SECTION 3.D.i: INVENTORY SITE WR19 ROSS ISLAND/OAKS BOTTOM

Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Brooklyn Action Corps; Sellwood-Moreland Improvement League
USGS Quadrangle and Quarter Section Maps:	1S1E10A, 1S1E10D, 1S1E11B, 1S1EC, 1S1E 14A, 1S1E14B, 1S1E14C, 1S1E14D, 1S1E15A, 1S1E15D, 1S1E22A, 1S1E22D, 1S1E23B, 1S1E23C
River Mile:	13.9 – 16.5
Site Size:	1,031 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	General Employment 2 (EG2) Commercial Employment (CE) Commercial/Mixed Use 1 (CM1) Commercial/Mixed Use 2 (CM2) High Density Residential (RH) Residential 1,000 (R1) Residential 2,000 (R2) Residential 2,500 (R2.5) Residential 5,000 (R5) Residential Farm/Forest (RF) Open Space (OS) Alternative Density Overlay Zone (a) Design Overlay Zone (d) Scenic Overlay zone (s) Willamette Greenway River General Overlay (g) Willamette Greenway River Natural Overlay (n) Willamette Greenway River Recreational Overlay (r) Willamette Greenway River Water Quality Overlay (q)
Existing Land Use:	Parks and open space, commercial, employment, residential, railroad, highway
General Description:	There are multiple parks and natural areas in this site including Oaks Bottom Wildlife Refuge, Oaks Bottom Amusement Park, Ross Island and the Springwater Trail. There is a floating home community at the beginning of Holgate Slough. Ross Island Sand and Gravel has locations on the island and mainland. McLoughlin Blvd and the Oregon Pacific Railroad run through the site.

Resource Features:	Open water, shallow water habitat, river bank, flood plain, wetland, riparian vegetation
Resource Functions:	Microclimate and shade; stream flow moderation and water storage; bank function and sediment, nutrient and pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and wildlife habitat and movement corridor
Special Habitat Area:	**Willamette River:** (S) – provides habitat for at-risk wildlife species; (C) – wildlife connectivity corridor; (M) – migratory stopover habitat **Ross Island Complex:** (I) – Island; (B) – bottomland hardwood forest; (C) – wildlife connectivity corridor; (M) – migratory stopover habitat **Oaks Bottom Complex:** (O) – Oregon white oak; (B) – bottomland hardwood forest; (C) – wildlife connectivity corridor; (S) – provides habitat for at-risk wildlife species
Special Status Species:	**Fish:** Lower Columbia River (LCR) Chinook salmon, LCR coho salmon, LCR steelhead trout, LCR coastal cutthroat trout, Columbia River chum salmon, Upper Willamette River (UWR) Chinook salmon, UWR steelhead trout, Pacific lamprey, Western brook lamprey, white sturgeon. **Amphibians:** Northern red-legged frog **Birds:** American kestrel, bald eagle, band-tailed pigeon, black-throated gray warbler, brown creeper, bufflehead, bushtit, common yellowthroat, downy woodpecker, great blue heron, green heron, Hammond's flycatcher, hooded merganser, Hutton's vireo, merlin, nashville warbler, olive-sided flycatcher, orange-crowned earbler, Pacific-slope flycatcher, peregrine falcon, pileated woodpecker, purple finch, purple martin, rufous hummingbird, Swainson's thrush, Thayer's gull, varied thrush, Vaux's swift, Western sandpiper, Western wood-pewee, white-breasted nuthatch (slender-billed), willow flycatcher, Wilson's warbler, winter wren (Pacific wren), wood duck and yellow warbler. **Mammals:** American beaver, hoary bat, Northern river otter
Natural Hazards:	Flood area, landslide, earthquake, liquefaction
Contamination:	Yes

Site Description

This 1,031 acre site is located between the Ross Island Bridge and the Sellwood Bridge and from the Willamette River thalwag east to include the Oaks Bottom Wildlife Refuge. The primarily uses in the inventory site are parks, recreation and natural areas. There is also a floating home community. Ross Island Sand and Gravel is located here.

The site contains approximately 123 acres (12 percent) impervious surface coverage. Of the vegetated areas over ½ acre in size, there is are approximately 209 acres of forest, 41 acres of woodland vegetation, 44 acres of shrubland and 41 acres of herbaceous vegetation. There are 835 acres of flood area, including 542 acres of open water, 227 acres of vegetation and 65 acres of developed area.

Table 9: Summary of Natural Resource Features in WR19 – Ross Island/Oaks Bottom	
	Study Area (miles/acres)
River (miles/acres)	**3/496**
Stream/Drainageway (miles)	**0**
Wetlands (acres)	**93**
Flood Area (acres)*	
Vegetated (acres)	227
Non-vegetated (acres)	65
Open Water** (acres)	542
Vegetated Areas >= ½ acre (acres)⁺	
Forest (acres)	209
Woodland (acres)	41
Shrubland (acres)	44
Herbaceous (acres)	41
Impervious Surfaces (acres)	123

* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.
** Open Water includes portions of the Willamette River.
⁺ The vegetation classifications are applied in accordance with the National Vegetation Classification System specifications developed by The Nature Conservancy. The data within the primary study area and within 300 feet of all open water bodies in Portland is draft and is currently being updated based on 2008 aerial photography.

