

UNIVERSITY OF OREGON  
NORTH CAMPUS CONDITIONAL USE PERMIT PROJECT  
**Riparian Assessment and Management Report**

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## 1.0 INTRODUCTION

The University of Oregon (UO) Campus Planning Office is planning for future land uses within the UO North Campus area adjacent to the Willamette River in Eugene, Oregon. Much of the North Campus area occurs within the City of Eugene's (City) Goal 5 Water Resource Conservation Overlay Zone that protects significant riparian areas, wetlands, and other water-related wildlife habitat areas. The City's Goal 5 Water Resource Conservation Overlay Zone land use code defines setbacks and standards to guide development actions within the overlay zone. Much of the North Campus area also occurs within the City's Goal 15 Willamette River Greenway boundary, which regulates new development, changes of use, and intensifications of use.

Mason, Bruce & Girard, Inc. (MB&G) was contracted to conduct a site assessment to determine the extent to which the Goal 5 and Goal 15 conservation setbacks are measured in the North Campus area. MB&G was also contracted to document riparian habitat and function characteristics within the North Campus area to provide riparian management recommendations to support the land use and master site planning effort.

Riparian areas are generally vegetated areas located adjacent to waterbodies that form the interface between terrestrial and aquatic areas. These areas protect water quality, remove contaminants, recharge groundwater, and are an important source of primary production for nutrient cycling and aquatic food webs. Riparian areas also provide habitat for a wide range of wildlife species, as well as flood storage and channel stability. The City of Eugene code (EC) states that "the overlay zone not only conserves the physical resources but also protects the water quality within the resource areas as a fundamental and essential requirement for continued survival of these biological systems" (EC 9.4900). The overlay zone establishes conservation setbacks that guide the planning, implementation, and management standards for multi-use development. These setbacks are established landward from a waterbody's top-of-high-bank (TOHB, 100 feet for the Willamette River and 40 feet for the Millrace Slough) or a waterbody's ordinary high water mark (OHWM, 120 feet for the Willamette River and 50 feet for the Millrace Slough), whichever is largest. Areas developed prior to November 14, 2005 should be excluded from conservation setbacks (EC 9.4920 [5]). However, the conservation setback discussed in this report does not exclude these areas. In addition, the conservation setback described in this report does not include the buffers of any jurisdictional wetlands (if present) within the project study area (PSA).

Riparian areas within the City are defined in the EC by the area between the TOHB and the OHWM. The EC defines TOHB as "the highest point at which the bank meets the grade of the surrounding topography, characterized by an abrupt or noticeable change from a steeper grade to a less steep grade" [EC 9.4920 (1)c1]. OHWM in the EC is defined as "the line on the bank or shore to which seasonal high water rises annually identified in the field by physical characteristics" [EC 9.4920 (1)c2]. This report addresses the methodology employed in the TOHB and OHWM determinations in the North Campus area, and an analysis of the baseline functional conditions and management recommendations for the riparian area.

### 1.1 Project Location

The PSA is approximately 36 acres and is bounded to the north by the Willamette River, to the south and east by the Southern Pacific Railroad right-of-way (railroad), and to the west by a paved parking lot owned by the Eugene Water & Electric Board (EWEB) (Appendix A, Figure 1). The PSA includes the Millrace Slough from the confluence with the Willamette River upstream to the railroad crossing. The PSA lies within Township 17 South, Range 3 West, Sections 32 and 33, and within the Muddy Creek-Willamette River watershed (5<sup>th</sup> field HUC 1709000306). The PSA includes three tax lots (1703322100300, 1703322405300, and 1703322405400) owned by UO. Other major waterbodies near the PSA include the Coast Fork and Middle Fork of the Willamette River, the McKenzie River, Muddy Creek, and Amazon Creek.

The PSA includes approximately 3 acres of riparian habitat, defined in this report as the area between the OHWM and TOHB along the Willamette River and Millrace Slough, and approximately 33 acres of upland habitat. Aquatic habitat comprises less than an acre of the PSA and is primarily Millrace Slough and Willamette River shoreline. The conservation setback encompasses 14 acres and overlaps with all three habitat types within the PSA. A paved bike and pedestrian path runs east to west within the PSA. The PSA includes a landscaped access ramp south of the Frohnmayer Bridge. The Frohnmayer Bridge serves as a bike and pedestrian bridge that spans Willamette River and connects the North Campus area to Alton Baker Park and Autzen Stadium on the north side of the river outside of the PSA. East of a roundabout within the PSA, the bike and pedestrian pathway merges with Riverfront Parkway which continues to the south under the railroad bridge and outside of the PSA.

The open space east of the Millrace Slough within the PSA was historically used for agriculture followed by a sand and gravel mining and processing operation owned by the Eugene Sand and Gravel Company (L.R. Squier Associates, Inc., 1990). The property was purchased by the UO in 1968. This area now includes a recreation field, bicycle path, mowed pastures with trees scattered throughout, several unmaintained foot paths, and Himalayan blackberry (*Rubus armeniacus*) patches. The portion of the PSA west of the Millrace Slough was historically a gravel and concrete plant and an EWEB transmission pole yard (L.R. Squier Associates, Inc., 1990). This area currently includes a large fenced field with several small depressions created from years of soil compaction from industrial use that may display wetland characteristics.

## 2.0 METHODS

MB&G biologists conducted TOHB and OHWM determinations and a riparian assessment within the PSA on July 25, 26, and 27, 2017. During the field effort, aquatic, riparian, and upland areas within and around the PSA were examined and photographed. Prior to the field effort, MB&G biologists reviewed 2015 3-foot LiDAR-derived digital elevation models (DEMs) along with 1-foot interpolated contours and aerial imagery (OLC 2015). MB&G biologists created 30 target field points to focus the field effort to areas with unreliable or low point density LiDAR data. These target points identified both TOHB and OHWM sampling areas that required further information gathering in the field.

### 2.1 Top of High Bank Determination

MB&G determined the TOHB line by visual identification of the highest point at which the bank met the grade of the surrounding topography [EC 9.4920 (1)c1]. The TOHB locations were recorded with a Trimble GeoXT 6000 series GPS unit capable of sub-meter accuracy. MB&G collected 27 TOHB points along the Willamette River and Millrace Slough in the PSA. MB&G post-corrected these points using Trimble Pathfinder software and compared them to known monument locations near the PSA, resulting in an absolute accuracy of less than 2 feet. MB&G used the post-corrected points to select contour lines representative of the TOHB line and to serve as guidance in areas where LiDAR data were ambiguous. Finally, MB&G biologists reviewed the TOHB line in-office and refined the line using field photos and riparian information collected on site.

### 2.2 Ordinary High Water Mark Determination

MB&G determined the OHWM by visual identification of one or more of the following [EC 9.4920 (1)c2]:

- a. A clear, natural line impressed on the bank by the presence of water, flowing water or waves.
- b. Changes in the characteristics of soils.
- c. The presence of water-borne litter and debris.
- d. The uppermost limit of destruction of terrestrial vegetation by the presence of water, flowing water or waves.”

MB&G recorded the OHWM using a Trimble GeoXT 6000 series GPS unit capable of sub-meter accuracy. MB&G collected 49 OHWM points along the Willamette River and Millrace Slough. MB&G post-corrected the points using Trimble Pathfinder software and compared them to known monument locations near the PSA, resulting in an absolute accuracy of less than 2 feet. MB&G used the post-corrected points to select contour lines representative of the OHWM line and to serve as guidance in areas where LiDAR data were ambiguous. Finally, MB&G biologists reviewed the OHWM lines in-office and refined them using field photos and riparian information collected on site.

### 2.3 Riparian Assessment Points

In order to describe the riparian area and functions within the PSA, MB&G created a data model to collect information using MobileMap™ data collection software. The data model included attributes used to characterize the riparian area function and physical structure at 57 riparian area sample points. MB&G documented attributes within a 15-foot radius of each riparian point; the attributes included:

- % shade
- Presence of erosion
- Presence of organic soil
- Vegetation cover
  - % tree cover
  - % shrub cover
  - % herbaceous species cover, and
  - % bare ground
- % invasive vegetation and dominant species
- River features (large woody debris, pools and riffles, backwater areas, gravel bars)
- Wildlife sign or potential habitat
- Ground photo description

The percentage of shade and invasive vegetation was not specific to one vegetation layer, but rather all layers combined (herbaceous, shrub, and tree) within a 15-foot radius of the riparian assessment point. These riparian assessment points allowed MB&G biologists to describe the collective baseline functional conditions within the PSA.

## 3.0 EXISTING CONDITIONS

Current conditions within the PSA have been altered from historical conditions after periods of development, vegetation management, and soil compaction. Over the years, the amount of fill added to the area has dramatically altered the physical and biological functions of the riparian habitat along the Willamette River. The bank of the Willamette River has been degraded due to use of riprap and other material to armor the bank, erosion from foot traffic, and alteration of existing vegetation communities. Dominant vegetation type and structure is different from historic conditions as a result of introduced flora and fauna and land uses discussed above that promote the spread of invasive species. Still, existing conditions within the PSA provide habitat that supports a wide range of native species associated with riparian areas. The riparian corridor has been historically reduced in size and function but still remains an important resource for terrestrial and aquatic species and provides other important riparian functions discussed below.

The PSA contains approximately 33 acres of disturbed habitat that now consists of maintained grassy fields. This open space area is relatively flat and is adjacent to the riparian zone which is steeply sloped. The Federal

Emergency Management Agency National Flood Hazard Layer shows that the 1% annual chance flood hazard (100-year floodplain) encompasses approximately 14 acres of the PSA. It extends up over the Willamette River's steep riparian bank and into the flat open space to the south. Figure 2 in Appendix A illustrates the current floodplain conditions within the PSA.

Riparian areas act as an important interchange between aquatic and upland habitat. Hence, in order to describe riparian biological and physical functions, it is important to elucidate both aquatic and upland habitat characteristics. Aquatic, upland, and riparian habitats within the PSA are discussed below and are mapped on Figure 3 in Appendix A.

### 3.1 Aquatic Habitat

The riparian zone directly affects the health of the waterbody that it surrounds. Hence, riparian habitat with intact physical and biological function improves water quality and condition. Riparian vegetation stabilizes streambanks, slows erosion, moderates stream temperatures, and filters overland runoff to aquatic habitats. Aquatic habitat offers many of the necessary elements for fish, wildlife, and invertebrates to thrive.

The PSA includes portions of the Willamette River and the Millrace Slough (Appendix A, Figure 1). The PSA is situated five miles downstream of the confluence of the Middle Fork Willamette River and the Coast Fork Willamette River. The portion of the Willamette River adjacent to the PSA runs east to west and measures approximately 400 feet wide at the OHWM. The Millrace Slough within the PSA flows south to north through the western portion of the PSA.

#### 3.1.1 Millrace Slough

The Millrace Slough enters the PSA from the south through a concrete box culvert with an adjacent water control structure under the railroad. The slough's channel is approximately 20 feet wide in this area and flows approximately 20 feet before passing under an unmaintained foot bridge with concrete abutments. The slough flows for approximately 150 feet before entering a culvert under the bike and pedestrian path near the Willamette River TOHB. The culvert under the bike path is constricted on the south side, obstructed by the heavy accumulation of sediment and debris. This constriction point appears to have caused a wider channel (the OHWM measuring approximately 30 feet wide) south (upstream) of the culvert. The area north of the culvert has a narrow OHWM approximately 10 feet wide and continues to the north for approximately 200 feet before its confluence with the Willamette River.

During the July 2017 field effort, the Millrace Slough was stagnant, murky, and fairly degraded with English ivy (*Hedera helix*) dominating the herbaceous vegetation community above OHWM (Appendix B, Photos). However, the overstory was predominantly composed of black cottonwood (*Populus trichocarpa*), providing shade and cooling the water within the slough. This area provides habitat for amphibians, reptiles, small mammals, and birds to forage, migrate, and reproduce.

#### 3.1.2 Willamette River

The portion of the Willamette River within the PSA contained many of the morphological components necessary for a healthy river ecosystem. These components included:

- Pools and riffles,
- gravel bars,
- seasonally exposed vegetated benches,
- large woody debris,
- mud flats,

- fringe wetlands,
- boulder clusters, and
- backwater and side channel habitat.

These components along the Willamette River provide habitat and forage for a wide-range of native fish species, both resident and anadromous. In order to spawn, most native fish require spawning gravels of various sizes with adequate flow and cool clear water. In addition, rearing juveniles and adults need sufficient cover in the form of large woody debris, undercut banks, and backwater or side channel habitat to provide protection from predators and refuge during high flow events. Based on the aquatic habitat features present along the Willamette River, the aquatic habitat within in the PSA appears to provide habitat that is suitable for all native fish species life stages expected to occur in the river.

Many other aquatic and water-dependent terrestrial species can benefit from these aquatic habitat components. For example, vegetated benches provide excellent habitat for garter snakes (*Thamnophis* sp.). Backwater microhabitats, fringe wetlands, and large woody debris create habitat for turtles to bask, reproduce, migrate, and forage. Waterfowl utilize fringe wetlands and gravel bars for feeding and roosting as well as shelters from disturbance. Sensitive species such as bald eagles and osprey rely on these aquatic habitats for forage. River-dependent mammals such as beavers and otters, along with several species of bat, all rely on one or more of the river components listed above for food and shelter.

Although the Willamette River within the PSA provides habitat for aquatic species, the area has also been subject to anthropogenic disturbances for many years. Current and historic use of the area for recreation has also directly and indirectly affected local aquatic habitat through disturbances to vegetation and streambank morphology, refuse build up, and nonpoint source pollutants. The majority of the PSA adjacent to the aquatic habitat was used as a gravel plant, a concrete plant, a transmission pole yard, and a sand and gravel mine. These historical industrial land uses have contributed to degraded aquatic conditions due to the runoff of contaminants and the addition of artificial barriers at the bottom of the bank. During the July 2017 field effort, MB&G noted riprap as well as large blocks of concrete slabs along the streambanks in the PSA. These slabs were most likely excess material from the concrete plant and were likely used to stabilize the bank. While these concrete slabs can provide limited shade and shelter to some aquatic species, the unnatural shape and size likely deter native species. Riprap and concrete blocks along a streambank can affect local flow hydraulics and scour regimes resulting in degraded channel and streambank dynamics. In addition, large riprap and concrete pieces can transfer heat to waterbodies as they absorb solar radiation during long summer days. However, the majority of substrate materials along the river margin consisted of cobbles, cohesive silt, and clay and are relatively resistant to erosion.

## 3.2 Riparian Habitat

Historically, the PSA was completely comprised of riparian bottomland forest with a wide floodplain and sloped bankline (Johnson et. al., 2010). Land uses have dramatically reduced the historic extent of the PSA's riparian forest to a narrow band of habitat along the Willamette River and Millrace Slough. Thick patches of Himalayan blackberry grow adjacent to and within the riparian zone, degrading habitat function and composition. Streambank armoring and other local physical streambank alterations have affected the riparian zone's ability to adapt and respond naturally to various flow regimes in the river. Flood control measures upstream of the PSA at multiple large reservoirs have limited the frequency and intensity of flood events, which limits the natural development and maintenance of riparian habitat and floodplain connectivity. Still, this narrow band of riparian habitat provides many of the necessary functions that are beneficial to the adjacent floodplain and aquatic areas, such as channel stability, limited flood storage, primary production and nutrient cycling, and shade. It also provides habitat for terrestrial wildlife species.

### **3.2.1 Millrace Slough**

During the July 2017 field effort, the northern segment of the Millrace Slough (south of the confluence) was dominated by English ivy, with the majority of the riparian zone lacking a shrub layer. English ivy can exacerbate erosion issues because its shallow root system lacks the ability to provide the deep soil anchoring and bank stabilization provided by mature trees and shrubs. Excessive soil erosion control can cause excessive sediment runoff, reducing water quality, and can lead to streambank failure and degraded riparian conditions. In addition, its climbing vines can eventually kill large overstory trees which provide the necessary shade for reducing water temperature. English ivy provides very little habitat for native wildlife species and reduces the overall biodiversity of the riparian zone.

The middle segment of the slough within the PSA provides improved habitat with a good mixture of tree, shrub, and herbaceous layers. However, the obstructed culvert on the south side of the bike path might restrict water from the Willamette River to flow freely into the slough, reducing flood storage. The southern segment of the slough at the railroad right-of-way near the Millrace Slough water control structure, contained little to no tree cover during the field effort. A lack of canopy cover may reduce shade, causing warmer water, and diminished habitat quality and species biodiversity.

The composition of vegetation strata at each riparian assessment point is shown in Figure 4, Appendix A.

### **3.2.2 Willamette River**

Riparian habitat throughout the Willamette River within the PSA was fairly uniform with steep banks and multilayered vegetation composition. The narrow riparian zone along the Willamette River displayed complex vegetation structure providing shade for aquatic and riparian species (Appendix B). In addition, this multilayered vegetation composition protects and stabilizes the river bank and reduces water velocity during high flows. The riparian zone of the Willamette River within the PSA was fairly steep, most likely a result of historic degradation of riparian functions and upstream flood control measures in place for the last 50-60 years. However, there are pockets of gently sloped streambank sections in the PSA that still provide intact riparian functions.

There were pockets of Himalayan blackberry thickets observed within the riparian zone at the time of the July 2017 field effort. Figure 2 in Appendix A illustrates the general location of the larger infestations that result in decreased streambank stability and degraded riparian habitat conditions.

## **3.3 Upland Habitat**

The upland habitat within the PSA has been historically used for mining, sand and gravel screening, concrete production, and utility pole storage, prior to the more recent, passive uses by UO (L.R. Squier Associates, Inc., 1990). This upland habitat is considered degraded or, in some areas marginal, due to these past land uses. The area has been converted to open fields used for recreation and educational purposes. As previously noted, a paved bike and pedestrian trail runs east-west within the PSA and there is a large access ramp south of the pedestrian bridge landscaped with ornamental shrubs. Well-established Himalayan blackberry patches are dispersed throughout the area, primarily adjacent to the riparian zone. The remaining open space contains a fenced field with possible seasonal wetlands, an irrigated athletic field, and a maintained area seeded with cultivar grasses. These habitat types are displayed in Appendix A, Figure 2.

This upland habitat contains compacted soils from years of industrial use. However, due to the location adjacent to the Willamette River, the area still serves to support baseline floodplain functions such as groundwater recharge and flood storage. In addition, with the buildup of urban areas surrounding the PSA, this upland open space provides a movement corridor for wildlife. Ungulates and larger terrestrial species might utilize this open

space to access migration corridors or to forage. Upland wildlife species documented in the field are listed in Table 3.

### 3.4 Species Presence within PSA

MB&G conducted several queries for the potential presence of fish, wildlife, and plant species within the PSA prior to the July 2017 field effort. In addition, MB&G recorded wildlife and plant species observed during the July 2017 field effort. These species are documented below.

#### 3.4.1 Sensitive Aquatic Species

MB&G conducted a query of potential sensitive aquatic species present within the PSA. Table 1 describes the sensitive species that have been historically present within the Willamette River, along with type of use, Federal Endangered Species Act (ESA) listing status, and run timing (StreamNet 2012). Additional native and non-native resident fish species are known to use the Willamette River and Millrace Slough within the PSA.

Table 1. Anadromous fish species distribution within the PSA (StreamNet, 2012).

