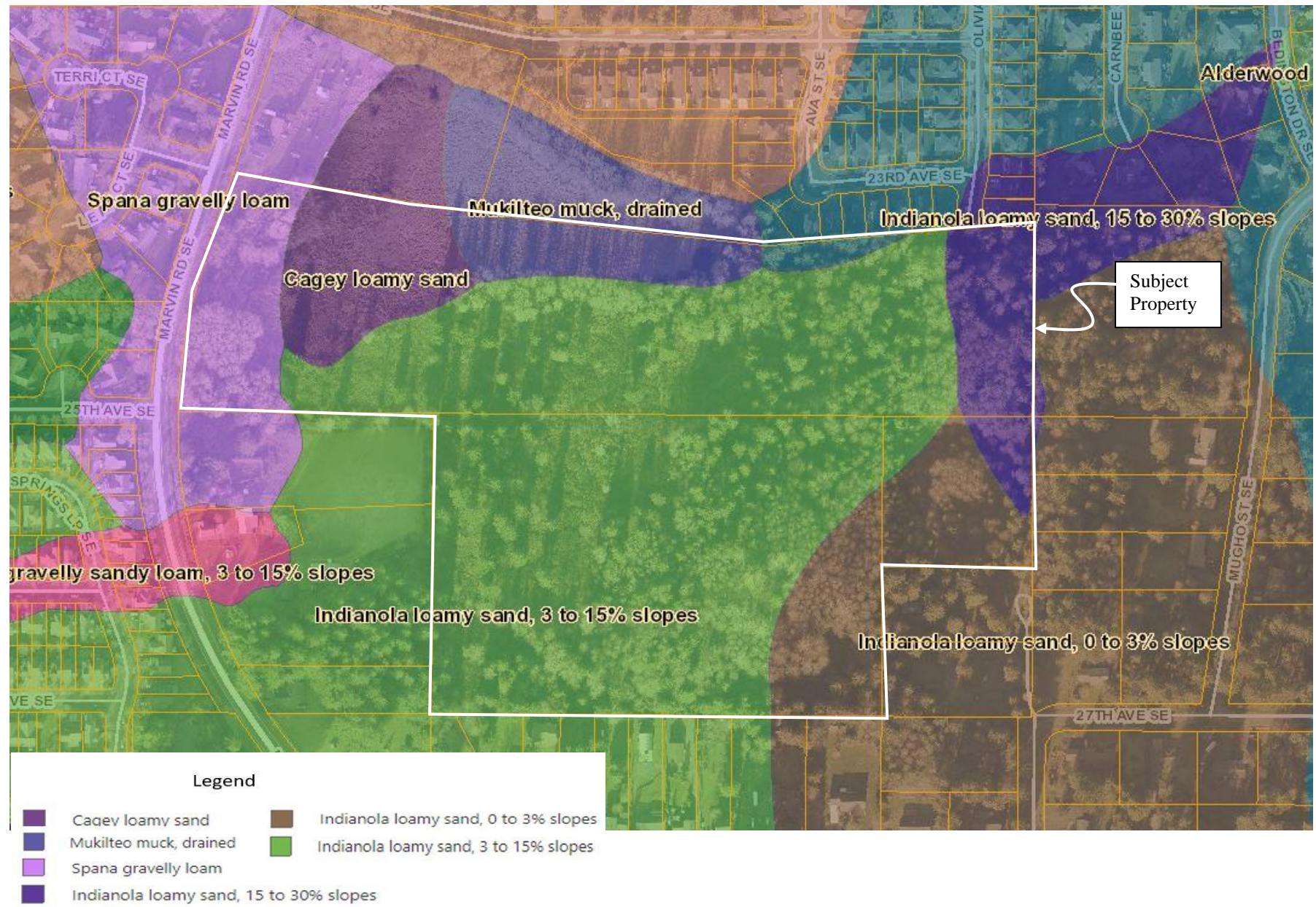


Photo 20. Deer scat throughout oak stand

APPENDIX B

Thurston County Geodatabase

Soils

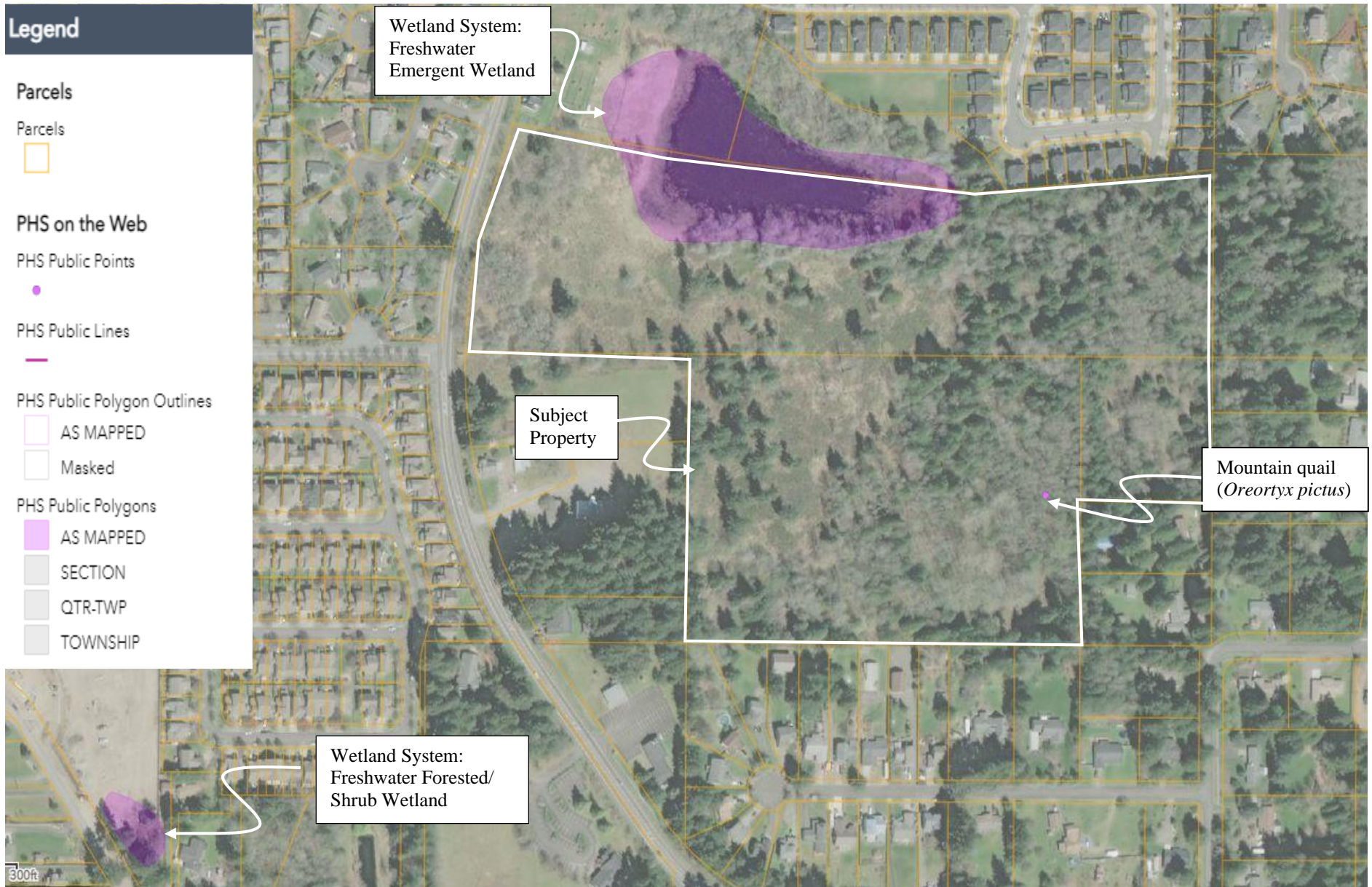


APPENDIX C

Washington State Department of Fish and Wildlife (WDFW)

Priority Habitat Species (PHS)

Database



APPENDIX D

Department of Natural Resources

Natural Heritage Database