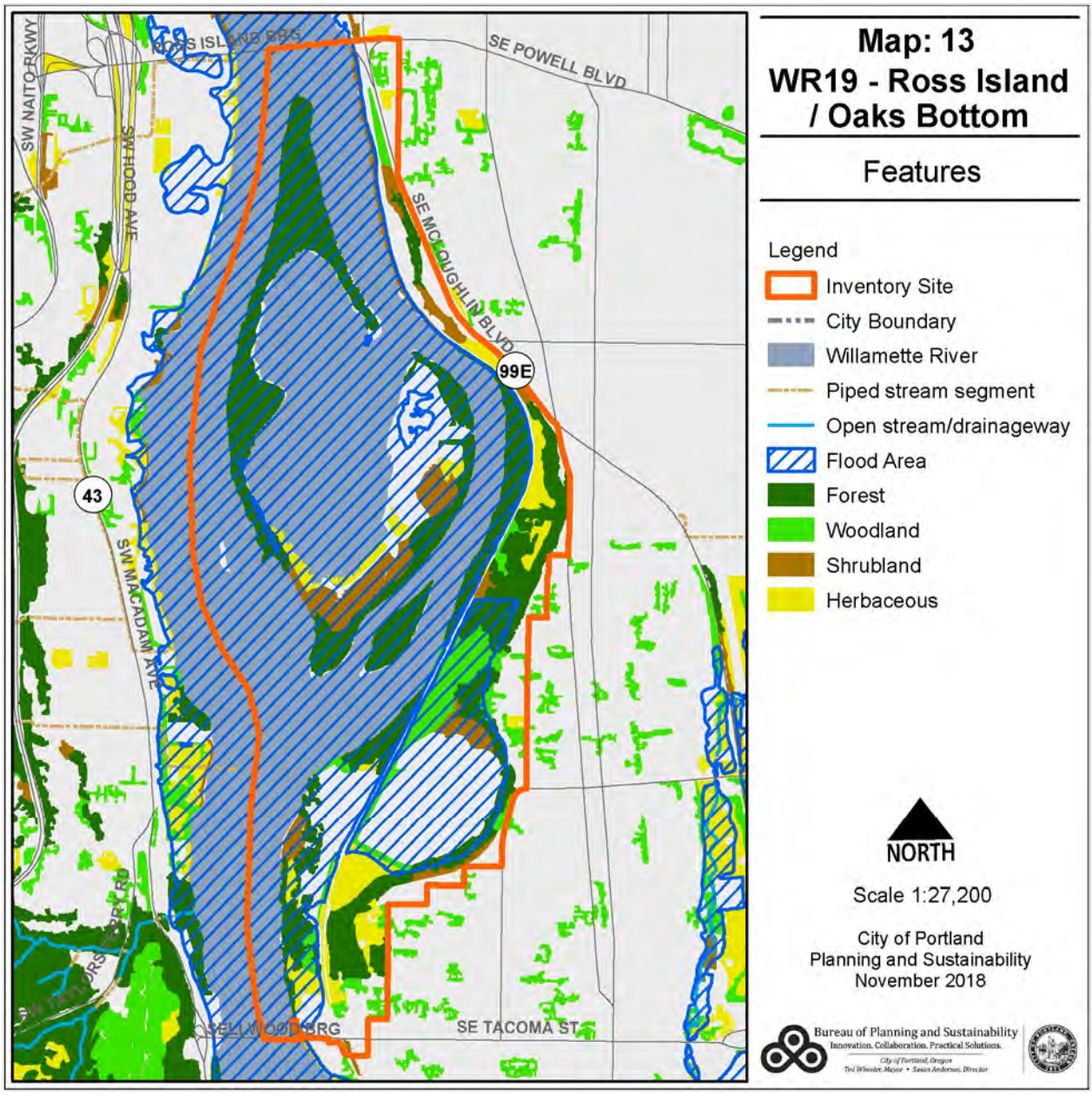
Natural Resource Description

Historically, the Portland-area portion of the Willamette River watershed was comprised of an active channel, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Vegetation in bottomland and wetland forests consisted of black cottonwood, Oregon ash and willow with associated native understory. Denser, mixed-conifer forests of Douglas fir, Bigleaf maple, western red cedar, western hemlock, grand fir and red alder dominated the west hills and some parts of the east terrace. Woodlands of Oregon white oak, Pacific madrone, red alder and bigleaf maple were found on the Willamette escarpment on the east side of the river.

Today, the land within the South Reach inventory area is comprised largely of parks and open spaces and commercial and residential development. Parks and open spaces in this inventory site include Ross Island Natural Area, Toe Island, Oaks Bottom Wildlife Refuge, Oaks Amusement Park, Springwater on the Willamette Corridor, Willamette Park, Willamette Moorage Park, Oaks Crossing, Sellwood Park, and Sellwood Riverfront Park. There are also some commercial uses along the major transportation corridors: SW Macadam Ave. and SE Tacoma St.