Species	Federal ESA Status	Run	PSA Use Type
Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	Threatened	Spring	Rearing and migration
Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )	Threatened	Fall	Spawning and rearing
Steelhead ( <i>Oncorhynchus mykiss</i> )	Not listed	Summer	Migration only
Steelhead ( <i>Oncorhynchus mykiss</i> )	Not listed	Winter	Migration only
White sturgeon ( <i>Acipenser transmontanus</i> )	Not listed	N/A	Migration only
Western brook lamprey ( <i>Lampetra richardsoni</i> )	Not listed	N/A	Unknown
Pacific lamprey ( <i>Lampetra tridentate</i> )	Species of Concern	N/A	Unknown

#### 3.4.2 Rare Species (ORBIC)

A data search from the Oregon Biodiversity Information Center (ORBIC) for the historic presence of rare species within one mile of the PSA resulted in nine species (other than those listed through StreamNet, Table 1 above) listed below in Table 2 (ORBIC 2017).

Table 2. Rare species historically documented within one mile of the PSA (ORBIC 2017).

Scientific Name	Common Name	Federal ESA Status	State ESA Status
<i>Actinemys marmorata</i>	Western pond turtle	Species of Concern	Sensitive critical
<i>Carex retrorsa</i>	Retorse sedge	N/A	N/A
<i>Chrysemys picta</i>	Painted turtle	N/A	Sensitive critical
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	Species of Concern	Sensitive critical
<i>Haliaeetus leucocephalus</i>	Bald eagle	N/A	Sensitive vulnerable
<i>Lomatium bradshawii</i>	Bradshaw's lomatium	Endangered	Endangered
<i>Oregonichthys crameri</i>	Oregon chub	N/A	Sensitive critical
<i>Salvelinus confluentus</i> pop. 28	Bull trout (Coastal population)	Threatened	Sensitive critical/vulnerable

Two species presented in Table 2 are listed as threatened or endangered under the federal ESA. Bradshaw's lomatium, a small flowering plant, was recorded in a disturbed/maintained field less than one mile south of the PSA in 2000, and bull trout presence within the Willamette River was derived from Oregon Department of Fish and Wildlife distribution maps from 2001 (ORBIC 2017). Bradshaw's lomatium occurs in wet prairie habitats with

poorly drained soils. The majority of populations occur near small rivers, in seasonally flooded prairies with a dense clay soil layer (ODA 2017). Bull trout require colder water than most salmonids to carry out their life histories. Other bull trout habitat requirements include waters that connect to spawning grounds, clean stream substrates, and complex habitats with side channels, undercut banks, large woody debris, pools, and riffles (U.S. Fish and Wildlife Service [USFWS] 2017). The PSA contains the appropriate aquatic, upland, and riparian habitat to support all nine of the rare species listed above.

A USFWS Information for Planning and Consultation (IPaC) query of potential rare and listed species is included in Appendix C. The list should be used as a reference only as it does not guarantee species presence within the PSA. The list is composed of the known or expected range of each species that have the potential to be affected directly or indirectly by activities within the PSA.

### 3.4.3 Wildlife Species Observed in PSA

MB&G documented wildlife species in the field via visual observation, audible identification, the presence of distinct tracks, or scat. The results of those observations are listed below in Table 3.

Table 3. Wildlife species documented within the PSA on July 25, 26, 27, 2017.

Common Name	Scientific Name	Type
Common muskrat	<i>Ondatra zibethicus</i>	Mammal
Coyote	<i>Canis latrans</i>	Mammal
Raccoon	<i>Procyon lotor</i>	Mammal
Western gray squirrel	<i>Sciurus griseus</i>	Mammal
American crow	<i>Corvus brachyrhynchos</i>	Bird
American robin	<i>Turdus migratorius</i>	Bird
Barn swallow	<i>Hirundo Rustica</i>	Bird
Belted kingfisher	<i>Ceryle alcyon</i>	Bird
Black-capped chickadee	<i>Poecile atrcapilla</i>	Bird
Bushtit	<i>Psaltriparus minimus</i>	Bird
Canada goose	<i>Branta canadensis</i>	Bird
Dark-eyed junco	<i>Junco hyemalis</i>	Bird
European starling	<i>Sturnus vulgaris</i>	Bird
Great blue heron	<i>Ardea herodias</i>	Bird
Great egret	<i>Ardea alba</i>	Bird
Killdeer	<i>Charadrius vociferus</i>	Bird
Mallard	<i>Anas platyrhynchos</i>	Bird
Osprey	<i>Pandion hallaetus</i>	Bird
Rock dove	<i>Columba livia</i>	Bird
Scrub jay	<i>Aphelocoma californica</i>	Bird
Song sparrow	<i>Melospiza melodia</i>	Bird
Spotted towhee	<i>Pipilo maculatus</i>	Bird
Turkey vulture	<i>Cathartes aura</i>	Bird
Western hybrid gull	<i>Larus glaucescens x Larus occidentalis</i>	Bird
Pacific treefrog	<i>Hyla regilla</i>	Amphibian

### 3.4.4 Plant Species Observed in PSA

MB&G recorded plant species, both native and invasive, within the PSA. Plant species were associated with either herbaceous, shrub, or tree strata. The most common species observed in the field are listed below in Table 4. A complete list of plants observed during the July 2017 field effort is included in Appendix C.

Table 4. Most common plant species documented within the PSA on July 25, 26, and 27, 2017.

Common Name	Scientific Name	Strata	Native or Invasive
Bird's foot trefoil	<i>Lotus corniculatus</i>	Herbaceous	Invasive
Perennial pea	<i>Lathyrus latifolius</i>	Herbaceous	Invasive
Poison hemlock	<i>Conium maculatum</i>	Herbaceous	Invasive
Queen Anne's lace	<i>Daucus carota</i>	Herbaceous	Invasive
Reed canary grass	<i>Phalaris arundinacea</i>	Herbaceous	Invasive
Common snowberry	<i>Symphoricarpos albus</i>	Shrub	Native
English hawthorn	<i>Crataegus monogyna</i>	Shrub	Invasive
Himalayan blackberry	<i>Rubus armeniacus</i>	Shrub	Invasive
Sweetbriar	<i>Rosa rubiginosa</i>	Shrub	Invasive
Bigleaf maple	<i>Acer macrophyllum</i>	Tree	Native
Black cottonwood	<i>Populus trichocarpa</i>	Tree	Native
Oregon ash	<i>Fraxinus latifolia</i>	Tree	Native
Red alder	<i>Alnus rubra</i>	Tree	Native
Pacific willow	<i>Salix lasiandra</i>	Tree	Native

The percentage of invasive plants was also documented at each riparian assessment point. Invasive species coverage greater than 50% was recorded at approximately half of the riparian assessment points. Riparian assessment points with high percentages of invasive plant coverage (i.e., greater than 80%) were located mostly within the Millrace Slough and east of the Frohnmayer Bridge along the Willamette River. There were minor infestations of Japanese knotweed (*Fallopia japonica*) within the southern portion of the PSA and infestations of Scotch broom (*Cytisus scoparius*) along the Willamette River bank.

Areas in the PSA that appear to be farthest from the disturbances discussed in this report had a lower percentage of invasive plant species with better composition of vegetation strata. Areas closer to trails and human disturbance were dominated by well-established patches of Himalayan blackberry, creating degraded habitat with single-layered vegetation structure. In addition, several homeless encampments were located in the blackberry thickets. These encampments were littered with refuse, which may attract invasive wildlife species to the area. These blackberry patches are shown in Figure 2, Appendix A. Percent cover of invasive plant species is shown on Figure 5, Appendix A.

## 4.0 BASELINE FUNCTIONAL CONDITIONS

Riparian functions contribute to maintaining water temperature and channel stability; providing flood storage and groundwater recharge; removing sediments; promoting nutrient cycling and aquatic food webs; and providing fish and wildlife habitat. The degradation of any of these functions, singularly or cumulatively, can result in diminished riparian function.

The following sections discuss the baseline riparian conditions within the PSA, relative to riparian functions listed in the paragraph above.

### 4.1 Temperature and Shade

The riparian plant community within the PSA's riparian zone is characterized by both disturbed and relatively undisturbed habitats. Vegetation within the riparian zone of the Willamette River is mostly uniform with a mixed strata of herbaceous, shrub, and tree species. The mixed strata provides coverage for terrestrial and aquatic

species. Trees along the Willamette River are mature and represent a thin, but functioning late-seral riparian tree canopy and provide beneficial shade to aquatic species dependent on cooler water. However, the river is wide and these functions are only effective along the shoreline. Still, the bankline is north facing so shade impacts may be greater here than on the north side of the channel. The Millrace Slough contained little canopy coverage in the southern portion of the PSA. However, several large cottonwoods located towards the confluence with the Willamette appear to provide adequate shade and temperature moderation to the northern portion of the slough.

MB&G collected the percent of tree and shrub cover at riparian assessment points along the OHWM of Millrace Slough and the Willamette River. Three-quarters of these points provided greater than 50% shade coverage to create cool microclimates and aquatic habitat. Riparian assessment points collected along the Millrace Slough showed a high percentage of shade but the extensive English ivy understory could threaten the overstory in the future if left uncontrolled. Riparian assessment points collected along the Willamette River revealed several areas with adequate shade. Conversely, Himalayan blackberry infestations along the parts of the Willamette River streambank resulted in an open canopy with minimal shading capacity. Figure 6 in Appendix A shows the percentage of shade documented in the field along the Willamette River and the Millrace Slough during MB&G field efforts.

## 4.2 Channel Stability

Channel stability is partially dependent on streambank and riparian dynamics that act as the physical container of a stream and control floodplain connectivity. The majority of the riparian zones within the PSA are vegetated with a riparian forest overstory, an interspersed shrub layer, and a dense layer of herbaceous groundcover. Dense riparian vegetation and natural streambank roughness (e.g., downed wood and large boulders) attenuate streambank erosion and help to promote channel stability.

The streambank of the Willamette River within the PSA has been stabilized in some areas by large concrete blocks and riprap. This riprap and concrete can promote undesirable habitat for aquatic and terrestrial species, and can reduce channel stability. However, natural substrate materials consisting mostly of cobbles, cohesive silt, and clay dominate the streambank areas and appear to promote bank stability and decrease erosion potential.

The presence of erosion was recorded at each riparian data point along the Willamette River and the Millrace Slough. Eroded banks were most commonly noted within the western half of the PSA along the Willamette River and throughout the Millrace Slough. The presence of erosion within the PSA is documented in Figure 7 in Appendix A.

## 4.3 Flood Storage

Naturally vegetated riparian and floodplain areas serve a number of beneficial functions for flood storage and control. Intact vegetated riparian areas reduce the force and velocity of floodwaters by providing roughness and resistance to flood flows, which in turn, spreads flood flows more evenly over the floodplain. The combined effect of all these functions reduces downstream flooding and peak instream flow volume, leading to effective flood storage.

Naturally-vegetated riparian areas are common throughout the PSA along the Willamette River. However, these areas have been historically reduced to narrow strips along the river, reducing flood storage function. The fields within the PSA are flat and can contribute to storing flood flows given their undeveloped nature, lack of excessive amounts of impervious surfaces, and ability to infiltrate flood flows directly on site. However, infiltration rates may vary throughout the upland parts of the PSA due to various levels of soil compaction.

## 4.4 Groundwater Recharge

Riparian and floodplain areas are important groundwater recharge areas that allow precipitation to infiltrate soil and pass to the water table. Uncompacted soils are porous and absorb moisture. Organic debris, vegetation, and native stream substrates can slow down surface runoff, providing additional time for infiltration of precipitation events and flood flows.

With the PSA, the riparian zone's relatively dense vegetation slows runoff rates and promotes infiltration. The upland areas of the PSA are undeveloped and have compacted soils in some locations due to historic mining, gravel and concrete production, and industrial land uses. These compacted soils can reduce the recharge of groundwater within the PSA. However, the PSA occurs in an urban area with extensive development and associated impervious surfaces. As such, there is a lack of local undeveloped floodplain areas that have the capacity to infiltrate precipitation or flood flows. Therefore, the riparian and floodplain areas in the PSA are critical for supporting infiltration and groundwater recharge in the urban project area.

## 4.5 Sediment and Contaminant Removal

Sediment loads to streams are often increased by roads and land management practices (e.g., grazing, logging, etc.) that disturb soils and create vectors for overland erosion and sediment transport. Trees, shrubs, and grasses act as a filter by reducing water flow rates and encouraging infiltration allowing sediments, nutrients, pesticides, pathogens, metals, and other pollutants to settle out prior to reaching water bodies. Vegetated riparian areas are common throughout the PSA and contribute to this riparian function. In addition to the well-vegetated riparian zones, there are several small potential wetland depressions and drainages within the PSA that may function to remove sediments from overland flows. Due to their depressional nature, these potential wetlands reduce the velocity of water allowing the sediments to settle in place.

## 4.6 Fish and Wildlife Habitat

Streamnet (2012) lists the Willamette River as habitat for spring and fall Chinook salmon (rearing and migration; spawning and rearing, respectively) and summer and winter steelhead (migration only) within the PSA. Bradshaw's tomcat has been reported as historically occurring near the PSA and bull trout have been recorded within the PSA (ORBIC 2017). Several other species were documented during the July 2017 field effort. It is expected that other mammals such as deer (*Odocoileus* sp.), coyotes (*Canis latrans*), muskrats (*Ondatra zibethicus*), rabbits (*Sylvilagus bachmani*), and small mammals from the family Sciuridae (such as squirrels and chipmunks) utilize the riparian and floodplain areas. Woody debris, benches, overhanging banks, rocks, and dense, stratified vegetation are present along the Willamette River riparian corridor within the PSA; providing food, water, and shelter to a large diversity of wildlife and serve as migration routes and stopping points between habitats for a variety of wildlife. Based on the riparian habitat functions observed within the PSA, it is expected that the riparian zone provides resting and wintering habitat to Canada goose, northern pintail (*Anas acuta*), mallards, herons (*Ardea* sp.), and other waterfowl; and breeding habitat to songbirds during the spring and summer. The riparian zone also provides potential habitat for reptiles and amphibians, such as gopher snakes (*Pituophis* sp.), garter snakes, and various native frogs (*Rana* sp., *Bufo* sp.), though none were observed during the site visit. Fish and wildlife habitat in the Millrace Slough within the PSA appears to be of lower quality due to the extensive English ivy infestation, degraded flow regime of the slough, and degraded streambank morphology. However, it is expected that some of the specific habitat functions for species listed above are marginally provided along the Millrace Slough part of the PSA.

## 5.0 RIPARIAN MANAGEMENT RECOMMENDATIONS

Riparian management recommendations are directed towards the City's Goal 5 Water Resource Conservation Setback (Setback). The Setback protects significant riparian areas, wetlands, and other water-related wildlife habitat areas through a buffer from both the OHWM (120-foot setback for the Willamette River, 50-foot setback for the Millrace Slough) and the TOHB (100-foot setback for the Willamette River, 40-foot setback for the Millrace Slough) (EC 9.4920 [1]c1&c2).

The following are the primary management recommendations for areas within the Setback shown on Figure 8 in Appendix A. The City's Water Resources Overlay Zone code for permitted and prohibited uses and exceptions provides the basis for many of these recommendations (EC 9.4930). However, applying these recommendations to upland areas within the PSA would also contribute to enhanced riparian function and value.

- **Protect Water Quality:**
  - Remove refuse and encampments to diminish the spread of invasive species, promote bank stability, and diminish safety issues.
  - Prohibit storage of hazardous or toxic material and the storage of wood, other building material, vehicles, or machinery.
  - Remove any fill found to be in violation of local, state, or federal regulations by a regulatory agency.
  - Remove invasive/non-native species to promote the establishment of native species and to reduce the need for the application of herbicides as a means for invasive/non-native species reduction. A list of non-native, invasive plant species known or likely to occur within the Eugene Urban Growth Boundary (UGB) is included in Appendix D (City of Eugene, 2003).
  - Replace any significant non-native or invasive trees removed within 25 feet of the OHWM within six months with native tree(s) that will grow to similar size, height, and canopy as the one being removed.
  - Monitor for invasive species, as this can lead to early detection and minimize further spread of invasive species. As a result, control of is more affordable and efficient.
  - Prohibit pesticide and fertilizer application within the Setback.
  - Provide signage and pet waste bags to prevent unnecessary chemical drainage into the waterways.
  - Develop and implement a Pollution Control Plan (PCP) to prevent impacts to water quality.
  
- **Revegetation and Habitat Enhancement:**
  - A restoration landscape plan should be developed to preserve and enhance the native habitat within the Millrace Slough and Willamette River riparian zones. The plan should include long-term strategies for landscape preservation, restoration, and enhancement along the project corridor.
  - Revegetate the riparian corridor using native species well adapted to the microclimates of the Millrace Slough and Willamette River. A list of native plant species for sites at or below 500 feet in elevation within the Eugene UGB is included in Appendix D (City of Eugene, 2003). In addition, a list of native plant species recommended for the adjacent riparian property as part of the EWEB Riverfront Mater Plan is included in Appendix D (Johnson et. al., 2010). General standards for planting recommendation include the following:
    - Areas adjacent to the OHWM should be planted with native species able to withstand the pressures of high water flows and act to slow the speed of water. This area should also be managed for plant species providing abundant shade in order to cool water and provide attractive habitat to native wildlife.

- Upper- and middle-bank habitat should be planted with native species that provide habitat value for birds and pollinators in order to increase populations in upland areas.
- Upland areas should be planted with native species that attract native pollinators and songbirds. Signage about native pollinator and songbird habitat can provide educational opportunities for recreationists.
- Wetland habitat should be planted with native species tolerant of wetter conditions in the winter and drier conditions in the summer. Bioswales and other stormwater facilities used to treat runoff from streets and rooftops should be planted with native species that provides little attraction for wildlife. These facilities may carry polluted water and contain sediments with high levels of toxic materials, hence, they could be detrimental to wildlife species.
- Any degraded riparian or wetland area within the project corridor should be restored and enhanced.
- Erosion Control:
  - An Erosion and Sediment Control Plan (ESCP) should be developed and implemented to minimize riparian habitat impacts during site development activities.
  - Erosion and sediment control measures (i.e., sediment fence and compost berms) should be installed as necessary during site development to prevent soil erosion and increases in stream turbidity.
- Promote Biodiversity:
  - Increase species biodiversity by using a multi-layered native plant palette that provides structural diversity through a planned succession of understory, middlestory, and canopy level species.
  - Promote habitat elements such as snags, leaf litter, backwater microhabitats, fringe wetlands, and large woody debris that are attractive to native wildlife species.
  - Remove concrete riprap along the shoreline of the Willamette River to enhance fish habitat.
  - Repair or replace failing or aging culverts within the Millrace Slough with structures meeting Oregon Department of Fish and Wildlife fish passage criteria.
  - Protect areas of minimal disturbance within the Setback (i.e., use limitations or restrictions) in order to maintain biodiversity as well as the functions and values essential to the riparian corridor.
  - Avoid impacts to any plant species listed as threatened or endangered by ODA or USFWS.
- Recreation:
  - Enhance recreation opportunities by providing a scenic riparian aesthetic for path users.
  - Construct low impact trails using pervious surfaces.
  - Minimize trail widths and associated cleared areas to maximum extent practicable.
  - Discourage creation and use of non-sanctioned trails and footpaths with signage.
  - Remove hazard trees and replant with native plant species with similar canopy coverage.