Significant natural resource areas in this inventory site include:

- Willamette River, including Holgate Channel (open water and river banks)
- Ross Island, including the lagoon
- Oaks Bottom Complex, including Oaks Crossing



Willamette River

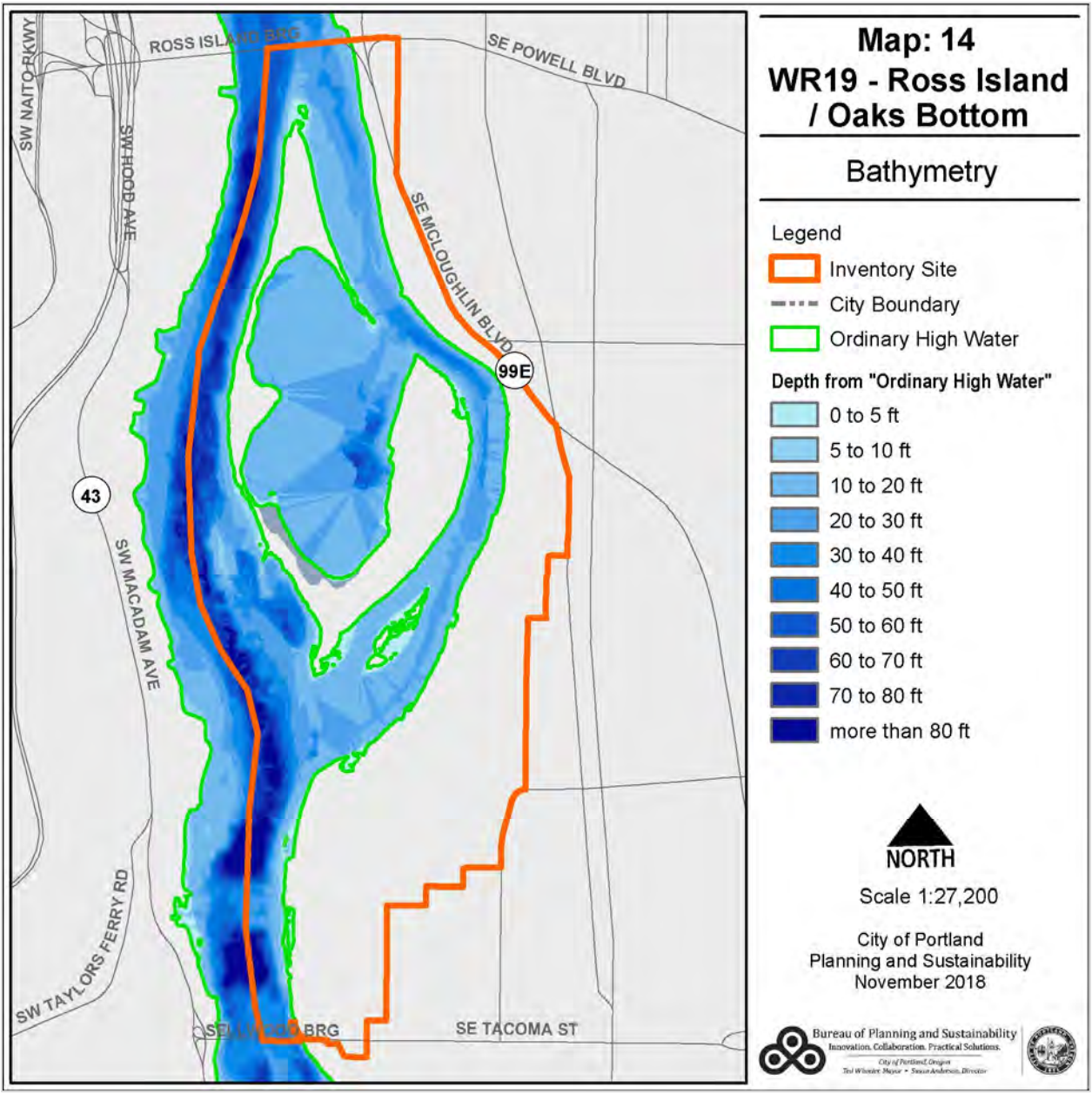
Below is a summary of Lower Willamette River natural resources documented in inventory site WR19. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The South Reach.

Inventory site WR19 includes 542 acres of the Lower Willamette River. The river is the primary habitat link providing connectivity between upstream and downstream aquatic habitats. This connection is critical for fish, resident and migrating birds, and other species.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho and chum salmon, as well as steelhead, and coastal cutthroat trout. These fish enter the Lower Willamette River system both as opportunistic

migrants to exploit forage associated with the annual shad run and to spawn in reaches throughout the Willamette River watershed. Shallow water areas, which are found along shoreline margins in this inventory site, are especially important for juvenile fish because they provide opportunities to escape the swift current of the main channel to rest and feed (see Map 14). Seasonal migrants use habitat within the inventory site during multiple life stages and are usually present during predictable seasonal peaks:

- Juvenile salmon and trout out-migration generally occurs between March and June.
- Spring Chinook out-migration peaks in April.
- Fall Chinook, steelhead and coho out-migration peaks between May and June.



Columbia eulachon pass through the lower Columbia and Willamette rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

White sturgeon generally move throughout the Columbia River estuary and Lower Willamette River throughout the year. As adults, sturgeon can migrate freely between fresh, brackish and saline water; juveniles and young-of-year cannot, so their rearing range is limited. Recent white sturgeon stock assessment data collected in the Willamette River between Willamette Falls and the Columbia River confluence describe a compromised population of white sturgeon represented by several young age classes.

The historic run of adult Pacific lamprey up and over Willamette Falls numbered in the hundreds of thousands. Today, that run is significantly smaller; however, tribal harvest of these fish for subsistence and ceremonial uses still brings many families to the Willamette Falls every year. Documentation of Pacific lamprey rearing and outmigration patterns in the Lower Willamette River is limited; however, juveniles are often observed in soft substrate samples collected throughout the lower river. The rearing life stage of Pacific lamprey is known to last between 4-7 years in freshwater habitat, before individuals migrate to the ocean for their maturation life stages.

Resident fish assemblages within this reach include native species such as largescale sucker, sculpin (prickly and reticulate), redside shiner and northern pikeminnow. Nuisance species include large and smallmouth bass, Asian carp and several varieties of perch.

The Willamette River within this inventory site plays an important part of the Pacific Flyway migratory route for over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, Peregrine falcon and bald eagle. Species use the open water habitat for foraging and as a migratory corridor. Avian species also use natural and man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl.

The Willamette River in the inventory site does not meet state water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 10). Total Maximum Daily Loads (TMDL) for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. The Oregon Water Quality Index values observed between 2001 to 2015 fairing Portland have seen modest improvement and the trend is steady.

Table 10: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries			
Pollutant	**Season**	**Year River was Listed for this Pollutant**	**Risk Factors**
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH, Total Chlordane, Cyanide, Hexachlorobenzene)	Year-round	1998, 2002, 2012	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Heavy Metals (iron, manganese, mercury)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Nutrients (Chlorophyll a)	Summer	2012	Fish and other aquatic life due excessive algal growth and a decrease in dissolved oxygen (DO)
Bacteria (Fecal Coliform)	Fall/Winter/Spring	1998	Water contact recreation
Temperature	Summer	1998	Salmonid fish rearing, anadromous fish passage
Biological Criteria	N/A	1998	Resident fish and aquatic life

(ODEQ, 2015)

Due to the presence of mercury, PCBs, dioxins and legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem river recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming resident and/or fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead, as they are migratory species and do not spend significant time residing in contaminated habitats. The Lower Willamette River in Portland was previously deemed unsafe for swimming during and immediately after rainstorm events due to sewer overflows. However, in 2011, the City completed a large infrastructure project to address combined sewer overflows into the river. The result is that combined sewer overflows should be very infrequent, if not eliminated, during the summer recreating season.

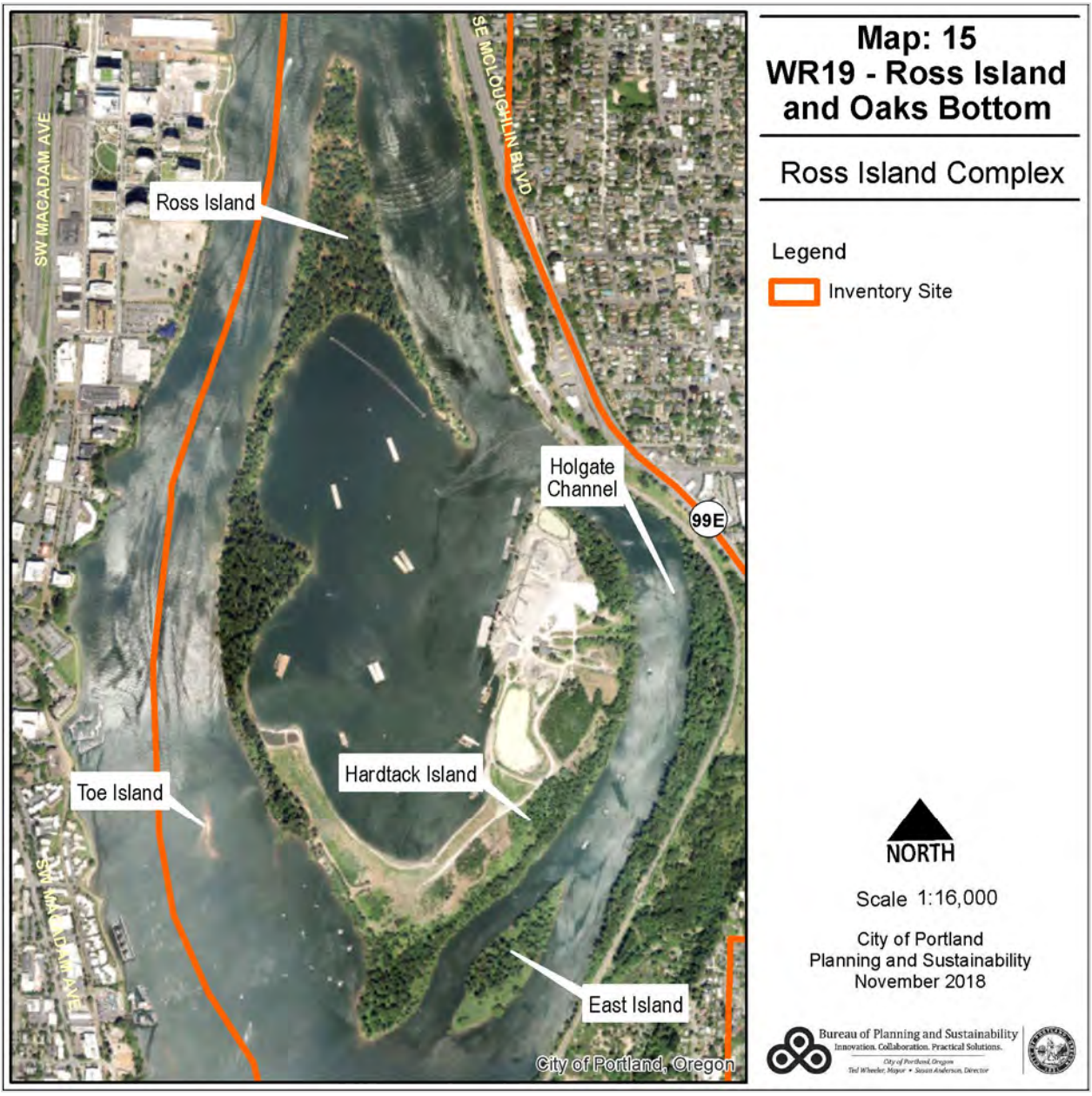
In the inventory site, the flood area is generally confined to the Willamette River itself; but the flood area includes Ross Island, Sellwood Riverfront Park, and extends into Oaks Bottom.