## 6.0 SUMMARY

MB&G documented riparian functions at 57 riparian assessment points throughout the PSA. Riparian areas were analyzed as well as the surrounding aquatic and upland habitat, as these habitats contribute greatly to riparian and floodplain functions. The PSA provides many of the necessary functions and values necessary for healthy local aquatic and terrestrial ecosystems. However, these ecosystems are also influenced by other functions that occur outside of the PSA on multiple temporal and spatial scales. The streambank of the Willamette River includes

several biologic and morphologic components conducive to supporting native aquatic species. The riparian vegetation along the Willamette River and Millrace Slough streambanks attenuates erosion, promotes groundwater recharge and infiltration, provides shade to moderate stream temperatures, and provides habitat for wildlife species. However, the history of disturbances associated with multiple land uses within the PSA has degraded or removed the historic, native vegetation composition in many locations. In addition, it is expected that areas with compacted soils within the upland portion of the PSA may have reduced the riparian/floodplain functions and values discussed in this report.

There are areas of the PSA that are in need of large-scale invasive plant removal. These infestations are common adjacent to the TOHB within the PSA. In addition, restoration actions could be targeted to provide immediate benefit to riparian function, such as the removal of concrete riprap along the shoreline of the Willamette River. Pristine areas along the riparian corridor should be considered for protection and enhancement to maintain the functions and values discussed in this report. Revegetation efforts should focus on native species well adapted to the microclimates of the Millrace Slough and Willamette River. Vegetation management should result in a multi-layered native plant palette that provides structural diversity through a planned succession of understory, middlestory, and canopy level species.

Proper planning and monitoring actions need to be employed in order to maintain a healthy riparian zone. Monitoring plans should have clearly defined goals and success metrics, with adaptive management opportunities. Employing long-term strategies for landscape preservation, restoration, and enhancement along the riparian corridor will ensure a well-functioning riparian zone.

## 7.0 REFERENCES

- City of Eugene. 2003. Exhibit F to Ordinance No. 20351. Adopted on July 28, 2003 or as subsequently amended by administrative order of the City Manager pursuant to EC 2.019. Available online from: <https://www.eugene-or.gov/Archive/ViewFile/Item/1531>. Eugene, Oregon.
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- U.S. Fish and Wildlife Service (USFWS). 2017. Bull Trout Species Fact Sheet. Washington Fish and Wildlife Office. Available online at: <https://www.fws.gov/wafwo/species/Fact%20sheets/BT%20final.pdf>. Olympia, Washington.

## APPENDIX A

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### Figures



**Figure 1.**  
**Project Study Area Map**

University of Oregon  
North Campus Conditional  
Use Permit Project  
Lane County, Oregon

-  Project Study Area
-  Top of High Bank (TOHB)
-  Ordinary High Water Mark (OHWM)

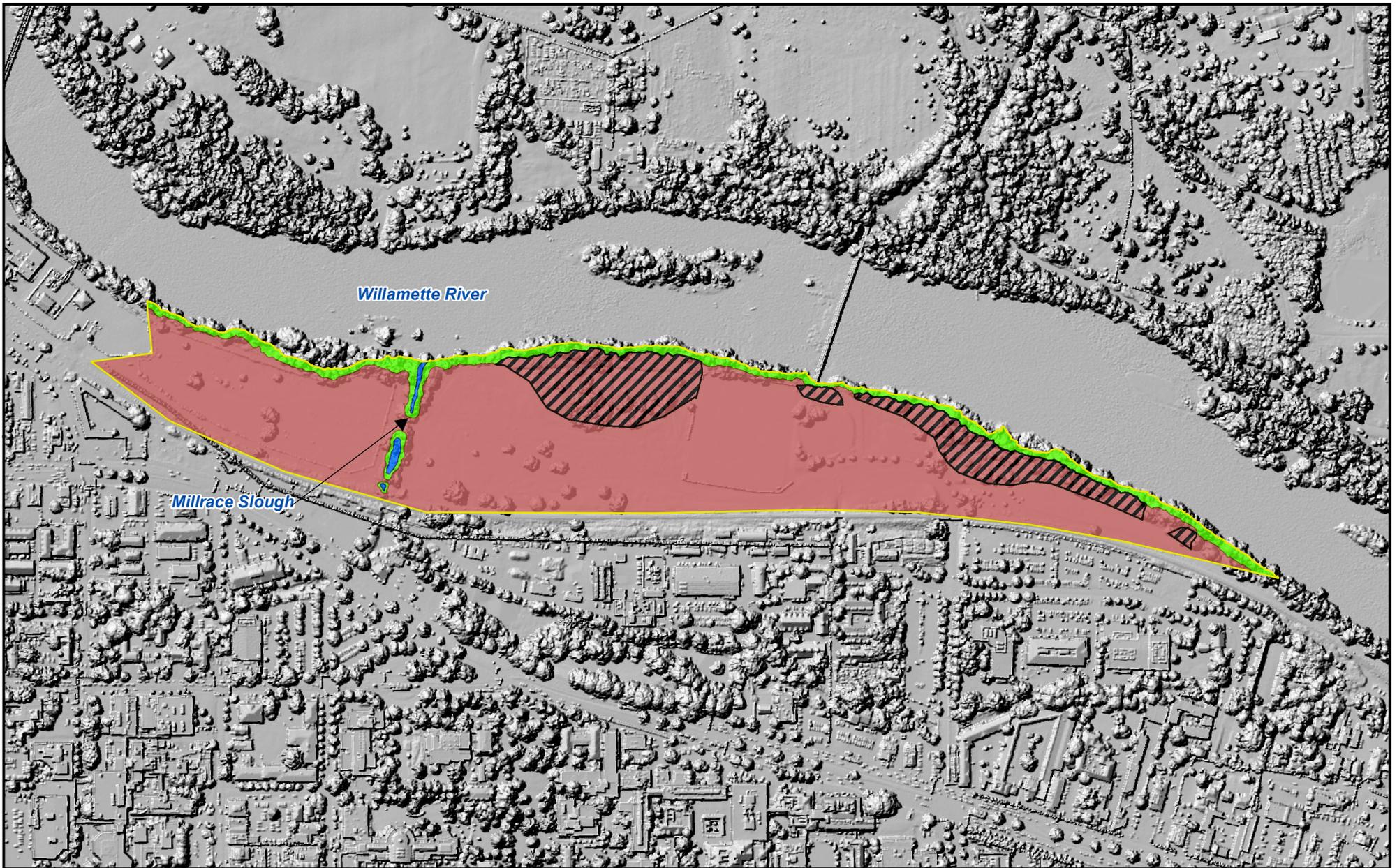
**MB&G**

Source: Aerial imagery from Microsoft Bing, PSA from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



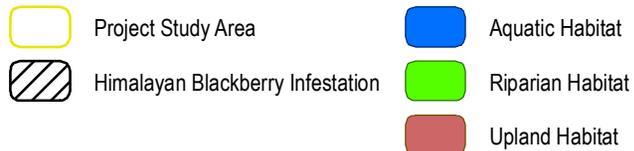
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0 125 250 500 Feet

CUP\_Figure1, 9/13/2017



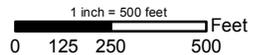
**Figure 2.  
Habitat Map**

University of Oregon  
North Campus Conditional  
Use Permit Project  
Lane County, Oregon

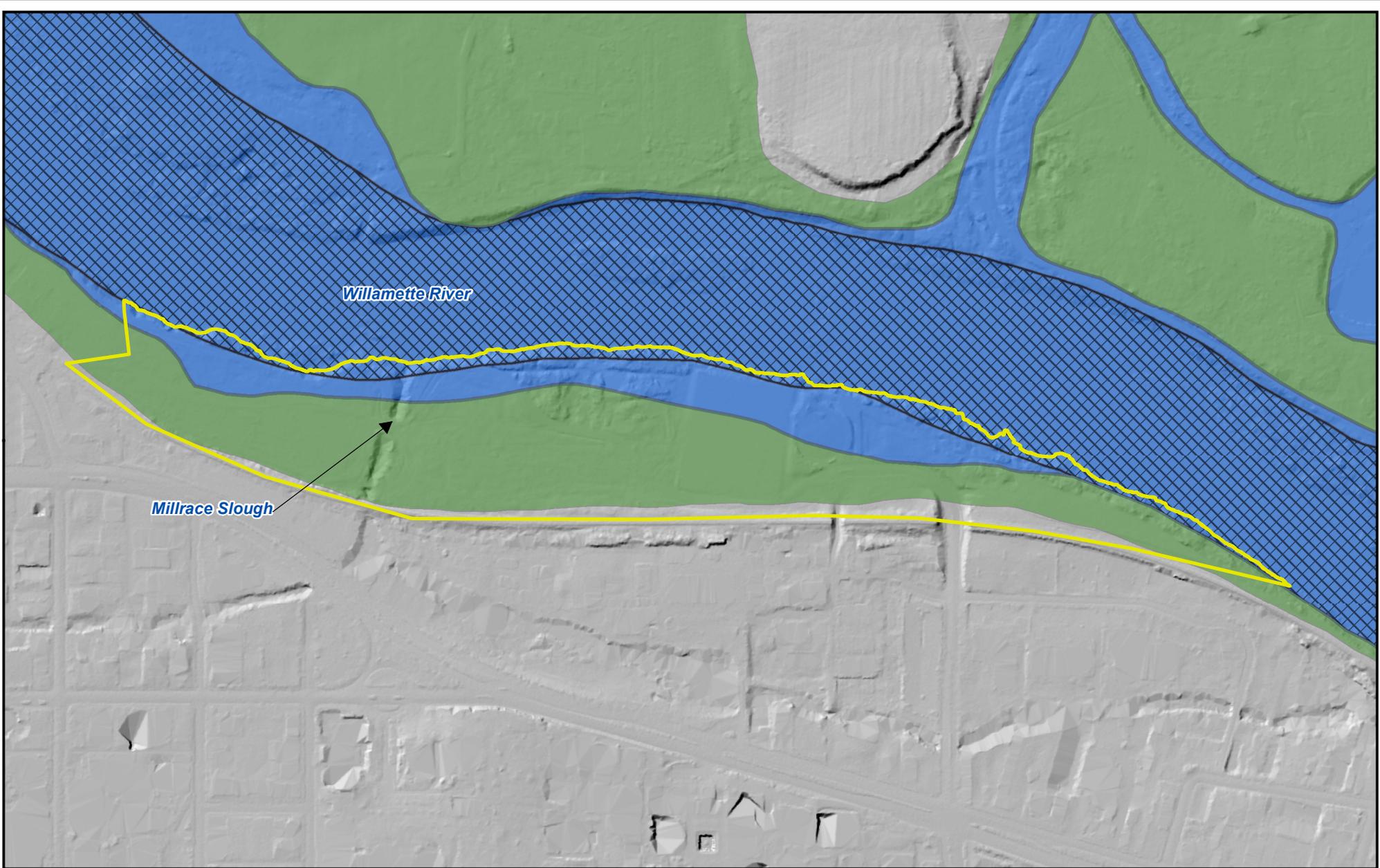


**MB&G**

Source: Highest hit DEM derived from OLC LIDAR.  
Habitat types from MB&G. Reproduced for informational  
purposes and may not be suitable for legal, engineering  
or surveying purposes. Conclusions drawn from such  
information are the responsibility of the user.



CUP\_Figure2\_habitat, 9/13/2017



**Figure 3.  
FEMA Floodplain Map**

University of Oregon  
North Campus Conditional  
Use Permit Project  
Lane County, Oregon



Project Study Area



1% Annual Chance Flood Hazard



0.2% Annual Chance Flood Hazard



Floodway

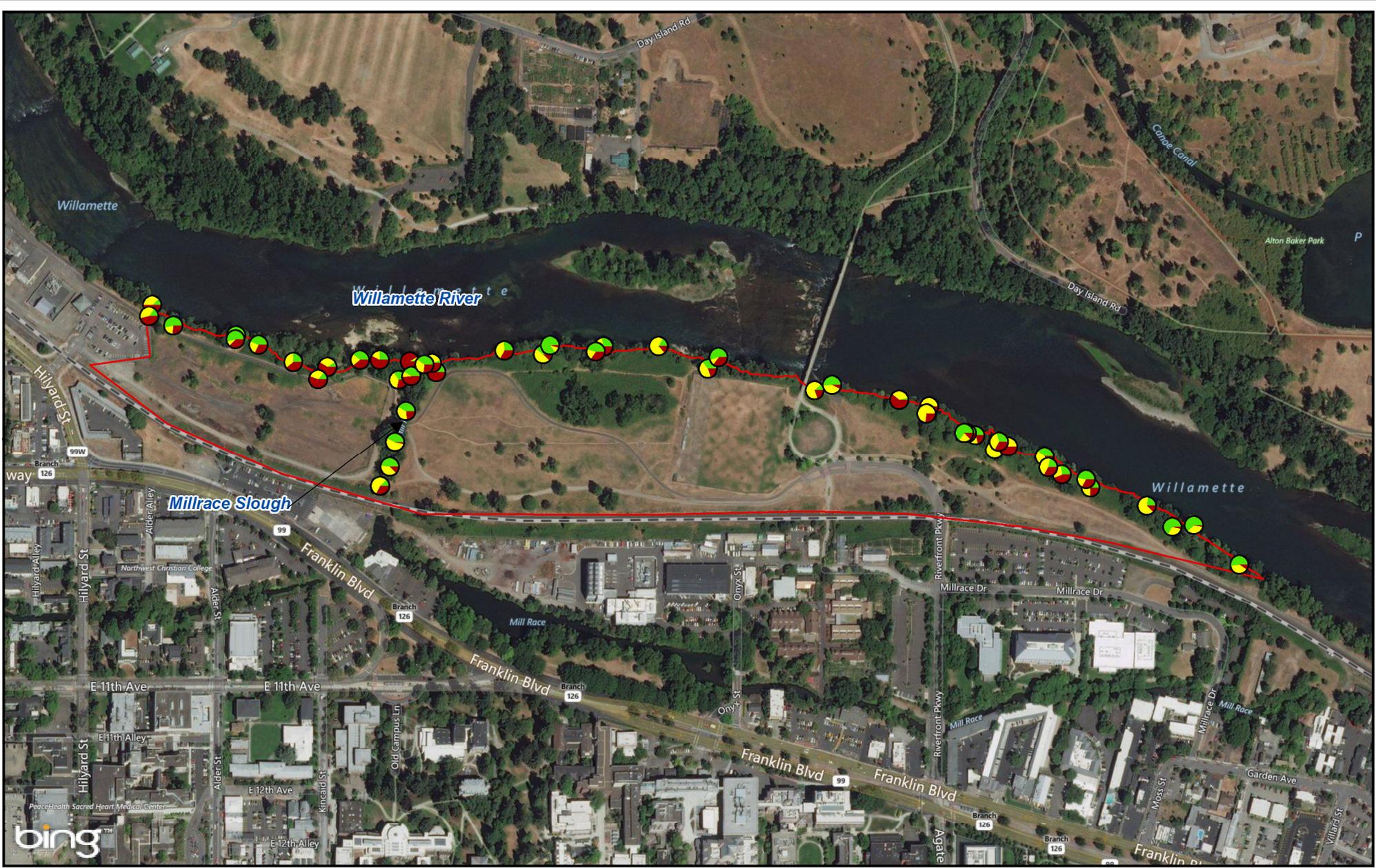


**MB&G**

Source: Bare Earth DEM derived from OLC LIDAR.  
Habitat types from MB&G. Reproduced for informational  
purposes and may not be suitable for legal, engineering  
or surveying purposes. Conclusions drawn from such  
information are the responsibility of the user.

1 inch = 481 feet  
0 125 250 500 Feet

CUP\_Figure3\_floodplain, 9/12/2017



**Figure 4.**  
**Vegetation Composition Map**

University of Oregon  
North Campus Conditional  
Use Permit Project  
Lane County, Oregon

-  Vegetation Composition Pie Chart
-  % Tree Cover
-  % Shrub Cover
-  % Herbaceous Cover
-  Project Study Area

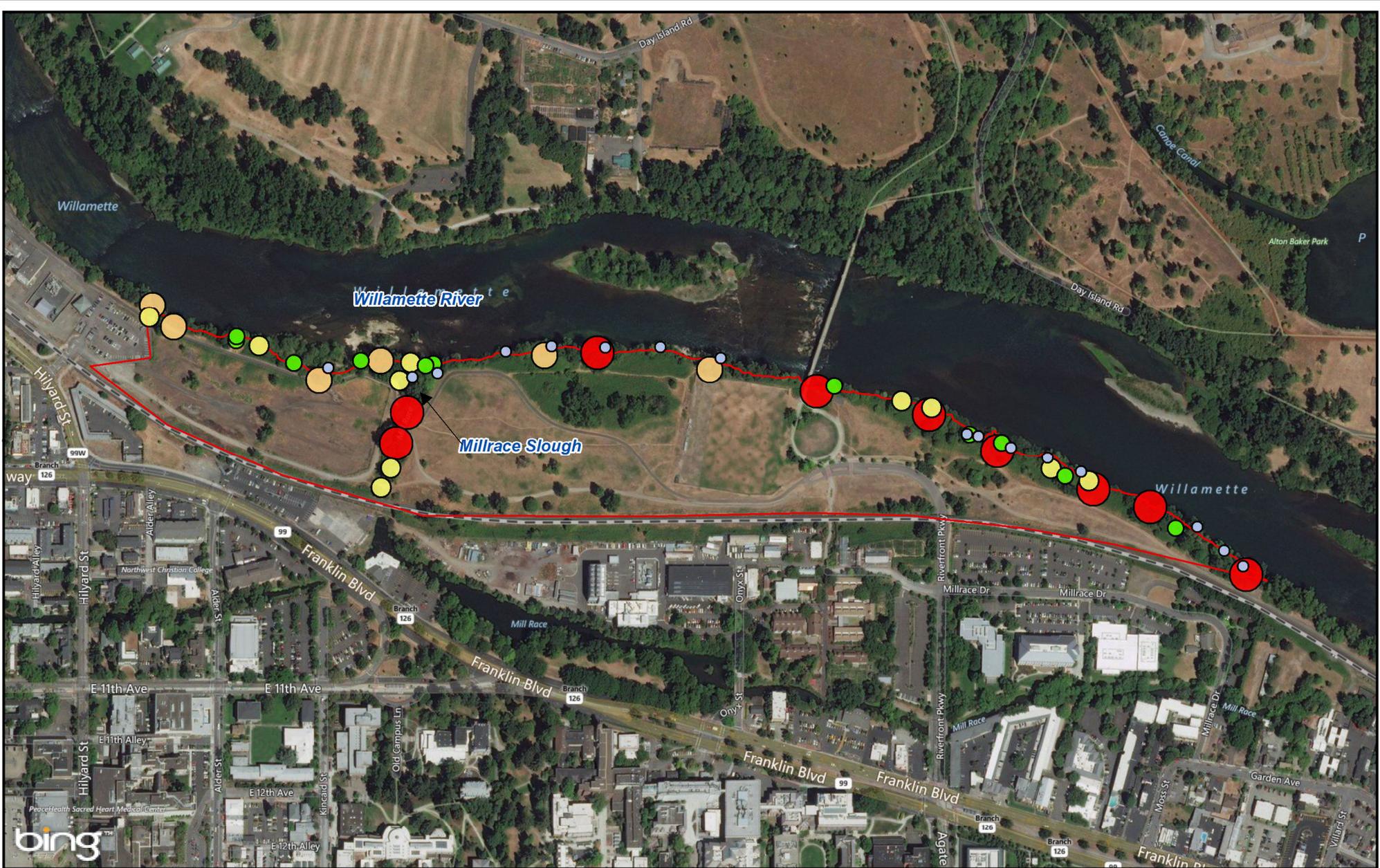
**MB&G**

Source: Aerial imagery from Bing, vegetation composition from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