The Willamette River and shallow water habitat are designated Special Habitat Areas because they meet the following criteria:

(S) – An at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(C) – Wildlife connectivity corridor
(M) – Migratory stopover habitat

<u>Ross Island Complex</u>

Inventory site WR19 includes Ross Island and the connected Hardtack Island. It also includes smaller Toe Island, a rocky outcrop which is located on the southwest side of Ross Island, and the larger East Island, located to the southeast side of Ross Island (see Map 15). These forested island areas are composed of fluvial gravel and sand. The main channel of the Willamette River flows west of Ross Island and the shallower Holgate Slough routes secondary flows.



The Ross Island Complex is a diverse establishment of habitat features that include riparian forest, forested wetland, scrub/shrub wetland, shallow water, beach, and a deep water lagoon. This island habitat mosaic is a highly unique feature in Portland; the only other area providing this degree of habitat diversity being West Hayden Island.

The Ross Island area includes more than two miles of sand and gravel beach on Ross, Hardtack, and East islands. Much of the beach and lower banks are densely vegetated with an early successional willow community of Pacific, Columbia River, and Piper's willows, as well as black cottonwood saplings. This dense vegetation with open sand beach helps control erosion during seasonal flooding events and traps large amounts of driftwood and large wood, which add cover habitat for birds and small mammals and organic biomass to the islands' food

web. There is erosion on the main channel side (west side) of Ross Island and the island's internal banks of the lagoon.

A bottomland forest containing the black cottonwood/red-osier dogwood association dominates the majority of Ross, Hardtack, and East Islands. The interiors of Ross and Hardtack Islands also contain Oregon ash, Pacific willow, black hawthorn, and red alder. The canopy closure is approximately 80 percent, with abundant dead and downed wood as well as snags at a density of 10 to 15 per acre. The diameter of the largest snag exceeds 36 inches and several snags are over 100 feet tall. These are dense bottomland forests in a mid- successional stage (60 to 100 years), with forested wetland areas occurring near the perimeter of the woods and extending toward the beach on East Island. Regeneration of black cottonwood and Oregon ash is persistent, with many seedlings and saplings evident in the shrub stratum. The shrub canopy cover is approximately 75 percent and is dominated throughout by trailing blackberry, red elderberry, snowberry, and dogwood. The herbaceous cover is approximately 85 percent and is dominated by reed canarygrass, slough and other sedges, rough bentgrass, sword fern, and stinging nettles. The understory contains a healthy volume of decaying, dead and downed wood which provides excellent habitat for many species and increases seedling survival by providing organic substrate and nutrients.

The entire site is within the Willamette River's 100-year floodplain. Seasonally-inundated wetlands are found in the lower elevations of the area, such as the forest and shrub habitats on East Island and at the south end of Hardtack Island.

The islands support high diversity of wildlife, indicative of a productive food web with many trophic levels and habitat niches. An active heron rookery occurs on East Island, adjacent to the slough between Hardtack and East Islands. Up to 30 active nests have been documented (approximately 60 adults and an unknown number of fledglings). In addition, another (older) rookery with over 20 nests is located on the central portion of Ross Island but appears to have low nest occupation or activity. Another rookery of approximately 15 nests is located at the northern tip of the island.

Bald eagles nest on the west side of Ross Island. Nest fidelity is very common for these birds and some maintain seasonal territories that contain two nests. In addition, red-tailed hawks and osprey are also known to nest on the island. The high occupancy of interspecific raptor nests indicates that sufficient cover, forage, and protected nest sites are available for each within this densely vegetated island area. Passerine species present during surveys included northern flickers, downy woodpeckers, varied thrushes, and western scrub jays. The islands also provide a feeding ground for thousands of birds that live in the adjacent Oaks Bottom Wildlife Refuge.

Other observations of wildlife included tracks from deer, river otter, nutria, and possibly red fox. Signs of active beaver and moles are also common. Due to the abundance of large snags with old nests or woodpecker holes on Ross and East Islands, it is highly likely that several common owl species including great horned occur here, as well as several species of bats including long-eared and long-legged myotis. It is apparent that the prey base on or near this area (including small mammals, amphibians, reptiles, fish, and insects) is sufficient to support the site's abundant wildlife.

Gravel mining has been occurring in the Ross Island Lagoon since 1972. Although RISG operations continue on the island today, gravel mining in the lagoon has ceased in the early 2000's. Parts of the lagoon have been excavated to a depth of up to 120 feet. The mining activities have had a significant impact on aquatic habitat and the noise likely impacts the surrounding wildlife. The lagoon and northern section of Holgate Channel are designated a No Wake zone; however, recreational boating in Holgate Slough creates noise and vibration that may disturb fish and wildlife.

The Ross Island Complex is designated a Special Habitat Area for the following:

(I) – Islands or the portions of riverine islands that provide habitat for river/island-associated resident and/or migrating wildlife species
(S) – an at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat

Oaks Bottom Complex

This area extends the entire length of the reach along the east bank of the Willamette River from the Ross Island Bridge south to Sellwood Riverfront Park (see Map 16). The north end of the site is a narrow corridor following a steep bluff between Holgate Slough and McLoughlin Boulevard and includes the Springwater Corridor trail and parallel rail line along the Willamette River. South of the McLoughlin and Holgate Street intersection the site widens to include the Oaks Bottom Wildlife Refuge. Three additional city parks, Oaks Crossing, Sellwood Park and Sellwood Riverfront Park, are located at the south end of the area. Oaks Amusement Park is centrally located within the site.

Since the late 1800s, railroad construction and fill have altered Oaks Bottom habitat and its relationship to the river. The railroad embankment disconnected an important part of the floodplain from the river. In 1905, the Oregon Water Power and Navigation Company built the 44-acre Oaks Amusement Park, filling part of the bottomlands west of the railroad and clearing much of the understory vegetation (oak trees were preserved and/or planted at the time). In 1909, the City of Portland acquired the 16-acre Sellwood Park located on the bluff above the bottomlands and developed it for active recreational use. The City acquired Oaks Pioneer Park in the late 1950s, which comprised 115 acres of bottomlands and bluff north of Sellwood Park. Soon thereafter, two large wetland areas were filled. The south end of the park was filled as a garbage dump and plans were crafted to build a parking lot at this location. Just north of the park, 50 acres of wetland were filled with debris from the Stadium Freeway project in anticipation of future development. In 1969, after a change in the City's political and social climate, the City purchased the northern property and crafted an initial plan for a wildlife and plant preserve, known today as Oaks Bottom Wildlife Refuge. Also, in 1969 the City acquired the 9-acre Sellwood Riverfront Park, which was developed for boating and passive recreational uses.

The Bureau of Environmental Services and Portland Parks and Recreation are currently partnering with the U.S. Army Corps of Engineers on a habitat enhancement project within the refuge. Replacement of an existing culvert with a larger natural-bottom arched culvert was completed in the fall of 2018. The replacement will improve fish passage between the river and the refuge. The project also includes the excavation of tidal slough channels and replacement of invasive vegetation with native species.

As a result of restoration activities over the past 40 years, the Oaks Bottom Complex provides some of the most diverse fish and wildlife habitat in Portland's Lower Willamette River. The natural resource functions here are closely linked to the adjacent Ross Island Complex described above, creating important aquatic, riparian and upland habitat in Portland.

The Oaks Bottom Complex contains a mosaic of bottomland forest, foothill savanna/oak woodland, conifer forest, shrub, grassland, and wetland habitats that remain linked, despite prior disturbances, to nearby river, slough, and island habitats. A dense, bottomland forest community dominated by black cottonwood covers large portions of this area, including forested wetlands and a high bluff fringe around the refuge. Pacific willow and red-osier dogwood are typical co-dominants with cottonwood. The cottonwood/dogwood association is common throughout the area, while the cottonwood/willow association is most notable north of the large

emergent wetland area and along the shoreline upstream of Ross Island. Other components of the forest include Oregon ash, red alder, and other willow species. The structural diversity of the forest is relatively high. Trees vary in age from approximately 40 to 80 years. Snags and large woody provide habitat complexity, particularly along the riverbank and within the wildlife refuge. In addition to dogwood and willow, the shrub layer includes snowberry, red elderberry, Indian plum, and Himalayan blackberry. The forest ground layer is dominated by trailing blackberry and English ivy, though sword fern remains common on the forested bluff. Large areas of reed canarygrass are also present in parts of the forest, particularly in the seasonal wetlands and in higher elevations along the Willamette River beach.

Considerable revegetation efforts have been undertaken by the City in the Oaks Bottom resource area. These include recent understory plantings in the forest and clearings north of Sellwood Riverfront Park, along Holgate Slough, and within the Oaks Bottom Wildlife Refuge. New plantings of Oregon white oak, cottonwood, alder, western red cedar, elderberry, hazel, and snowberry dominate recent endeavors.

The vegetation found along the bluffs at Oaks Bottom has notable differences from that found at the Waud Bluff and Mock's Crest bluff sites in the North Reach. At Oaks Bottom, Oregon white oak is dominant along portions of the bluff, occasionally with madrone as a co-dominant, but species such cottonwood, Douglas fir, and big-leaf maple are much more prevalent than in north or central reaches. The understory layer is comprised of snowberry, poison oak, blackberry, English ivy, and clematis. Oregon white oak also occurs on the slightly elevated river terrace at Oaks Amusement Park. Some of the oaks at this site are well over 100 years in age.

Upland shrub habitat typically occurs in disturbed areas of the site such as the north fill and along the northern bluff. As in other parts of the study area, the shrub association is dominated by Himalayan blackberry, which often forms a dense, impenetrable thicket. Other occasional shrub species in this association include dogwood, witch hazel, and willows.

Grassland habitats are found in the areas of prior fill and disturbance. These areas include the north and south fill areas at Oaks Bottom Wildlife Refuge and the managed lawns at Oaks Park and Sellwood Riverfront Park. The grassland habitat at Oaks and Sellwood Parks is chiefly comprised of mowed grassland and lawn.