1 inch = 500 feet  
0 125 250 500 Feet

CUP\_Figure4\_composition, 9/12/2017



**Figure 5.  
Percentage of  
Invasive Plant Species**

University of Oregon North Campus  
Conditional Use Permit Project  
Lane County, Oregon

- + Project Study Area
- <20% Invasive Plants
- 20-40% Invasive Plants
- 40-60% Invasive Plants
- 60-80% Invasive Plants
- 80-100% Invasive Plants

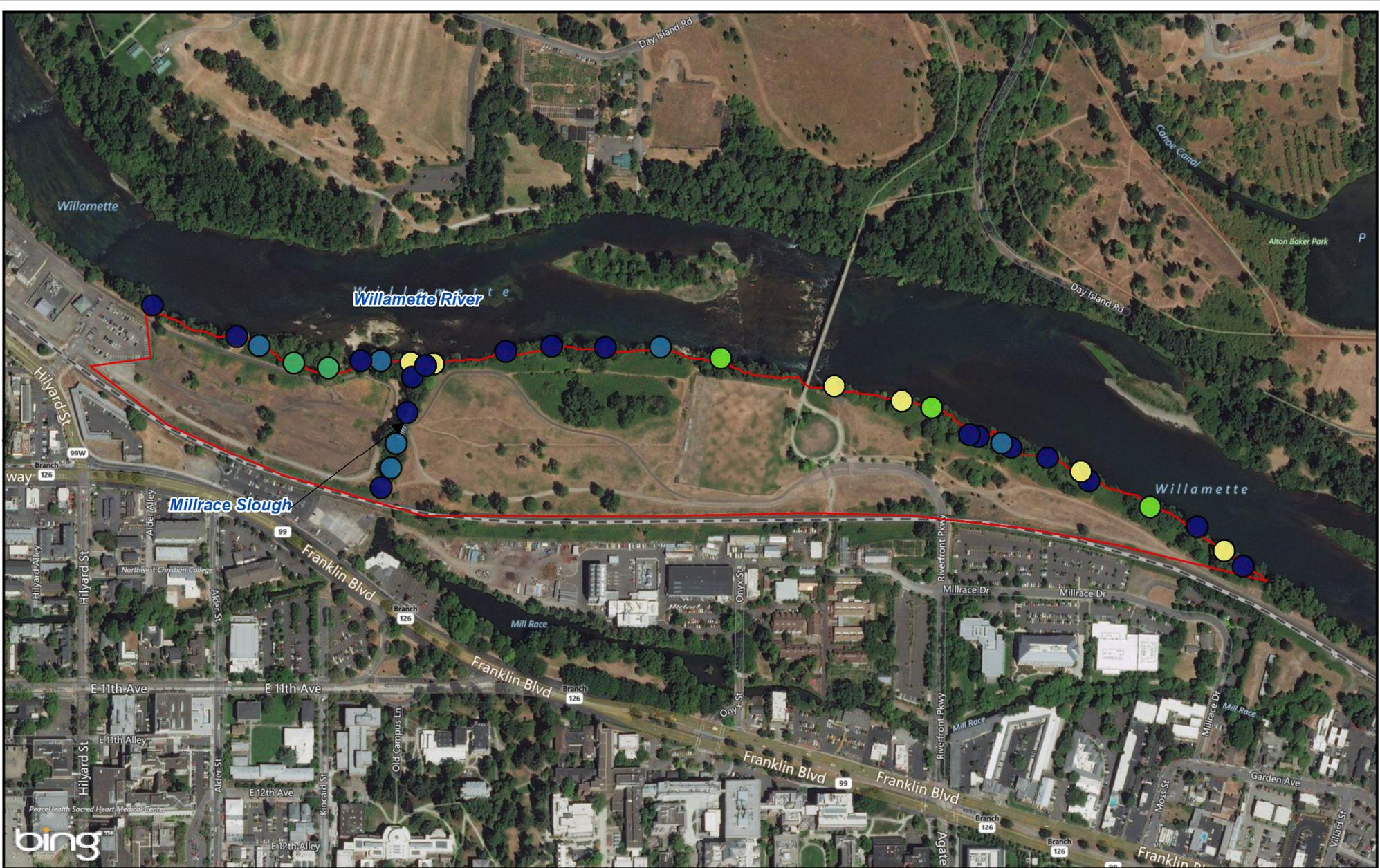
**MB&G**

Source: Aerial imagery from Bing, percentage of shade from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

1 inch = 500 feet

0 125 250 500 Feet

CUP\_Figure5\_invasives, 9/12/2017



**Figure 6.**  
**Percentage of Shade from**  
**Shrub and Tree Species**

University of Oregon North Campus  
 Conditional Use Permit Project  
 Lane County, Oregon

- |   |                    |   |               |
|---|--------------------|---|---------------|
|  | Project Study Area |  | 40-60% Shade  |
|  | <20% Shade         |  | 60-80% Shade  |
|  | 20-40% Shade       |  | 80-100% Shade |

**MB&G**

Source: Aerial imagery from Bing, percentage of shade from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

1 inch = 500 feet

0 125 250 500 Feet

CUP\_Figure6\_shade\_9/12/2017



**Figure 7.**  
**Presence of Streambank Erosion**

University of Oregon  
 North Campus Conditional  
 Use Permit Project  
 Lane County, Oregon

-  Project Study Area
-  No Erosion Present
-  Erosion Present

**MB&G**

Source: Aerial imagery from Bing, erosion data from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.



1 inch = 500 feet  
 Feet  
 0 125 250 500

CUP\_Figure7\_erosion, 9/12/2017



Figure 8.  
Conservation Setback Map

University of Oregon  
North Campus Conditional  
Use Permit Project  
Lane County, Oregon

-  Project Study Area
-  Top of High Bank (TOHB)
-  Ordinary High Water Mark (OHWM)
-  Conservation Setback

**MB&G**

Source: Aerial Imagery from Microsoft Bing, PSA from MB&G. Reproduced for informational purposes and may not be suitable for legal, engineering or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

1 inch = 500 feet

0 125 250 500 Feet

CUP\_Figure8, 12/20/2017

## APPENDIX B

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### Photographs of the Project Study Area



**PHOTO 1**  
**July 25, 2017**

Photo looking west of a seasonally-exposed vegetated bench along the Willamette River.



**PHOTO 2**  
**July 25, 2017**

Mud flat along the Willamette River channel with raccoon and waterfowl tracks.



**PHOTO 3**  
**July 25, 2017**

Photo looking east  
along the Willamette  
River at fringe  
wetland vegetation.



**PHOTO 4**  
**July 25, 2017**

Backwater area of the  
Willamette River  
during higher flow  
events.



**PHOTO 5**  
**July 25, 2017**

Refuse within a blackberry thicket adjacent to the TOHB of the Willamette River.



**PHOTO 6**  
**July 26, 2017**

Photo looking north of the Willamette River showing a seasonally-exposed bedrock outcropping in the foreground and riffle in the background.



**PHOTO 7**  
**July 25, 2017**

Photo looking north at the Willamette River at the head of a backwater channel (in the foreground). Note the vegetated cobble island, large wood debris, and riffles.



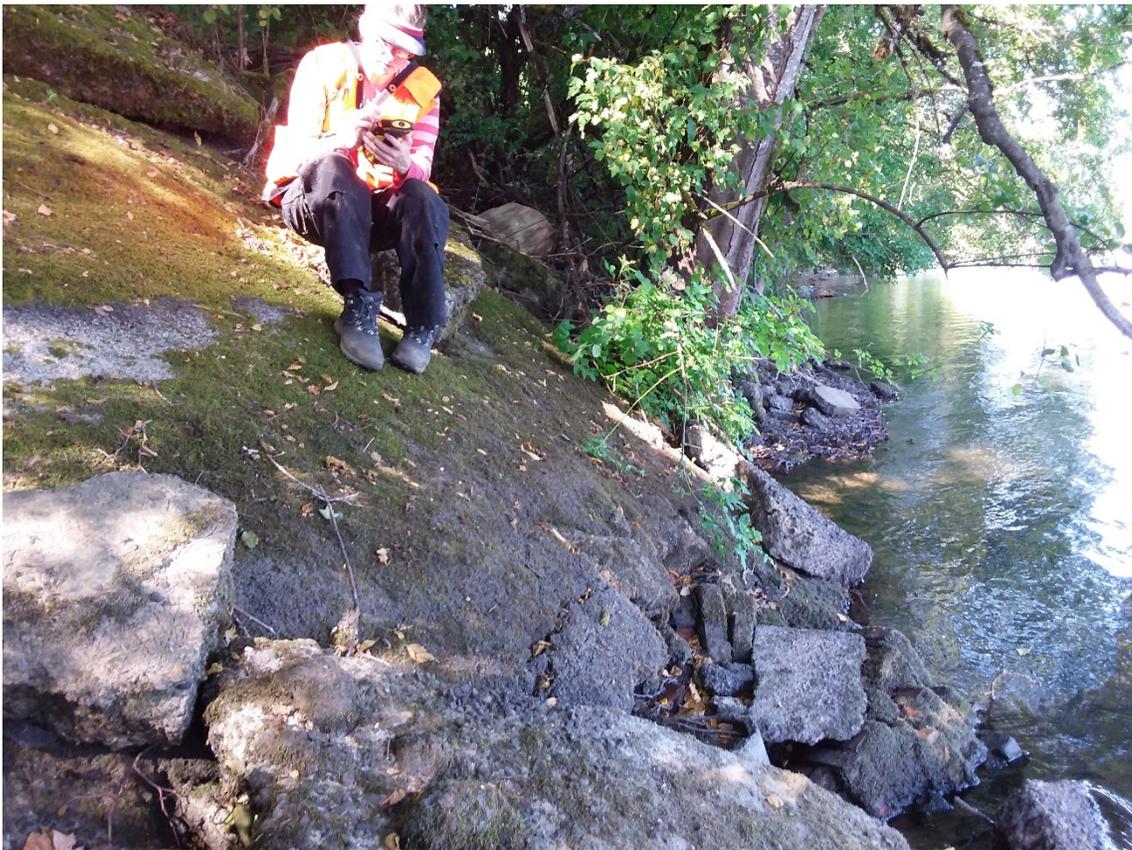
**PHOTO 8**  
**July 25, 2017**

Apparent OHWM line across tree trunk with exposed root system at the Willamette River.



**PHOTO 9**  
**July 25, 2017**

Photo taken from TOHB looking north at the Willamette River. Note the well-stratified riparian vegetation.



**PHOTO 10**  
**July 26, 2017**

Photo looking west along the Willamette River of concrete bank stabilization measures.



**PHOTO 11**  
**July 25, 2017**

View to the south of the Millrace Slough with stagnant, turbid water dominated by English ivy ground cover.



**PHOTO 12**  
**July 26, 2017**

(Left) Photo looking to the south within the Millrace Slough of the 3-foot diameter culvert under the bike and pedestrian path. (Right) Photo taken looking north at the same culvert obstructed by debris (constricted to a 6-inch diameter opening, red arrow).



**PHOTO 13**  
**July 27, 2017**

Photo to the north of a potential wetland created by compacted soil and precipitation on the western side of the PSA.



**PHOTO 14**  
**July 27, 2017**

Photo looking northwest of a potential depressional wetland within a large blackberry thicket adjacent to TOHB of the Willamette River within the 100-year floodplain.



**PHOTO 15**  
**July 27, 2017**

Photo to the southeast of a maintained grass field with a potential wetland drainage adjacent to the bike path.

## APPENDIX C

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### Additional Tables and Information

Plants Observed During the July 2017 Field Effort

Habitat	Genus	Species	Common Name	Native or Introduced
Herbaceous	<i>Agrostis</i>	<i>exerata</i>	spike bentgrass	N
Herbaceous	<i>Aira</i>	<i>caryophyllea</i>	hairgrass	I
Herbaceous	<i>Alopecurus</i>	<i>pratensis</i>	meadow foxtail	I
Herbaceous	<i>Arrhenatherum</i>	<i>elatius</i>	tall oatgrass	I
Herbaceous	<i>Avena</i>	<i>barbata</i>	slim oat	I
Herbaceous	<i>Avena</i>	<i>fatua</i>	wild oat	I
Herbaceous	<i>Avena</i>	<i>sativa</i>	common oat	I
Herbaceous	<i>Bellis</i>	<i>perennis</i>	English lawn daisy	I
Herbaceous	<i>Brassica</i>	<i>sp.</i>	mustard species	I
Herbaceous	<i>Briza</i>	<i>minor</i>	little quaking grass	I
Herbaceous	<i>Bromus</i>	<i>sp</i>	brome	n/a
Herbaceous	<i>Carex</i>	<i>obnupta</i>	slough sedge	N
Herbaceous	<i>Cichorium</i>	<i>intybus</i>	chicory	I
Herbaceous	<i>Cirsium</i>	<i>vulgare</i>	bull thistle	I
Herbaceous	<i>Cirsium</i>	<i>arvense</i>	Canada thistle	I
Herbaceous	<i>Conium</i>	<i>maculatum</i>	Poison hemlock	I
Herbaceous	<i>Convolvulus</i>	<i>arvensis</i>	field bindweed	I
Herbaceous	<i>Dactylis</i>	<i>glomerata</i>	orchard grass	I
Herbaceous	<i>Daucus</i>	<i>carota</i>	Queen Anne's lace	I
Herbaceous	<i>Dipsacus</i>	<i>fullonum (old=sylvestris)</i>	teasel	I
Herbaceous	<i>Epilobium</i>	<i>sp.</i>	fireweed	N
Herbaceous	<i>Epilobium</i>	<i>ciliatum</i>	fringed willow herb	N
Herbaceous	<i>Equisetum</i>	<i>arvense</i>	field horsetail	N
Herbaceous	<i>Eschscholzia</i>	<i>california</i>	California poppy	N
Herbaceous	<i>Festuca</i>	<i>rubra</i>	red fescue	I
Herbaceous	<i>Festuca</i>	<i>sp.</i>	fescue	n/a
Herbaceous	<i>Foeniculum</i>	<i>vulgare</i>	sweet fennel	N
Herbaceous	<i>Geranium</i>	<i>robertianum</i>	stinky bob	I
Herbaceous	<i>Gnaphalium</i>	<i>palustre</i>	lowland cudweed	N
Herbaceous	<i>Hedera</i>	<i>helix</i>	English ivy	I
Herbaceous	<i>Heracleum</i>	<i>lanatum</i>	cow parsnip	N
Herbaceous	<i>Holcus</i>	<i>lanatus</i>	velvet grass	I
Herbaceous	<i>Hordeum</i>	<i>murinum ssp. leporinum</i>	mouse barley	I
Herbaceous	<i>Hypericum</i>	<i>perforatum</i>	Klamathweed	I
Herbaceous	<i>Hypochaeris</i>	<i>radicata</i>	false dandelion	I
Herbaceous	<i>Ilex</i>	<i>aquifolium</i>	English holly	I
Herbaceous	<i>Iris</i>	<i>pseudacorus</i>	yellow flag	I
Herbaceous	<i>Lapsana</i>	<i>communis</i>	nipplewort	I
Herbaceous	<i>Lathyrus</i>	<i>latifolius</i>	perennial pea	I
Herbaceous	<i>Linum</i>	<i>bienne (old=augustifolium)</i>	pale flax	I
Herbaceous	<i>Lotus</i>	<i>corniculatus</i>	bird's foot trefoil	I
Herbaceous	<i>Marah</i>	<i>oregana</i>	man-root	N
Herbaceous	<i>Melica</i>	<i>sp.</i>	melicgrass	N
Herbaceous	<i>Mentha</i>	<i>pulegium</i>	pennyroyal	I
Herbaceous	<i>Myosotis</i>	<i>sp.</i>	field forget-me-not	I
Herbaceous	<i>Phalaris</i>	<i>arundinacea</i>	reed canary grass	I
Herbaceous	<i>Plagiobothrys</i>	<i>scouleri</i>	meadow popcorn-flower	N

Habitat	Genus	Species	Common Name	Native or Introduced
Herbaceous	<i>Plantago</i>	<i>lanceolata</i>	English plantain	I
Herbaceous	<i>Poa</i>	<i>annua</i>	annual bluegrass	I
Herbaceous	<i>Poa</i>	<i>pratensis</i>	Kentucky bluegrass	I
Herbaceous	<i>Polygonum</i>	<i>cuspidatum</i>	Japonese knot-weed	I
Herbaceous	<i>Pteridium</i>	<i>aquilinum</i>	sword fern	N
Herbaceous	<i>Rumex</i>	<i>crispus</i>	curly dock	I
Herbaceous	<i>Schedonorus</i>	<i>arundinaceas (old=Festuca)</i>	tall fescue	I
Herbaceous	<i>Senecio</i>	<i>jacobaea</i>	tansy ragwort	I
Herbaceous	<i>Sisymbrium</i>	<i>officinale</i>	hedge mustart	I
Herbaceous	<i>Solanum</i>	<i>dulcamara</i>	climbing nightshade	I
Herbaceous	<i>Sonchus</i>	<i>asper</i>	prickly sow-thistle	I
Herbaceous	<i>Stachys</i>	<i>cooleyae</i>	coastal hedgenettle	N
Herbaceous	<i>Taraxacum</i>	<i>officianale</i>	common dandelion	I
Herbaceous	<i>Tragopogon</i>	<i>dubius</i>	yellow salsify	I
Herbaceous	<i>Trifolium</i>	<i>arvense</i>	rabbittfoot clover	I
Herbaceous	<i>Trifolium</i>	<i>dubium</i>	least hop clover	I
Herbaceous	<i>Trifolium</i>	<i>pratense</i>	red clover	I
Herbaceous	<i>Trifolium</i>	<i>repens</i>	white clover	I
Herbaceous	<i>Urtica</i>	<i>dioica ssp. gracilis</i>	stinging nettle	N
Herbaceous	<i>Verbascum</i>	<i>thapsus</i>	common mullein	I
Shrub	<i>Berberis</i>	<i>aquifolium</i>	tall Oregon grape	N
Shrub	<i>Cornus</i>	<i>sericea (old=stolonifera)</i>	red-osier dogwood	N
Shrub	<i>Corylus</i>	<i>cornuta</i>	wild hazelnut	N
Shrub	<i>Crataegus</i>	<i>monogyna</i>	English hawthorn	I
Shrub	<i>Cytisus</i>	<i>scoparius</i>	Scot's broom	I
Shrub	<i>Physocarpus</i>	<i>capitatus</i>	Pacific ninebark	N
Shrub	<i>Rosa</i>	<i>eglantera</i>	sweetbriar rose	I
Shrub	<i>Rosa</i>	<i>sp.</i>	rose	n/a
Shrub	<i>Rubus</i>	<i>armenicus</i>	Himalayan blackberry	I
Shrub	<i>Rubus</i>	<i>laciniatus</i>	cut-leaf blackberry	I
Shrub	<i>Salix</i>	<i>sp.</i>	willow	N
Shrub	<i>Salix</i>	<i>hookeriana</i>	dune willow	N
Shrub	<i>Symphoricarpos</i>	<i>albus</i>	common snowberry	N
Shrub	<i>Toxicodendron</i>	<i>diversilobum</i>	poison oak	N
Tree	<i>Acer</i>	<i>macrophyllum</i>	bigleaf maple	N
Tree	<i>Alnus</i>	<i>rhombifolia</i>	white alder	N
Tree	<i>Alnus</i>	<i>rubra</i>	red alder	N
Tree	<i>Calocedrus</i>	<i>decurrens</i>	incense cedar	N
Tree	<i>Fraxinus</i>	<i>latifolia</i>	oregon ash	N
Tree	<i>Juglans</i>	<i>nigra</i>	black walnut	I
Tree	<i>Oemleria</i>	<i>cerasiformis</i>	osoberry	N
Tree	<i>Populus</i>	<i>trichocarpa</i>	black cottonwood	N
Tree	<i>Prunella</i>	<i>vulgaris</i>	self-heal	N
Tree	<i>Prunus</i>	<i>sp.</i>	plum	n/a
Tree	<i>Pseudotsuga</i>	<i>menziesii</i>	Douglas fir	N
Tree	<i>Quercus</i>	<i>garryana</i>	Oregon white oak	N
Tree	<i>Quercus</i>	<i>sp.</i>	oak	n/a
Tree	<i>Robinia</i>	<i>pseudoacacia</i>	black locust	I
Tree	<i>Salix</i>	<i>lasiandra</i>	red willow	N

## IPaC Information for Planning and Consultation U.S. Fish & Wildlife Service

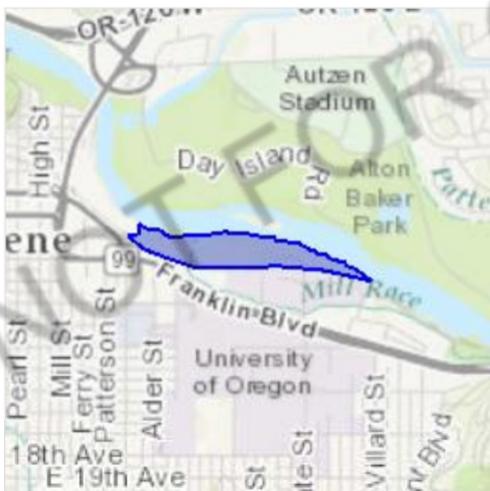
# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Lane County, Oregon



## Local office

Oregon Fish And Wildlife Office

☎ (503) 231-6179

📠 (503) 231-6195

2600 Southeast 98th Avenue, Suite 100  
Portland, OR 97266-1398

<https://www.fws.gov/oregonfwo/articles.cfm?id=149489416>

NOT FOR CONSULTATION

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service.