A variety of forested, scrub-shrub, emergent and open water wetland habitats occur at this site. Generally, this area is a large emergent wetland dominated by Columbia sedge, scouring rush, spike-rush, reed canary grass, and several other species of sedges, rushes, and emergent grasses. Another emergent wetland, dominated by common rush, occurs along the beach at Oaks Park. A small wet meadow habitat is located at the eastern edge of the north fill, near the base of the forested bluff. Scrub-shrub wetlands are located at the edges of emergent wetlands at the Wildlife Refuge and in the northeast portion of Sellwood Riverfront Park. Forested wetlands typically are willow-dominated areas within the bottomland forest containing hydric soils and dominated by hydrophytes.

With one or two minor exceptions, this site contains natural or semi-natural banks along the entire length of the Willamette River and Holgate Slough, although sections are fairly steep and eroded. Bordering the upstream segment of river south of Holgate Slough is one of the longest and most diverse beach habitats within the study area. In a pattern similar to the Stephens Creek site across the river and Kelley Point Park at the Willamette-Columbia River confluence, Pacific willow of varying ages and reed canarygrass commonly occur along the high water fringe of the beach. As noted above, an emergent wetland (bordered by willows) is located on the beach

below Oaks Park. During high water events, this wetland is connected to the Willamette River forming a backwater area. The beach and backwater area, combined with the shoreline willow growth, recruit substantial quantities of large wood. These large logs and root wads provide long-term cover, resting, and feeding areas for reptiles, birds, and small mammals.

Holgate Slough is the only true side-channel habitat within the study area. The Slough links Oaks Bottom to the Ross Island habitat areas, and shorelines are preserved in a natural or semi-natural condition with overhanging vegetation, undeveloped banks, and large wood. This side channel provides the best refuge for wildlife of any riverine site within the study area.

This site attracts the greatest abundance of wildlife within the study area. The mosaic of aquatic and terrestrial habitat types and the connection to Willamette River, Holgate Slough, and the islands creates forage, nesting, and resting opportunities for birds, reptiles, amphibians, and mammals. More than 200 species of birds have been reported at this site, including birds nesting on Ross and East Islands such as bald eagle, great blue heron, red tail hawk, and osprey. Several active osprey nests were also noted at Oaks Bottom (see Table 11). Other raptors at this site include kestrels, harriers, hawks, and owls. Anna's hummingbird is reported to nest at Oaks Bottom; this is believed to be the northernmost nesting site within the species' range. River birds include green-backed heron, northern shoveler, pintails, mallards, wood ducks, coots, widgeons, gulls, cormorants, and owls. Passerines include warblers, red-winged blackbird, common yellowthroats, chickadees, bushtits, flycatchers, hummingbirds, wrens, robins, sparrows, juncos, thrushes, finches, towhees, nuthatches, kinglets, woodpeckers, flickers, and kingfishers. Other birds identified at Oaks Bottom include quail, jays, crows, and band-tailed pigeons.

Table 11: Avian Special Status Species Observed at Oaks Bottom Wildlife Refuge

Common Name	Scientific Name	SHA At Risk Species	Notes
American Kestrel	Falco sparverius		Occassional, only a few records per year
Bald Eagle	Haliaeetus leucocephalus	X	
Band-tailed Pigeon	Columba fasciata	X	Occassional, only a few records per year
Black-throated Gray Warbler	Dendroica nigrescens		Fairly common in spring
Brown Creeper	Certhia americana		Known or likely breeding species
Bufflehead	Bucephala albeola	X	
Bushtit	Psaltriparus minimus		Known or likely breeding species
Common Yellowthroat	Geothlypis trichas		Known or likely breeding species
Downy Woodpecker	Picoides pubescens		Known or likely breeding species
Great Blue Heron	Ardea herodias		
Green Heron	Butorides virescens		
Hammond's Flycatcher	Empidonax hammondii		Uncommon spring and fall migrant
Hooded Merganser	Lophodytes cucullatus		
Hutton's Vireo	Vireo huttoni		Known or likely breeding species
Merlin	Falco columbarius	X	Occassional, only a few records per year
Nashville Warbler	Vermivora ruficapilla		Occassional spring migrant
Olive-sided Flycatcher	Contopus cooperi	X	Occassional, only a few records per year
Orange-crowned Warbler	Vermivora celata		

Pacific-slope Flycatcher	Empidonax dificilus		Uncommon to occassional spring and fall migration
Peregrine Falcon	Falco peregrinus	X	
Pileated Woodpecker	Dryocopus pileatus	X	Occassional, only a few records per year
Purple Finch	Carpodacus purpureus		Occassional, only a few records per year
Purple Martin	Progne subis	X	Known or likely breeding species
Rufous Hummingbird	Selasphorus rufus		Known or likely breeding species
Swainson's Thrush	Catharus ustulatus		Uncommon
Thayer's Gull	Larus thayeri		Uncommon
Varied Thrush	Ixoreus naevius		Uncommon
Vaux's Swift	Chaetura vauxi		
Western Sandpiper	Calidris mauri		Uncommon to occassional spring and fall migration
Western Wood-Pewee	Contopus sordidulus		Known or likely breeding species
White-breasted Nuthatch (Slender-billed)	Sitta carolinensis aculeata	X	
Willow Flycatcher (Little)	Empidonax traillii brewsteri	X	Known or likely breeding species
Wilson's Warbler	Wilsonia pusilla		Uncommon spring and fall migrant
Winter Wren	Troglodytes troglodytes		
Wood Duck	Aix sponsa		Known or likely breeding species
Yellow Warbler	Dendroica petechia		Uncommon spring and fall migrant