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

## Birds

NAME

STATUS

Marbled Murrelet *Brachyramphus marmoratus* Threatened

There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/4467>

Northern Spotted Owl *Strix occidentalis caurina* Threatened

There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/1123>

Streaked Horned Lark *Eremophila alpestris strigata* Threatened

There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/7268>

Yellow-billed Cuckoo *Coccyzus americanus* Threatened

There is **proposed** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/3911>

## Fishes

NAME

STATUS

Bull Trout *Salvelinus confluentus*

Threatened

There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/8212>

## Insects

NAME

STATUS

Fender's Blue Butterfly *Icaricia icarioides fenderi*

Endangered

There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/6659>

## Flowering Plants

NAME

STATUS

Bradshaw's Desert-parsley <i>Lomatium bradshawii</i>	Endangered
No critical habitat has been designated for this species.	
<a href="https://ecos.fws.gov/ecp/species/5743">https://ecos.fws.gov/ecp/species/5743</a>	
Kincaid's Lupine <i>Lupinus sulphureus</i> ssp. <i>kincaidii</i>	Threatened
There is <b>final designated</b> critical habitat for this species. Your location is outside the critical habitat.	
<a href="https://ecos.fws.gov/ecp/species/3747">https://ecos.fws.gov/ecp/species/3747</a>	
Nelson's Checker-mallow <i>Sidalcea nelsoniana</i>	Threatened
No critical habitat has been designated for this species.	
<a href="https://ecos.fws.gov/ecp/species/7340">https://ecos.fws.gov/ecp/species/7340</a>	
Water Howellia <i>Howellia aquatilis</i>	Threatened
No critical habitat has been designated for this species.	
<a href="https://ecos.fws.gov/ecp/species/7090">https://ecos.fws.gov/ecp/species/7090</a>	
Willamette Daisy <i>Erigeron decumbens</i>	Endangered
There is <b>final designated</b> critical habitat for this species. Your location is outside the critical habitat.	
<a href="https://ecos.fws.gov/ecp/species/6270">https://ecos.fws.gov/ecp/species/6270</a>	

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service<sup>3</sup>. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is

responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are [USFWS Birds of Conservation Concern](#) that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the [E-bird data mapping tool](#) (year-round bird sightings by birders and the general public) and [Breeding Bird Survey](#) (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the [E-bird Explore Data Tool](#).

NAME	BREEDING SEASON
Black Oystercatcher <i>Haematopus bachmani</i> <a href="https://ecos.fws.gov/ecp/species/9591">https://ecos.fws.gov/ecp/species/9591</a>	Breeds Apr 15 to Oct 31
Black Turnstone <i>Arenaria melanocephala</i>	Breeds elsewhere
Great Blue Heron <i>Ardea herodias</i> <a href="https://ecos.fws.gov/ecp/species/2170">https://ecos.fws.gov/ecp/species/2170</a>	Breeds Mar 15 to Aug 15
Lesser Yellowlegs <i>Tringa flavipes</i> <a href="https://ecos.fws.gov/ecp/species/9679">https://ecos.fws.gov/ecp/species/9679</a>	Breeds elsewhere
Long-billed Curlew <i>Numenius americanus</i> <a href="https://ecos.fws.gov/ecp/species/5511">https://ecos.fws.gov/ecp/species/5511</a>	Breeds elsewhere

Marbled Godwit <i>Limosa fedoa</i> <a href="https://ecos.fws.gov/ecp/species/9481">https://ecos.fws.gov/ecp/species/9481</a>	Breeds elsewhere
Olive-sided Flycatcher <i>Contopus cooperi</i> <a href="https://ecos.fws.gov/ecp/species/3914">https://ecos.fws.gov/ecp/species/3914</a>	Breeds May 20 to Aug 31
Red Knot <i>Calidris canutus ssp. roselaari</i> <a href="https://ecos.fws.gov/ecp/species/8880">https://ecos.fws.gov/ecp/species/8880</a>	Breeds elsewhere
Red-throated Loon <i>Gavia stellata</i>	Breeds elsewhere
Rock Sandpiper <i>Calidris ptilocnemis ptilocnemis</i>	Breeds elsewhere
Rufous Hummingbird <i>selasphorus rufus</i> <a href="https://ecos.fws.gov/ecp/species/8002">https://ecos.fws.gov/ecp/species/8002</a>	Breeds Apr 15 to Jul 15
Semipalmated Sandpiper <i>Calidris pusilla</i>	Breeds elsewhere
Short-billed Dowitcher <i>Limnodromus griseus</i> <a href="https://ecos.fws.gov/ecp/species/9480">https://ecos.fws.gov/ecp/species/9480</a>	Breeds elsewhere
Whimbrel <i>Numenius phaeopus</i> <a href="https://ecos.fws.gov/ecp/species/9483">https://ecos.fws.gov/ecp/species/9483</a>	Breeds elsewhere

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee

was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

- To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
- The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

### Breeding Season (■)

Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

### Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

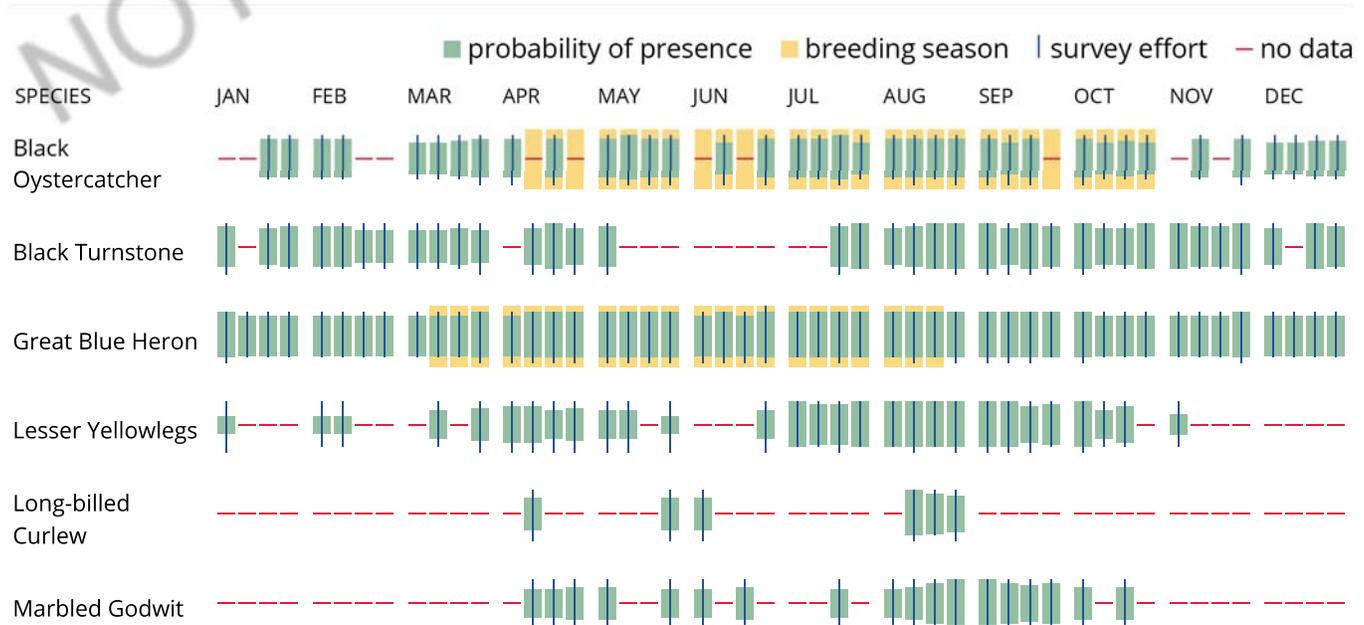
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

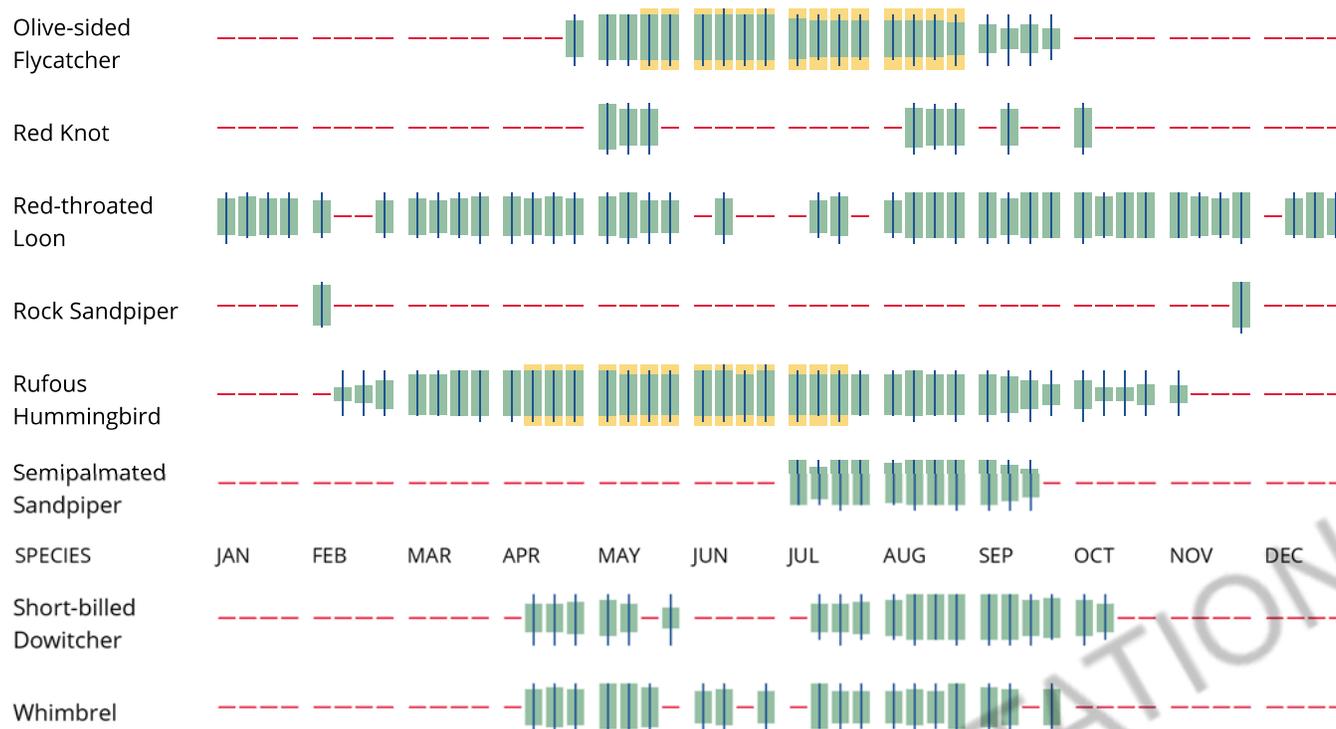
### No Data (—)

A week is marked as having no data if there were no survey events for that week.

### Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.





**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in [Birds of North America \(BNA\) Online](#) under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a [subscription](#). [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the [Endangered Species Act \(ESA\)](#).

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#). The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the [E-bird](#)

[Explore Data Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

## Facilities

### Wildlife refuges

Any activity proposed on [National Wildlife Refuge](#) lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

### Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

## Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

[PSSC](#)

RIVERINE

[R2UBH](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <https://ecos.fws.gov/ipac/wetlands/decoder>

### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

## APPENDIX D

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### Planting Recommendations and Invasive/Non-Native Species List

## Exhibit F to Ordinance No. 20351

### Native and Non-Native Plant List

#### Part 1

#### **NATIVE PLANT SPECIES FOR SITES AT OR ABOVE 425 FEET IN ELEVATION WITHIN THE EUGENE UGB**

The plant species included in this list are species that grow and propagate themselves in the Eugene area through natural processes, are adapted to the weather, soils and hydrology of the area, and have evolved in the area or been introduced to the area by natural causes. These native plant species are distinguished from plant species that have been deliberately or accidentally imported or introduced from other areas by humans or human activities.

This list applies to all habitat types, including riparian, upland and wetland areas, above 425 feet in elevation. To meet Eugene Code requirements for native plants, these species are to be used within the specified geographic area or elevation. Do not substitute alternate species. You must use the specific species, subspecies or variety listed.

Wetland Indicator Status and Site Suitability information in the table below is intended as a guideline for identifying suitable locations for plant species based on additional site characteristics, such as soils and hydrology.

#### Trees

<u>Common Name</u>	<u>Scientific Name</u>	Wetland Indicator <u>Status</u>	Site <u>Suitability</u>
grand fir	<i>Abies grandis</i>	NOL	UB
vine maple	<i>Acer circinatum</i>	FACU+	UB
Oregon bigleaf maple	<i>Acer macrophyllum</i>	FACU	UB
red alder	<i>Alnus rubra</i>	FAC	LB, UB
Pacific madrone	<i>Arbutus menziesii</i>	NOL	UB
incense cedar	<i>Calocedrus decurrens</i>	NOL	UB
Pacific dogwood	<i>Cornus nuttallii</i>	NOL UB	
Oregon ash	<i>Fraxinus latifolia</i>	FACW	LB, UB
Ponderosa pine	<i>Pinus ponderosa</i>	FACU	UB
black cottonwood	<i>Populus trichocarpa</i>	FAC	LB
Douglas fir	<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	NOL	UB
Oregon white oak	<i>Quercus garryana</i> var. <i>garryana</i>	NOL	UB
California black oak	<i>Quercus kelloggii</i>	NOL	UB
Pacific willow	<i>Salix lucida</i> ssp. <i>lasiandra</i>	FACW+	WE, LB
Scouler's willow	<i>Salix scouleriana</i>	FAC	LB, UB
Sitka willow	<i>Salix sitchensis</i>	FACW	WE, LB
Pacific yew	<i>Taxus brevifolia</i>	FACU-	UB

**Shrubs and Vines**

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
serviceberry	<i>Amelanchier alnifolia</i> var. <i>semiintegrifolia</i>	FACU	UB
tall Oregon grape	<i>Berberis aquifolium</i>	NOL	UB
common buckbrush	<i>Ceanothus cuneatus</i>	NOL	UB
redstem ceanothus	<i>Ceanothus sanguineus</i>	NOL	UB
wild clematis	<i>Clematis ligusticifolia</i>	FACU	UB
Suksdorf's hawthorn	<i>Crataegus suksdorfii</i>	FAC	UB
red-osier dogwood	<i>Cornus sericea</i>	FACW	WE, LB
California hazel	<i>Corylus cornuta</i> var. <i>californica</i>	NI	UB
salal	<i>Gaultheria shallon</i>	NOL	UB
ocean spray	<i>Holodiscus discolor</i>	NOL	UB
orange honeysuckle	<i>Lonicera ciliosa</i>	NOL	UB
hairy honeysuckle	<i>Lonicera hispidula</i>	NOL	UB
osoberry/indian plum	<i>Oemleria cerasiformis</i>	NOL	UB
mock-orange	<i>Philadelphus lewisii</i>	NOL	UB
Pacific ninebark	<i>Physocarpus capitatus</i>	FAC+	WE, LB
chokecherry	<i>Prunus virginiana</i> var. <i>demissa</i>	FACU	UB
cascara buckthorn	<i>Rhamnus purshiana</i>	FAC-	UB
straggly gooseberry	<i>Ribes divaricatum</i>	NI	UB
red currant	<i>Ribes sanguineum</i>	NOL	UB
baldhip rose	<i>Rosa gymnocarpa</i>	NI	UB
Nootka rose	<i>Rosa nutkana</i> var. <i>nutkana</i>	NI	LB, UB
thimbleberry	<i>Rubus parviflorus</i>	FACU+	UB
salmon berry	<i>Rubus spectabilis</i>	FAC	LB, UB
dewberry	<i>Rubus ursinus</i>	NOL	UB
blue elderberry	<i>Sambucus mexicana</i>	FAC-	UB
red elderberry	<i>Sambucus racemosa</i> var. <i>arborescens</i>	FACU	UB
Douglas spiraea	<i>Spiraea douglasii</i> var. <i>douglasii</i>	FACW	WE, LB
snowberry	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	FACU	UB
red huckleberry	<i>Vaccinium parviflorum</i>	NOL	UB
viburnum	<i>Viburnum ellipticum</i>	NOL	UB

**Herbaceous Plants**

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
vanilla-leaf	<i>Achlys triphylla</i>	NOL	UB
baneberry	<i>Actaea rubra</i>	NOL	UB
pathfinder	<i>Adenocaulon bicolor</i>	NOL	UB
red columbine	<i>Aquilegia formosa</i>	FAC	LB, UB
wild ginger	<i>Asarum caudatum</i>	NOL	UB
wild aster	<i>Eurybia radulina (Aster radulinus)</i>	NOL	UB
lady-fern	<i>Athyrium filix-femina</i>	FAC	WE, LB, UB
American wintercress	<i>Barbarea orthoceras</i>	FACW+	LB
elegant brodiaea	<i>Brodiaea elegans</i>	FACU	UB
harvest Brodiaea	<i>Brodiaea coronaria</i>	NOL	UB
wood bittercress	<i>Cardamine angulata</i>	FACW	LB, UB
spring beauty	<i>Cardamine nuttallii</i> var. <i>nuttallii</i>	NOL	UB
miner's lettuce	<i>Claytonia perfoliata</i>	FAC	UB
candyflower	<i>Claytonia sibirica</i>	FACW	UB
tall larkspur	<i>Delphinium trolliifolium</i>	NOL	UB
bleeding heart	<i>Dicentra formosa</i>	NOL	UB
Hooker's fairy bells	<i>Prosartes hookeri</i>	NOL	UB
Watson's willow herb	<i>Epilobium ciliatum</i> var. <i>watsonii</i>	FACW-	WE, LB
Oregon fawn lily	<i>Erythronium oregonum</i>	NOL	UB
large-leaf avens	<i>Geum macrophyllum</i>	FACW+	LB, UB
lowland cudweed	<i>Gnaphalium palustre</i>	FAC+	WE
Willamette valley gumweed	<i>Grindelia integrifolia</i>	FACW	WE, LB
cow-parsnip	<i>Heracleum lanatum</i>	FAC	UB
Pacific waterleaf	<i>Hydrophyllum tenuipes</i>	NOL	UB
bog St. John's-wort	<i>Hypericum anagalloides</i>	OBL	SW, WE
tiger lily	<i>Lilium columbianum</i>	FAC	UB
miniature lupine	<i>Lupinus polycarpus</i>	NOL	UB
riverbank lupine	<i>Lupinus rivularis</i>	FAC	LB, UB
skunk cabbage	<i>Lysichiton americanus</i>	OBL	SW, WE
big smilacina	<i>Maianthemum racemosum</i>	FAC-	UB
little smilacina	<i>Maianthemum stellatum</i>	FAC-	UB
Oregon bigroot	<i>Marah oreganus</i>	NOL	UB
western bluebell	<i>Mertensia platyphylla</i>	NOL	UB
water montia	<i>Montia fontana</i>	OBL	SW, WE
aquatic claytonia	<i>Montia linearis</i>	NOL	LB, UB
small forget-me-not	<i>Myosotis laxa</i>	OBL	SW, WE
small flowered nemophila	<i>Nemophila parviflora</i> var. <i>nemophylla</i>	NOL	UB
water-parsley	<i>Oenanthe sarmentosa</i>	OBL	SW, WE
sweet cicely	<i>Osmorhiza berteroi</i>	NOL	UB
w. yellow wood sorrel	<i>Oxalis suksdorfii</i>	NOL	UB
sweet colt's-foot	<i>Petasites frigidus</i> var. <i>palmatus</i>	FACW	LB

woodland phacelia	<i>Phacelia nemoralis</i>	FACU	UB
swordfern	<i>Polystichum munitum</i>	NOL	UB
bracken fern	<i>Pteridium aquilinum</i>	FACU	UB
self-heal	<i>Prunella vulgaris</i> var. <i>lanceolata</i>	FACU+	UB
white water buttercup	<i>Ranunculus aquatilis</i>	OBL	SW, WE
woods buttercup	<i>Ranunculus uncinatus</i>	FAC	UB
willow leaved dock	<i>Rumex salicifolius</i>	FACW	WE
Pacific sanicle	<i>Sanicula crassicaulis</i>	NOL	UB
yerba buena	<i>Satureja douglasii</i>	NOL	UB
Idaho blue-eyed grass	<i>Sisyrinchium idahoense</i> var. <i>idahoense</i>	FACW	WE, LB
beautiful blue eyed grass	<i>Sisyrinchium bellum</i>	FACW -	UB
hedge-nettle	<i>Stachys mexicana</i>	FACW	LB, UB
spring queen	<i>Synthyris reniformis</i>	NOL	UB
fringecups	<i>Tellima grandiflora</i>	NOL	UB
western meadowrue	<i>Thalictrum occidentale</i>	FACU UB	
tall western meadowrue	<i>Thalictrum polycarpum</i>	NOL	UB
piggy-back plant	<i>Tolmiea menziesii</i>	FAC	LB
star-flower	<i>Trientalis latifolia</i>	FAC-	UB
sessile trillium	<i>Trillium albidum</i>	NOL	UB
western trillium	<i>Trillium ovatum</i> ssp. <i>ovatum</i>	NOL	UB
inside-out flower	<i>Vancouveria hexandra</i>	NOL	UB
American vetch	<i>Vicia americana</i>	NI	WE, LB
woodland violet	<i>Viola glabella</i>	FACW+	UB

### **Grasses, Sedges, Rushes**

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
Sitka brome	<i>Bromus sitchensis</i>	NOL	UB
Dewey's sedge	<i>Carex deweyana</i> var. <i>leptopoda</i>	FAC+	UB
Henderson's sedge	<i>Carex hendersonii</i>	NI	LB
slough sedge	<i>Carex obnupta</i>	OBL	SW, WE
sawbeak sedge	<i>Carex stipata</i> var. <i>stipata</i>	NOL	WE, LB
needle spikerush	<i>Eleocharis acicularis</i>	OBL	SW, WE
creeping spikerush	<i>Eleocharis palustris</i>	OBL	SW, WE
blue wild-rye	<i>Elymus glaucus</i> ssp. <i>glaucus</i>	FACU	UB
tall manna grass	<i>Glyceria striata</i>	FACW+	WE, LB
meadow barley	<i>Hordeum brachyantherum</i>	FACW	WE, LB
common rush	<i>Juncus effusus</i> var. <i>gracilis</i>	FACW+	SW, WE
spreading rush	<i>Juncus patens</i>	FACW	SW, WE
lacquered rush	<i>Juncus laccatus</i>	?	SW, WE
onion grass	<i>Mellica subulata</i>	NOL	UB

### Key to Wetland Indicator Status

OBL = Obligate Wetland Plants. Under normal conditions, these plants almost always occur in wetlands (estimated probability of wetland occurrence 99%).

FACW = Facultative Wetland Plants. Under normal conditions these plants are usually found in wetlands, but also may be found outside wetlands (estimated probability of wetland occurrence 67-99%)

FAC = Facultative Plants. Under normal conditions, these plants are found equally in wetlands and non-wetlands (estimated probability of wetland occurrence 33-66%).

FACU = Facultative Upland Plants. Under normal conditions, these plants are most likely to be found in non-wetlands (estimated probability of wetland occurrence 1-33%).

UPL = Obligate Upland Plants. These plants are almost always found in non-wetlands, and are expected to be found in wetlands less than 1% of the time.

NOL = Not on U.S.F.W.S. wetland plant list.

### Key to Site Suitability

SW = Shallow water

WE = Water's edge

LB = Lower bank

UB = Upper bank and terraces above the ordinary high water line

Wetland indicator status information is taken from:

“National List of Plant Species That Occur In Wetlands: Northwest (Region 9),” U.S. Fish and Wildlife Service, May 1988; 1993 supplement.

## Part 2

### **NATIVE PLANT SPECIES FOR SITES AT OR BELOW 500 FEET IN ELEVATION WITHIN THE EUGENE UGB**

The plant species included in this list are species that grow and propagate themselves in the Eugene area through natural processes, are adapted to the weather, soils and hydrology of the area, and have evolved in the area or been introduced to the area by natural causes. These native plant species are distinguished from plant species that have been deliberately or accidentally imported or introduced from other areas by humans or human activities.

This list applies to all habitat types, including riparian, upland and wetland areas, below 500 feet in elevation within the UGB, *except* within the West Eugene Wetlands Plan area, and within seasonal wet prairie habitats (see Part 3). To meet Eugene Code requirements for native plants, these species are to be used within the specified geographic area and elevation. Do not substitute alternate species. You must use the specific species, subspecies or variety listed.

Wetland Indicator Status and Site Suitability information in the table below is intended as a guideline for identifying suitable locations for plant species based on additional site characteristics, such as soils and hydrology.

#### Trees

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
grand fir	<i>Abies grandis</i>	NOL	UB
vine maple	<i>Acer circinatum</i>	FACU+	UB
Oregon bigleaf maple	<i>Acer macrophyllum</i>	FACU	UB
white alder	<i>Alnus rhombifolia</i>	FACW	LB, UB
red alder	<i>Alnus rubra</i>	FAC	LB, UB
incense-cedar	<i>Calocedrus decurrens</i>	NOL	UB
Pacific dogwood	<i>Cornus nutallii</i>	NOL	UB
Oregon ash	<i>Fraxinus latifolia</i>	FACW	LB, UB
ponderosa pine	<i>Pinus ponderosa</i>	FACU	UB
black cottonwood	<i>Populus balsamifera</i>	FAC	LB
	<i>ssp. trichocarpa</i>		
Douglas-fir	<i>Pseudotsuga menziesii</i>		
	<i>var. menziesii</i>	NOL	UB
Oregon white oak	<i>Quercus garryana</i> <i>var. garryana</i>	NOL	UB
California black oak	<i>Quercus kelloggii</i>	NOL	UB
Pacific willow	<i>Salix lucida</i>	FACW+	WE, LB
	<i>ssp. lasiandra</i>		
western yew	<i>Taxus brevifolia</i>	FACU-	UB
western redcedar	<i>Thuja plicata</i>	FAC	UB

**Shrubs**

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
serviceberry	<i>Amelanchier alnifolia</i> FACU var. <i>semiintegrifolia</i>	UB	
tall Oregon grape	<i>Berberis aquifolium</i>	NOL	UB
common buckbrush	<i>Ceanothus cuneatus</i>	NOL	UB
Suksdorf's hawthorn	<i>Crataegus suksdorfii</i> FAC var. <i>suksdorfii</i>	UB	
red-osier dogwood	<i>Cornus sericea</i>	FACW	WE, LB
California hazel	<i>Corylus cornuta</i> var. <i>californica</i>	NI	UB
ocean spray	<i>Holodiscus discolor</i>	NOL	UB
osoberry/indian plum	<i>Oemleria cerasiformis</i>	NOL	UB
mock-orange	<i>Philadelphus lewisii</i>	NOL	UB
Pacific ninebark	<i>Physocarpus capitatus</i>	FAC+	WE, LB
chokecherry	<i>Prunus virginiana</i> var. <i>demissa</i>	FACU	UB
cascara buckthorn	<i>Rhamnus purshiana</i>	FAC?	UB
straggly gooseberry	<i>Ribes divaricatum</i>	NI	UB
red currant	<i>Ribes sanguineum</i>	NOL	UB
baldhip rose	<i>Rosa gymnocarpa</i>	NI	UB
Nootka rose	<i>Rosa nutkana</i>	NI	LB, UB
blackcap	<i>Rubus leucodermis</i>	NOL	UB
thimbleberry	<i>Rubus parviflorus</i>	FACU+	UB
salmonberry	<i>Rubus spectabilis</i>	FAC	LB, UB
dewberry	<i>Rubus ursinus</i>	NOL	UB
Columbia River willow	<i>Salix fluviatilis</i>	OBL	SW, WE
Piper's willow	<i>Salix hookeriana (piperi)</i>	FACW	LB
Scouler's willow	<i>Salix scouleriana</i>	FAC	LB, UB
Sitka willow	<i>Salix sitchensis</i>	FACW	WE, LB
blue elderberry	<i>Sambucus mexicana (cerulea)</i>	FAC-	UB
red elderberry	<i>Sambucus racemosa</i> var. <i>arborescens</i>	FACU	UB
Douglas spiraea	<i>Spiraea douglasii</i> var. <i>douglasii</i>	FACW	WE, LB
snowberry	<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	FACU	UB
oval-leaved viburnum	<i>Viburnum ellipticum</i>	NOL	UB

## Vines

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
wild clematis	<i>Clematis ligusticifolia</i>	FACU	UB
orange honeysuckle	<i>Lonicera ciliosa</i>	NOL	UB
hairy honeysuckle	<i>Lonicera hispidula</i>	NOL	UB

## Herbaceous Plants

<u>Common Name</u>	<u>Scientific Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
vanilla-leaf	<i>Achlys triphylla</i>	NOL	UB
baneberry	<i>Actaea rubra</i>	NOL	UB
pathfinder	<i>Adenocaulon bicolor</i>	NOL	UB
red columbine	<i>Aquilegia formosa</i>	FAC	LB, UB
wild ginger	<i>Asarum caudatum</i>	NOL	UB
lady-fern	<i>Athyrium filix-femina</i>	FAC	WE, LB, UB
American wintercress	<i>Barbarea orthoceras</i>	FACW+	LB
camas	<i>Camassia leichtlinii</i>	FACW-	LB, UW
wood bittercress	<i>Cardamine angulata</i>	FACW	LB, UB
spring beauty	<i>Cardamine nuttallii</i> var. <i>nuttallii</i>	NOL	UB
small-flowered claytonia	<i>Claytonia parviflora</i>	NOL	UB
miner's lettuce	<i>Claytonia perfoliata</i>	FAC	UB
candyflower	<i>Claytonia sibirica</i>	FACW	UB
tall larkspur	<i>Delphinium trolliifolium</i>	NOL	UB
bleeding heart	<i>Dicentra formosa</i>	NOL	UB
coastal shield fern	<i>Dryoptera arguta</i>	NOL	UB
Watson's willow herb	<i>Epilobium ciliatum</i> (watsonii)	FACW-	LB
Oregon fawn lily	<i>Erythronium oregonum</i>	NOL	UB
large-leaf avens	<i>Geum macrophyllum</i>	FACW+	LB, UB
lowland cudweed	<i>Gnaphalium palustre</i>	FAC+	UB
Willamette valley gumweed	<i>Grindelia integrifolia</i>	FACW	WE, LB
cow-parsnip	<i>Heracleum lanatum</i>	FAC	UB
Pacific waterleaf	<i>Hydrophyllum tenuipes</i>	NOL	UB
bog St. John's-wort	<i>Hypericum anagalloides</i>	OBL	SW, WE
tiger lily	<i>Lilium columbianum</i>	FAC	UB
miniature lupine	<i>Lupinus polycarpus</i>	NOL	UB
riverbank lupine	<i>Lupinus rivularis</i>	FAC	UB
skunk cabbage	<i>Lysichiton americanus</i>	OBL	SW, WE
big smilacina	<i>Maianthemum racemosa</i>	FAC-	UB
little smilacina	<i>Maianthemum stellaum</i>	FAC-	UB
Oregon bigroot	<i>Marah oreganus</i>	NOL	UB
western bluebell	<i>Mertensia platyphylla</i>	NOL	UB
water montia	<i>Montia fontana</i>	OBL	SW, WE

aquatic claytonia	<i>Montia linearis</i>	NOL	LB, UB
small forget-me-not	<i>Myosotis laxa</i>	OBL	SW, WE
small-flowered nemophila	<i>Nemophila parviflora</i> var. <i>nemophylla</i>	NOL	UB
water-parsley	<i>Oenanthe sarmentosa</i>	OBL	SW, WE
sweet cicely	<i>Osmorhiza berteroi</i>	NOL	UB
w. yellow wood sorrel	<i>Oxalis suksdorfii</i>	NOL	UB
sweet colt's-foot	<i>Petasites frigidus</i> var. <i>palmatius</i>	FACW	LB
woodland phacelia	<i>Phacelia nemoralis</i>	FACU	UB
swordfern	<i>Polystichum munitum</i>	NOL	UB
Hooker's fairy bells	<i>Prosartes hookeri</i>	NOL	UB
self-heal	<i>Prunella vulgaris</i> var. <i>lanceolata</i>	FACU+	UB
white water buttercup	<i>Ranunculus aquatilis</i>	OBL	SW, WE
woods buttercup	<i>Ranunculus uncinatus</i>	FAC	UB
western dock	<i>Rumex occidentalis</i> var. <i>procerus</i>	FAC-	UB
willow leaved dock	<i>Rumex salicifolius</i>	FACW	WE
Pacific sanicle	<i>Sanicula crassicaulis</i>	NOL	UB
yerba buena	<i>Satureja douglasii</i>	NOL	UB
small-fruited bulrush	<i>Scirpus microcarpus</i>	OBL	WE
Hitchcock's blue-eyed grass	<i>Sisyrinchium hitchcockii</i>	NOL	UB
hedge-nettle	<i>Stachys mexicana</i>	FACW	LB, UB
fringecups	<i>Tellima grandiflora</i>	NOL	UB
western meadowrue	<i>Thalictrum occidentale</i>	FACU	UB
tall western meadowrue	<i>Thalictrum polycarpum</i>	NOL	UB
piggy-back plant	<i>Tolmiea menziesii</i>	FAC	LB
star-flower	<i>Trientalis latifolia</i>	FAC-	UB
sessile trillium	<i>Trillium albidum</i>	NOL	UB
western trillium	<i>Trillium ovatum</i> ssp. <i>ovatum</i>	NOL	UB
stinging nettle	<i>Urtica dioica</i>	FAC+	UB
inside-out flower	<i>Vancouveria hexandra</i>	NOL	UB
American vetch	<i>Vicia americana</i>	NI	WE, LB
woodland violet	<i>Viola glabella</i>	FACW+	UB

### **Grasses, Sedges, Rushes**

<u>Common Name</u>	<u>Scientific Name</u>	Wetland Indicator <u>Status</u>	Site <u>Suitability</u>
Dewey's sedge	<i>Carex deweyana</i> var. <i>leptopoda</i>	FAC+	UB
Henderson's sedge	<i>Carex hendersonii</i>	NI	LB
green-fruited sedge	<i>Carex interrupta</i>	OBL	SW, WE
slough sedge	<i>Carex obnupta</i>	OBL	SW, WE
sawbeak sedge	<i>Carex stipata</i> var. <i>stipata</i>	NOL	WE, LB
needle spikerush	<i>Eleocharis acicularis</i>	OBL	SW, WE

creeping spikerush	<i>Eleocharis palustris</i>	OBL	SW, WE
blue wild-rye	<i>Elymus glaucus</i> ssp. <i>glaucus</i>	FACU	UB
tall manna grass	<i>Glyceria striata</i>	FACW+	WE, LB
meadow barley	<i>Hordeum brachyantherum</i>	FACW	WE, LB
taper-tip rush	<i>Juncus acuminatus</i>	OBL	SW, WE
three-stamen rush	<i>Juncus ensifolius</i>	FACW	WE, LB
common rush	<i>Juncus effusus</i>	FACW+	SW, WE
shiny rush	<i>Juncus laccatus</i>	NOL	SW, WE
pointed rush	<i>Juncus oxymersis</i>	FACW+	SW, WE
spreading rush	<i>Juncus patens</i>	FACW	SW, WE
slender rush	<i>Juncus tenuis</i>	FAC	LB
onion grass	<i>Melica subulata</i>	NOL	UB

Key to Wetland Indicator Status

- OBL = Obligate Wetland Plants. Under normal conditions, these plants almost always occur in wetlands (estimated probability of wetland occurrence 99%).
- FACW = Facultative Wetland Plants. Under normal conditions these plants are usually found in wetlands, but also may be found outside wetlands (estimated probability of wetland occurrence 67-99%)
- FAC = Facultative Plants. Under normal conditions, these plants are found equally in wetlands and non-wetlands (estimated probability of wetland occurrence 33-66%).
- FACU = Facultative Upland Plants. Under normal conditions, these plants are most likely to be found in non-wetlands (estimated probability of wetland occurrence 1-33%).
- UPL = Obligate Upland Plants. These plants are almost always found in non-wetlands, and are expected to be found in wetlands less than 1% of the time.
- NOL = Not on U.S.F.W.S. wetland plant list.

Key to Site Suitability

- SW = Shallow water
- WE = Water's edge
- LB = Lower bank
- UB = Upper bank and terraces above the ordinary high water line

Wetland indicator status information is taken from:

“National List of Plant Species That Occur In Wetlands: Northwest (Region 9),” U.S. Fish and Wildlife Service, May 1988; 1993 supplement.

### Part 3

#### **NATIVE PLANT SPECIES FOR SITES IN THE WEST EUGENE WETLANDS PLAN AREA AND IN SEASONAL WET PRAIRIE HABITAT IN OTHER GEOGRAPHIC AREAS**

The plant species included in this list are species that grow and propagate themselves in the Eugene area through natural processes, are adapted to the weather, soils and hydrology of the area, and have evolved in the area or been introduced to the area by natural causes. These native species are distinguished from plant species that have been deliberately or accidentally imported or introduced from other areas by humans or human activities.

This list applies to sites within the West Eugene Wetlands Plan area and within wet prairie habitats (e.g., in Westmoreland Park and Amazon Park). To meet Eugene Code requirements for native plants, these species are to be used within the specified geographic area or elevation. Do not substitute alternate species. You must use the specific species, subspecies or variety listed.

Wetland Indicator Status and Site Suitability information in the table below is intended as a guideline for identifying suitable locations for plant species based on additional site characteristics, such as soils and hydrology.

#### **Trees**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
<i>Fraxinus latifolia</i>	Oregon ash	FACW	BA, TW
<i>Pinus ponderosa</i>	Ponderosa pine	FACU-	BA, TN
<i>Populus trichocarpa</i>	black cottonwood	FAC	BA, TN
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir	NOL	TN
<i>Quercus kelloggii</i>	California black oak	NOL	TN
<i>Quercus garryana</i> var. <i>garryana</i>	Oregon white oak	NOL	TN
<i>Salix sitchensis</i>	Sitka willow	FACW	WE, BA
<i>Salix scouleriana</i>	Scouler's willow	FAC	BA
<i>Salix piperi</i>	Piper's willow	FACW	WE, BA
<i>Salix lucida</i> ssp. <i>lasiandra</i>	Pacific willow	FACW+	WE, BA

#### **Shrubs**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
<i>Amelanchier alnifolia</i> var. <i>semiintegrifolia</i>	serviceberry	FACU	TN

<i>Berberis aquifolium</i>	tall Oregon-grape	NOL	TN
<i>Corylus cornuta</i>	western hazelnut	NI	TN
<i>Crataegus suksdorfii</i>	Suksdorf's hawthorn	FAC	BA, TN
<i>Holodiscus discolor</i>	ocean spray	NOL	TN
<i>Lonicera hispidula</i>	hairy honeysuckle	NOL	TN
<i>Oemleria cerasiformis</i>	indian plum	NOL	TN
<i>Physocarpus capitatus</i>	Pacific ninebark	FAC+	BA
<i>Pyrus fusca</i>	western crab-apple	FAC+	TN
<i>Rhamnus purshiana</i>	cascara	NI	TN
<i>Rosa nutkana</i>	Nootka rose	NI	TN
<i>Rosa pisocarpa</i>	clustered wild rose	FACU	TN
<i>Spiraea douglasii</i> var. <i>douglaii</i>	Douglas' spiraea	FACW	WE, BA, TW
<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	common snowberry	FACU	TN
<i>Viburnum ellipticum</i>	Oregon viburnum	NOL	TN

### **Herbaceous Plants**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
<i>Achillea millefolium</i>	common yarrow	FACU	TN
<i>Alisma plantago-aquatica</i> var. <i>americana</i>	broad-leaf water-plantain	OBL	SW, WE
<i>Allium amplexans</i>	slimleaf onion	NOL	TN
<i>Aster hallii</i>	Hall's aster	FAC	TN, TW
<i>Bidens cernuua</i>	nodding beggar's-tick	FACW+	WE, TW
<i>Bidens frondosa</i>	leafy beggar's-tick	FACW+	WE, TW
<i>Boisduvalia densiflora</i>	dense spike-primrose	FACW-	WE
<i>Brodiaea hyacinthina</i>	hyacinth brodiaea	FACU	TN
<i>Brodiaea coronaria</i>	harvest brodiaea	NOL	TN
<i>Callitriche heterophylla</i>	water-starwort	OBL	SW, WE
<i>Camassia leichtlinii</i> ssp. <i>Suksdorfii</i>	tall camas	FACW-	TW
<i>Camassia quamash</i> ssp. <i>maxima</i> common	camas	FACW	TW
<i>Cardamine penduliflora</i>	Willamette Valley bittercress	OBL	SW, WE, TW
<i>Cardamine nutallii</i> var. <i>nutallii</i>	slender toothwort	NOL	UB
<i>Claytonia sibirica</i>	candyflower	FACW	UB
<i>Delphinium troliifolium</i>	Columbia larkspur	NOL	TN
<i>Downingia elegans</i>	common downingia	OBL	SW, WE
<i>Epilobium paniculatum</i>	autumn willow-herb	NOL	TN
<i>Eriophyllum lanatum</i>	woolly sunflower	NOL	TN
<i>Eryngium petiolatum</i>	Oregon coyote-thistle	OBL	SW, WE
<i>Geum macrophyllum</i>	large-leaved avens	FACW+	WE, BA

<i>Grindelia integrifolia</i> var. <i>integrifolia</i>	Willamette valley gumweed	FACW	WE, BA
<i>Heracleum lanatum</i>	cow-parsnip	FAC	BA, TN
<i>Hydrocotyle ranunculoides</i>	floating marsh-pennywort	OBL	SW
<i>Lasthenia glaberrima</i>	smooth lasthenia	OBL	SW
<i>Lotus formosissimus</i>	seaside lotus	FACW+	WE
<i>Lotus pinnatus</i>	bog lotus	FACW	SW, WE
<i>Lotus purshianus</i>	spanish-clover	NOL	TN
<i>Ludwigia palustris</i> var. <i>pacifica</i>	water-purslane	OBL	SW, WE
<i>Lupinus polyphyllus</i>	bigleaf lupine	FAC+	BA, TN
<i>Marah oreganus</i>	Oregon bigroot	NOL	TN
<i>Microseris laciniata</i>	cut-leaved microseris	NOL	TN
<i>Montia linearis</i>	narrow-leaved montia	NOL	TN
<i>Myosotis laxa</i>	small-flowered forget-me-not	OBL	WE
<i>Nuphar polysepalum</i>	pond lily	OBL	SW
<i>Oenanthe sarmentosa</i>	water parsely	OBL	SW, WE
<i>Osmorhiza chilensis</i>	sweet-cicely	NOL	TN
<i>Perideridia gairdneri</i>	Gairdner's yampah	FACU	TN
<i>Plagiobothrys figuratus</i>	fragrant popcorn-flower	FACW	SW, TW
<i>Polygonum hydropiperoides</i>	waterpepper	OBL	SW, WE, TW
<i>Polystichum munitum</i>	common sword fern	NOL	BA, TN
<i>Potentilla gracilis</i> var. <i>gracilis</i>	slender cinquefoil	FAC	TN
<i>Prunella vulgaris</i> var. <i>lanceolata</i>	self-heal	FACU+	TN
<i>Ranunculus uncinatus</i>	disappointing buttercup	FAC	BA
<i>Ranunculus orthorhynchus</i>	straight-beak buttercup	FACW-	BA
<i>Ranunculus occidentalis</i>	western buttercup	FACW	BA
<i>Ranunculus aquatilis</i>	white water-buttercup	OBL	SW, WE, TW
<i>Rorippia curvisiliqua</i>	western yellowcress	FACW+	WE, TW
<i>Rubus ursinus</i>	Pacific blackberry	NI	TN
<i>Rumex salicifolius</i>	willow-leaved dock	FACW	TW
<i>Sanicula crassicaulis</i> var. <i>crassicaulis</i>	western sanicle	NOL	TN
<i>Saxifraga oregana</i>	Oregon saxifrage	FACW+	WE, BA
<i>Sidalcea cusickii</i>	Cusick's checkermallow	NOL	WE
<i>Sparganium emersum</i>	simple-stem bur-reed	OBL	SW, WE, TW
<i>Stachys rigida</i>	rigid hedge-nettle	FACW-	BA
<i>Tellima grandiflora</i>	fringecups	NOL	TN
<i>Trillium albidum</i>	sessile trillium	NOL	TN
<i>Typha latifolia</i>	broad-leafcattail	OBL	SW, WE
<i>Veratrum californicum</i> var. <i>caudatum</i>	tailed false-hellebore	OBL	SW, WE
<i>Veronica americana</i>	American speedwell	OBL	SW, WE
<i>Veronica scutellata</i>	marsh speedwell	OBL	SW, WE
<i>Wyethia angustifolia</i>	narrow-leaf wyethia	FACU	TN
<i>Zigadenus venenosus</i>	death camas	FAC	TW, TN

var. *venenosus*

**Grasses, Sedges and Rushes**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Wetland Indicator Status</u>	<u>Site Suitability</u>
<i>Agrostis exarata</i>	spike bentgrass	FACW	BA, TW
<i>Alopecurus geniculatus</i>	water foxtail	FACW+	BA, TW
<i>Beckmannia syzigachne</i>	American slough grass	OBL	SW, WE
<i>Carex densa</i>	dense sedge	OBL	SW, WE
<i>Carex deweyana</i> var. <i>leptopoda</i>	Dewey's sedge	FAC+	BA, TW
<i>Carex lanuginosa</i>	woolly sedge	OBL	SW, WE
<i>Carex leporina</i>	hare sedge	FAC	BA, TW
<i>Carex obnupta</i>	slough sedge	OBL	SW, WE
<i>Carex unilateralis</i>	one-sided sedge	FACW	WE, TW
<i>Danthonia californica</i>	California oatgrass	FACU-	TN
<i>Deschampsia cespitosa</i>	tufted hairgrass	FACW	TW
<i>Deschampsia danthonioides</i>	annual hairgrass	FACW-	TW
<i>Deschampsia elongata</i>	slender hairgrass	FACW-	TW
<i>Eleocharis acicularis</i>	needle spikerush	OBL	SW, WE
<i>Eleocharis ovata</i>	ovoid spike-rush	OBL	SW, WE
<i>Eleocharis palustris</i>	creeping spikerush	OBL	SW, WE
<i>Elymus glaucus</i> ssp. <i>glaucus</i>	blue wildrye	FACU	TN
<i>Glyceria occidentalis</i>	western mannagrass	OBL	SW, WE
<i>Hordeum brachyantherum</i>	meadow barley	FACW	WE, TW
<i>Juncus acuminatus</i>	tapered rush	OBL	SW, WE
<i>Juncus articulatus</i>	jointed rush	OBL	SW, WE
<i>Juncus nevadensis</i>	Sierra rush	FACW	WE, TW
<i>Juncus oxymeris</i>	pointed rush	FACW+	WE, TW
<i>Juncus patens</i>	spreading rush	FACW	WE, TW
<i>Juncus tenuis</i> var. <i>tenuis</i>	slender rush	FAC	BA, TW
<i>Koeleria cristata</i>	junegrass	NOL	TN
<i>Panicum occidentale</i>	western witchgrass	FACW	WE, TW
<i>Scirpus validus</i>	softstem bulrush	OBL	SW, WE

**Key to Wetland Indicator Status**

OBL = Obligate Wetland Plants. Under normal conditions, these plants almost always occur in wetlands (estimated probability of wetland occurrence 99%).

FACW = Facultative Wetland Plants. Under normal conditions these plants are usually found in wetlands, but also may be found outside wetlands (estimated probability of wetland occurrence 67-99%)

- FAC = Facultative Plants. Under normal conditions, these plants are found equally in wetlands and non-wetlands (estimated probability of wetland occurrence 33-66%).
- FACU = Facultative Upland Plants. Under normal conditions, these plants are most likely to be found in non-wetlands (estimated probability of wetland occurrence 1-33%).
- UPL = Obligate Upland Plants. These plants are almost always found in non-wetlands, and are expected to be found in wetlands less than 1% of the time.
- NOL = Not on U.S.F.W.S. wetland plant list.

### Key to Site Suitability

SW = Shallow water

WE = Water's edge

BA = Bank

TW = Top of Bank, wetland (e.g., where prairie wetlands exist adjacent to a stream or channel)

TN= Top of Bank, non-wetland

Wetland indicator status information is taken from:

“National List of Plant Species That Occur In Wetlands: Northwest (Region 9),” U.S. Fish and Wildlife Service, May 1988; 1993 supplement.

## Part 4

### **NON-NATIVE, INVASIVE PLANT SPECIES KNOWN OR LIKELY TO OCCUR WITHIN THE EUGENE URBAN GROWTH BOUNDARY**

The plant species included in this list are species that have been deliberately or accidentally imported or introduced from other areas by humans or human activities. In addition, these species escape from cultivated settings and spread aggressively into natural areas, and are capable of displacing large areas of native vegetation. These non-native, invasive plant species are distinguished from those native species that grow and propagate themselves in the Eugene area through natural processes, are adapted to the weather, soils and hydrology of the area, and have evolved in the area or been introduced to the area by natural causes.

This list applies to all habitat types within the Eugene Urban Growth Boundary. To meet Eugene Code requirements for removal of non-native, invasive plants, you must remove the specific species, subspecies or variety listed.

<b>Scientific Name</b>	<b>Common Name</b>	<b>Notes</b>	<b>Reference</b>
<i>Acer platanoides</i>	Norway maple	Invasive tree spreading into forested natural areas around town including Skinner's Butte.	1
<i>Aesculus hippocastanum</i>	horsechestnut	Populations have been found in south end of Hendricks Park and this species is known to be problematic in other cities.	1
<i>Ailanthus altissima</i>	tree-of-heaven	Invasive tree that is problematic in City parks, alleys, and undeveloped property. This species is capable of becoming established through cracks in concrete.	1,3
<i>Alliaria petiolata</i>	garlic mustard	One of the most invasive forest under story plants in the east and Midwest, starting to establish in the Seattle area. Documented as present in Portland and Eugene	1, 4
<i>Anchusa azurea</i>	anchusa; common bugloss	Exploding in large patches roadside and in woods in western Benton County. Also known recently from Lane and Clackamas counties.	1, 3
<i>Arum italicum</i>	Arum	While it appears to be moved primarily by humans, it occasionally is found away from human activity areas. Once established, it is extremely difficult to remove.	1
<i>Betula pendula/pubesc</i>	European birch	This species is spreading rapidly along waterways and is now established along the entirety of Amazon Creek from near its headwaters to Fern Ridge	5

<i>ens</i>		Reservoir.	
<i>Brachypodium sylvaticum</i>	false-brome	Highly invasive grass rapidly spreading through forests and along rivers in our area in numerous places including Alton Baker Park. It has the potential to permanently alter the forest under story, as it out-competes most other species and no control is known.	1, 3, 4
<i>Buddleia alternifolia</i> , <i>Buddleia davidii</i>	fountain butterfly bush	Both butterfly bushes displace native willows which are essential host plants for native butterflies.	1, 4
<i>Clematis vitalba</i>	traveler's-joy	Invasive climber comparable to English ivy is a problem in areas of Portland and Seattle. Currently appearing in several areas along the Willamette River with large populations established on Skinner Butte.	1, 3, 4
<i>Cotoneaster franchetti</i>	cotoneaster	Occurring in native prairies and woodland edges. (Cotoneaster franchetti, C. horizontalis, C. parneyi, etc. Best to avoid all cotoneasters.)	1
<i>Cotoneaster horizontalis</i>	cotoneaster	Occurring in native prairies and woodland edges. (Cotoneaster franchetti, C. horizontalis, C. parneyi, etc. Best to avoid all cotoneasters.)	1
<i>Crataegus monogyna</i>	English hawthorn	This species is well established and spreading rapidly into woodlands and prairies throughout town. It interbreeds with the native hawthorn creating hybrids that are difficult to accurately identify.	1, 3, 4
<i>Cynoglossum officinale</i>	common houndstongue	This common garden species has escaped and appears regularly in several City parks, along waterways and in unimproved alleys.	2, 3
<i>Cytisus monspessulana</i>	French broom	This species is a serious problem in CA and OR south coast and is now appearing in Eugene	1, 2, 3, 4
<i>Cytisus scoparius</i>	Scot's broom	Dense populations established along the Willamette, in the south hills, throughout the West Eugene Wetlands, along roadways and railways and in several city parks. Avoid use of all brooms.	1, 2, 3, 4
<i>Daphne laureola</i>	spurge laurel	Spread by birds into forested areas throughout town.	1, 3
<i>Digitalis purpurea</i>	foxglove	This common and attractive garden wild flower escapes easily and forms dense populations. It is becoming well established in some areas along the Willamette River.	1, 3

<i>Genista monspessulana</i>	broom	This species is a serious problem in CA and along the south OR coast. Now beginning to appear in Eugene.	
<i>Geranium lucidum</i>	shining crane's-bill	Beginning to dominate forest understories in south Eugene.	1
<i>Geranium robertianum</i>	herb robert	Dominates forest understories in several areas in Eugene including Hendrick's park. This species is spreading rapidly throughout town.	1, 3, 4
<i>Glechoma hederacea</i>	ground ivy; creeping Charlie	Can become a dominant plant in moist, shady riparian areas.	
<i>Hedera helix</i>	English ivy	Spreads vegetatively in forested and open areas. Seeds spread mostly by exotic birds including starlings. This species is an extensive and widespread problem throughout Eugene, especially in forested areas and along the Willamette River.	1, 2, 3, 4
<i>Hypericum perforatum</i>	St. John's wort	This species invades meadows, trailsides, roadsides, and other areas throughout town.	1, 2, 3, 4
<i>Ilex aquifolium</i>	English holly	Spread by birds and appears regularly in forest understories throughout town.	1, 3
<i>Iris pseudoacorus</i>	yellow flag iris	Forms monocultures in wetlands. This species has established in Bertelsen Slough, Amazon Creek, Flat Creek, Spring Creek and along the Willamette River.	1, 3
<i>Juniperus virginiana</i>	eastern redcedar	Birds eat berries and spread seeds.	1
<i>Lamiastrum galeobdolan</i>	Yellow archangel	Primarily spread by humans. Very aggressive, primarily moving out from landscaped areas. Has escaped in Springfield, Corvallis, and in Seattle, where a botanist says it "covers hillsides."	1
<i>Lathyrus sp.</i>	latifolius sweet, perennial or everlasting pea	Well-established, primarily along roadsides and hedgerows, large population on Chamber's connector. Listed in "Weeds of the West"	1
<i>Leucanthemum vulgare</i>	oxeye daisy	This species is common in commercial "wildflower mixes". It has become widely established in meadows in West Eugene, Amazon Park, and along roadsides and mowed waterways. Formerly Chrysanthemum leucanthemum.	1, 3, 4

<i>Ligustrum vulgare</i>	common privet	Birds eat fruits and spread plants into woods and prairies.	1
<i>Linaria vulgaris</i>	yellow toadflax	Roadside weed expanding into prairies.	1, 2, 3, 4
<i>Lotus corniculatus</i>	birdsfoot trefoil	Sold in pasture mixes. This species has invaded wetland areas throughout town including most drainage channels.	1, 3
<i>Lunaria annua</i>	honesty; money plant	Invasive in forest understories.	1
<i>Lysimachia nummularia</i>	moneywort	Regular dominant of riparian wetlands in our areas, both in sun and shade.	1
<i>Lythrum salicaria</i>	purple loosestrife	This species forms monocultures in wetlands and is a species of national concern. Although not yet widespread, populations have been found in Amazon Creek and Willamette River and appear to be expanding.	1, 2, 3, 4
<i>Melissa officinalis</i>	lemon balm	Widespread weed in native prairies and openings in woods.	1
<i>Mentha pulegium</i>	Mentha pulegium	Forms large monocultures in emergent wetlands in West Eugene, displacing native wetland plants.	1
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	Includes water-milfoils. Myriophyllum aquaticum (M. brasiliense; parrot's feather) and M. spicatum (Eurasian milfoil) are common aquatic species in waterways and ponds throughout Eugene.	1, 2, 3, 4
<i>Myosotis scorpioides</i>	common forget-me-not	Can dominate forest understories, especially openings and on edges.	1
<i>Myriophyllum</i> ssp.	parrot's feather, et. al.	This genus of floating aquatic plants includes the water milfoils. Myriophyllum aquaticum (parrot's feather) is the major offender, and Myriophyllum spicatum (Eurasian milfoil) is also very damaging.	1
<i>Phalaris aquatica</i>	Harding grass	This wetland species is found in slightly drier conditions than P. arundinacea. While populations are not yet as widespread as P. arundinacea, populations are rapidly expanding.	1, 3, 4
<i>Phalaris arundinacea</i>	reed canarygrass	This species forms dense monocultures and is one of the most widespread species in all types of wetlands	1, 3, 4

		throughout Eugene. It permanently and dramatically effects ecosystems where it has become established. This species is still sold commercially.	
<i>Polygonum cuspidatum</i> (and related species and hybrids)	Japanese knotweed	This species forms riparian monocultures. This species is not yet common in Eugene but populations are becoming more common and larger. It is already a significant problem in the Portland and Seattle areas. Avoid all the large knotweeds.	1, 2, 3
<i>Populus alba</i>	white poplar	This species spreads rapidly via suckers and is difficult to remove once established. It also quickly becomes a hazard tree as the brittle branches are prone to breakage. This species is found in several City parks including Alton Baker Park.	3
<i>Prunus avium</i>	sweet cherry	This species is spread by birds into forested areas and is a quite common understory invader in forested areas throughout Eugene.	1, 3, 4
<i>Prunus cerasifera</i>	thundercloud plum	Grafted species and rootstocks that sucker and flower, produce fruit which is spread easily by birds. This species is appearing in prairie areas in West Eugene and woodland edges throughout town.	1
<i>Prunus domestica</i>	plum	Not as invasive as <i>P. avium</i> .	1
<i>Prunus laurocerasus</i>	English laurel	This common hedge evergreen is spread by birds and appears regularly in forested understories, especially at Skinner Butte, Morse Ranch, and Hendricks Park.	1, 3
<i>Prunus lusitanica</i>	Portugal laurel	Similar to <i>P. laurocerasus</i> , this species appears regularly in forest understories.	1
<i>Prunus mahaleb</i>	mahaleb cherry	Birds spread seeds of this species, which is common in the understories of forested areas and woodland edges throughout town.	3
<i>Pueraria montana</i> var. <i>lobata</i>	kudzu	While populations have not been found in Eugene, two occurrences have been noted in the Willamette Valley. This species has devastated plant communities in southern and eastern states.	1, 2, 4
<i>Pyracantha</i> spp.	fire thorn	Birds eat fruits and spread plants into prairies. <i>P. angustifolia</i> , <i>P. coccinea</i> , et al.	1
<i>Pyrus communis</i>	pear	This species appears occasionally in prairie areas and shrub/scrub communities throughout town.	5

<i>Ranunculus ficaria</i>	lesser celandine	Highly invasive in Hendricks Park and Mt. Pisgah Arboretum. Once established populations are extremely difficult to control.	1
<i>Ranunculus repens</i>	creeping buttercup	This species is allelopathic. It forms large monocultures, especially in moist areas. It is common in many of our parks including Tugman Park.	1
<i>Robinia pseudoacacia</i>	black locust	Widely escaped east of Cascades, beginning to naturalize on West Side (Portland area, Benton County, Lane County.) This species can form woodland monocultures.	1, 3
<i>Rorippa nasturtium-aquaticum</i>	watercress	Chokes out small waterways on the valley floor.	1, 3
<i>Rosa eglanteria</i>	sweet-briar	This species easily invades prairie areas and is common throughout town especially in West Eugene.	1, 3
<i>Rosa multiflora</i>	multiflowered rose	This species, similar to <i>R. eglantaria</i> , is a common problem in west Eugene wetlands and Fern Ridge Wildlife Area.	1
<i>Rubus armeniacus</i> (discolor)	Himalaya or Armenian blackberry	One of the most widespread exotic species in the Pacific Northwest. Populations are well established in all plant communities throughout Eugene.	1, 3, 4
<i>Rubus laciniatus</i>	evergreen blackberry	Not as invasive as <i>R. armeniacus</i> , but still forms dense clumps.	1, 3
<i>Sorbus aucuparia</i>	European mountain-ash	Appearing in west Eugene wetlands and uplands. Birds spread seed.	1, 3
<i>Ulex europeaus</i>	gorse	A massive problem on the OR coast, now beginning to appear in the Willamette Valley. Extremely difficult to remove.	1
<i>Vinca major</i>	periwinkle; vinca	Mostly near old homesites -- they appear to spread vegetatively only. Completely dominates understories.	1
<i>Vinca minor</i>	periwinkle; vinca	Mostly near old homesites -- they appear to spread vegetatively only. Completely dominates understories.	1, 3

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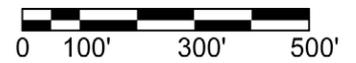
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3. Draft of Exotic Pest Plants of Greatest Ecological Concern in Oregon and Washington; May 23 1997, The Pacific Northwest Exotic Pest Council, from <http://www.wnps.org/eppclet.html> accessed on 04/10/02,
4. NW Oregon most harmful invasive plant species list: based on information provided at & before the October 10, 2001 meeting in Salem BLM, Bureau of Land Management, Salem District, 2001.
5. City of Eugene staff recommendation based on resources required to remove species from parks, open spaces and waterways.

## Habitat Zones + Plant Communities

Proposed Habitat Zones have been established by the project team based on information from the Riverfront Ecological Analysis and Design Report prepared by a consultant team led by Bart Johnson. The preliminary findings from this assessment greatly influenced and informed the master plan, and helped to ensure that the ecological functions and human experience envisioned would be integrated. The recommendations from the ecological report reinforced the guiding principles of the Master Plan that address ecology, sustainability, and livability, and are largely consistent with the proposed design. The full report is included in the Appendix.

The EWEB site has five proposed habitat zones: wetland, riparian floodplain, midbank/upper bank, prairie and urban habitat. Each zone has its own set of environmental conditions such as access to water, sun exposure, and soil type that determine the community of plants that will grow. Together, these zones are designed to contribute naturalized habitat on site, and to integrate and connect larger areas of habitat and nearby open space. All zones would consist primarily of native species and non-invasive introduced species that require minimal supplemental water, fertilization or pest or disease control.

To function as envisioned, these zones will need to be designed and maintained. The intent is to encourage biodiversity across the riverfront site, to support natural systems and processes with appropriate plantings and maintenance, and to create a managed, naturalized, educational landscape.



## Native Plant Communities

A plant community is an assemblage of different species of plants growing together in a particular habitat. On the EWEB site, there are five communities that relate to habitat zones.

In the riparian floodplain, the steep bank, variable water level, and large existing trees dictate smaller trees and shrubs that can withstand the shade and high water flows. Farther up the bank, there is bank-stabilizing riprap, less frequent high-water events, and tall existing trees. These challenging conditions call for a hardy suite of plants of mostly small trees, shrubs, and herbs that can provide valuable habitat for birds and pollinators. The conditions become much more variable in the upper bank zone with areas of sun and shade, and wet and dry. This variety translates into an assortment of plants each with its favored conditions, color, and texture. Lastly, the pollinator prairie is a great mosaic of flowering herbs and small trees—all intended to attract pollinators and songbirds, and to provide habitat that is both functioning and educational. This variety of conditions provides for the opportunity to create a landscape of rich variety and ecological function.

The plants specified for each habitat zone (some examples at right, see Appendix for full suite of recommendations) were selected for their native qualification, and their ability to thrive in the environmental conditions, provide habitat and food, and aesthetic qualities. Native plants do more than beautify the landscape. They are hardier than their cultivated counterparts, less susceptible to pests and diseases, and unlikely become invasive. They require less maintenance, provide habitat, protect the soil, and don't require fertilizer or pesticides.





Existing riparian vegetation and woody debris (top) and invasive species (below) along the EWEB riverfront property.

## Riparian Floodplain

The Riparian Floodplain extends the length of the riverfront. The intent of the master plan is to increase and enhance the riparian zone where possible. This would be achieved by:

- Removing invasive vegetation
- Enhancing existing native riparian vegetation in order to increase management species habitat, mitigate erosion, and increase river shading
- Increasing the area of riparian habitat above Ordinary High Water Mark
- Creating new habitat where space allows using native trees, shrubs, forbs, grasses, sedges and rushes

Plant recommendations for the Riparian Floodplain includes:

### Tree Species

*Alnus rhombifolia*  
*Alnus rubra*  
*Fraxinus latifolia*  
*Populus trichocarpa*

### Small Tree & Shrub Species

*Cornus sericea*  
*Crataegus suksdorfii*  
*Malus fusca*  
*Physocarpus capitatus*  
*Salix hookeriana*  
*Salix lucida ssp. Lasiandra*  
*Salix sitchensis*  
*Symphoricarpos albus var. laevigatus*  
*Viburnum ellipticum*

### Forb Species

*Scutellaria lateriflora*  
*Stachys cooleyae*  
*Urtica dioica*

### Grass and Sedge Species

*Carex obnupta*  
*Carex hendersonii*  
*Carex interrupta*  
*Juncus effuses ssp. Pacificus*  
*Juncus occidentalis*

## Wetland

The Wetland Habitat Zone consists of constructed wetlands and/or bioswales that address stormwater management for the site. These areas would receive stormwater from public streets and cleanse it prior to it being discharged into the river. These areas would consist of:

- Naturalized stormwater bioswales
- Millpond Swale
- Plantings with native wetland small trees, shrubs, forbs, grasses, sedges, and rushes

Plant recommendations for the Wetland Zone includes:

### Small Tree & Shrub Species

*Acer circinatum*  
*Cornus sericea*  
*Crataegus suksdorfii*  
*Malus fusca*  
*Physocarpus capitatus*  
*Salix hookeriana*  
*Salix lucida ssp. lasiandra*  
*Salix sessilifolia*  
*Salix sitchensis*  
*Spiraea douglasii*  
*Viburnum ellipticum*

### Forb & Fern Species

*Allisa triviale\** (in water)  
*Camassia leichtlinii*  
*Delphinium trolliifolium\**  
*Dicentra formosa\**  
*Lupinus polphyllus*  
*Lysichiton americanum\** (in water)  
*Ranunculus orthorhyncus\**  
*Sidalcea cusickii\**  
*Sisyrinchium idahoense\**  
*Urtica dioica\**  
*Veronica scutellata\** (in standing water)  
*Dodecatheon hendersonii*

### Grass & Sedge Species

*Agrostis exarata*  
*Alopecurus geniculatus*



### Mill Pond Swale Only

*Bromus carinatus*  
*Bromus sitecehsis*  
*Carex densa*  
*Carex hendersonii*  
*Carex leptopoda*  
*Carex obnupta*  
*Carex stipata*  
*Danthonia californica*  
*Deschampsia cespitosa*  
*Festuca romerii*  
*Eleocharis accicularis*  
*Eleocharis ovata*  
*Eleocharis palustris*  
*Glyceria occidentalis*  
*Glyceria striata*  
*Hordeum brachyantherum*  
*Juncus acuminatus*  
*Juncus effuses ssp. Pacificus*  
*Juncus occidentalis*  
*Juncus patens*  
*Juncus tenuis*  
*Schoenoplectus acutus* (in water)  
*Schoenoplectus americanus* (in water)  
*Schoenoplectus tabernaemontoni* in water)  
*Scirpus microcarpus*  
*Scirpus validus*  
*Spaganium* (in water)

## Pollinator Prairie

The Pollinator Prairie Habitat Zone encompasses all zones that have a grassy, meadow character and would incorporate:

- Native grassland meadow
- Planting of native species that serve as nectar/food and host/shelter sources for native pollinators as well as songbirds
- Educational and interpretive measures that inform the public about native pollinator and songbird habitat
- Habitat greenroofs on adjacent buildings

Plant recommendations for the Pollinator Prairie Zone includes:

### Small Tree & Shrub Species:

*Amelanchier alnifolia*  
*Berberis aquifolium*  
*Corylus cornuta* var. *californica*  
*Holodiscus discolor*  
*Oemleria cerisiformis*  
*Philadelphus lewisii*  
*Prunus emarginata* var. *mollis*  
*Prunus virginiana*  
*Rhamnus purshiana*  
*Ribes sanguineum*  
*Symphoricarpos albus* var. *laevigatus*

### Forb Species

*Achillea millefolium*  
*Anaphalis margaritacea*  
*Aquilegia Formosa*  
*Brodiaea coronaria* ssp. *coronaria*  
*Clarkia amoena*  
*Clarkia purpurea* var. *purpurea*  
*Collinsia grandiflora*  
*Collomia grandiflora*  
*Delphinium menziesii*  
*Epilobium ciliatum* var. *glandulosum*  
*Epilobium densiflorum*  
*Eriophyllum lanatum*  
*Erysimum capitatum* var. *capitatum*  
*Escholtzia californica*  
*Fragaria virginiana* var. *platypetala*  
*Geranium oreganum*



*Gilia capitata*  
*Heuchera micrantha*  
*Iris tenax*  
*Lomatium dissectum*  
*Lomatium nudicaule*  
*Lomatium ultriculatum*  
*Lupinus bicolor*  
*Lupinus polyphyllus*  
*Mertensia platyphylla*  
*Plectritis congesta*  
*Potentilla gracilis*  
*Prunella vulgaris* ssp. *lanceolata*  
*Ranunculus occidentalis*  
*Sidalcea virgata* (syn=*malviflora* var. *virgata*)  
*Sisyrinchium idahoense*  
*Solidago canadensis*  
*Symphyotrichum hallii*  
*Symphyotrichum subspicatum*  
*Triteleia hyacinthine*  
*Viola adunca*  
*Wyethia angustifolia*

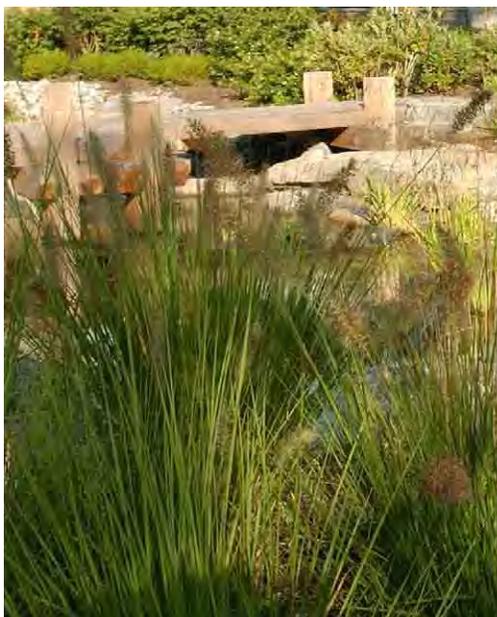
### Grass & Sedge species

*Carex tumicola*  
*Danthonia californica*  
*Elymus glaucus*  
*Festuca roemerii*  
*Koeleria macrantha*

## Upperbank + Midbank

The Upperbank and Midbank Habitat Zones connect to the Riparian Zone and extend across a large area of the riverfront open space. These areas would address:

- The removal of invasive vegetation
- Joint planting of native shrubs (e.g., willow) in riprap areas at/above Ordinary High Water Mark
- Bank alteration and reduction of steep slopes where possible to encourage plant establishment and improve maintenance
- Plantings with native small trees, shrubs, forbs and grasses that have habitat value for birds, insect pollinators and other wildlife species
- Maintaining of views to the river and good lines of sight in public areas



Plant recommendations for the Upper/Midbank Zone includes:

### Tree Species

*Acer macrophyllum*  
*Arbutus menziesii*  
*Fraxinus latifolia*  
*Quercus garryana*  
*Quercus kelloggii*

### Small Tree & Shrub Species

*Acer circinatum*  
*Amelanchier alnifolia*  
*Arbus dioicus*  
*Baccharis pilularis*  
*Berberis aquifolium*  
*Ceanothus sanguineus*  
*Ceanothus velutinus*  
*Corylus cornuta var. californica*  
*Holodiscus discolor*  
*Lonicera involucrata*  
*Oemleria cerisiformis*  
*Philadelphus lewisii*  
*Prunus emarginata var. mollis*  
*Prunus virginiana var. demissa*  
*Rhamnus purshiana*  
*Ribes sanguineum*  
*Rubus parviflorus*  
*Salix scoulerina*  
*Sambucus racemosa*

*Symphoricarpos albus var. laevigatus*  
*Viburnum ellipticum*

### Forb & Fern Species

*Aquilegia Formosa*  
*Artemesia douglasiana*  
*Asclepias speciosa*  
*Clarkis amoena*  
*Clarkis purpurea var. purpurea*  
*Claytonia sibirica*  
*Collomia grandiflora*  
*Delphinium menziesii*  
*Delphinium troliifolium*  
*Dicentra Formosa*  
*Erysimum capitatum var. catitatum*  
*Eschscholzia californica*  
*Fragaria vesca var. bracteata*  
*Fragaria virginiana var. platypetela*  
*Geranium oreganum*  
*Gilia capitata*  
*Hechera lanatum*  
*Heuchera micrantha*  
*Hydrophyllum tenuipes*  
*Iris chrysophylla*  
*Iris tenax*  
*Lomatium dissectum*

*Lomatium nudicaule*  
*Lomatium utriculatum*  
*Lupines rivularis*  
*Mertensia platyphylla*  
*Plectris congesta*  
*Polystichum munitum*  
*Plectritis congesta*  
*Potentilla gracilis*  
*Prunella vulgaris ssp. lanceolata*  
*Ranunculus occidentalis*  
*Sidalcea malviflora var. virgata*  
*Sisyrinchium idahoense*  
*Solidago canadensis*  
*Symphytrotrichum hallii*  
*Symphytrotrichum subspicatum*  
*Triteleia hyacinthine*  
*Viola adunca*  
*Wyethia angustifolia*

### Grass & Sedge Species

*Carex tumulicola*  
*Danthonia californica*  
*Elymus glaucus*  
*Festuca roemerii*  
*Koeleria macrantha*



## Urban Habitat

Urban Habitat is the landscape associated with the redevelopment sites, streets, perimeter planting, and public open spaces for urban agriculture, play areas, and plazas. These areas would consist primarily of native species and non-invasive introduced species that require minimal supplemental water, fertilization or pest or disease control. The Urban Habitat Zone includes:

- Installation of stormwater bioswales and rain gardens using native species adapted to the specific conditions of each feature
- Planting of native species similar to Upperbank Habitat species that provide additional habitat for birds and pollinators
- Streetscape plantings, landscape boulevards, and private courtyards using mostly native species supplemented by non-invasive introduced species that require minimal supplemental water, fertilization, pest or disease control



Plant recommendations for the Urban Habitat Zone include all plant materials noted in the Upper/Midbank Habitat Zone, in addition to the following urban trees:

### Tree Species

*Acer rubrum* varieties  
*Carpinus betulus*  
*Quercus accutissima*  
*Quercus frinetta*  
*Quercus phellos*  
*Arbutus menziesii*  
*Fraxinus latifolia*  
*Quercus garryana*  
*Quercus kelloggii*  
*Zelkova serrata*