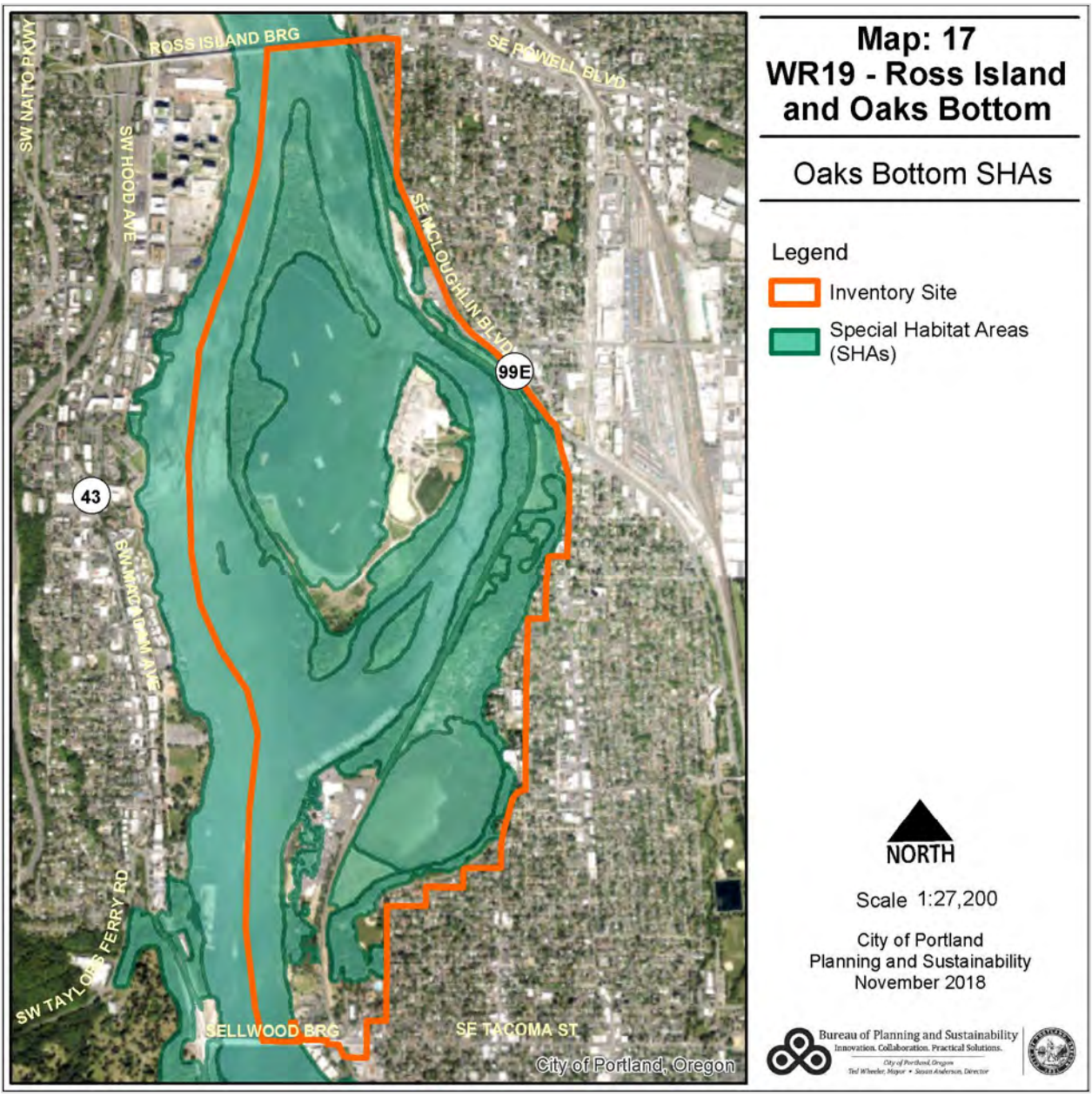
A two-year amphibian study was completed in 2009 by City of Portland's Bureau of Parks and Recreation. Oregon salamander (Ensatia eschscholtzii), Western red-back salamander (Plethodon vehiculum), Pacific chorus frog (Pseudacris regilla), red-legged frog (Rana aurora) and long-toed salamander (Ambystoma macrodactylum) were found in the Oaks Bottom refuge. Red-legged frog is an at risk species. Rough-skinned newts have also been observed.


Oregon salamander—
Ensatina eschscholtzii

The Holgate Slough banks contain numerous large holes at or above the high water mark, indicating the presence of river otter. Other mammals utilizing this site include deer, beaver, and small rodents.

Oaks Bottom is designated a Special Habitat Area for the following:

(S) – an at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(O) - Oak
(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat



Natural Resource Evaluation

The natural resources located within this site have been evaluated for relative riparian and wildlife habitat quality. Relative quality is presented in the form of relative functional value ranks for riparian corridors, wildlife habitat, and riparian/wildlife habitat value combined (Table 12). The relative ranks are produced using GIS models and information on Special Habitat Areas.

The approach used to generate the relative ranks is summarized in the introduction to the inventory sites. Additional detail is provided in Chapter 2: Methodology Overview of this report and Appendix C: *Natural Resources Inventory: Riparian Corridors and Wildlife Habitat Project Report*.

All of the ranked resource areas provide at least some important riparian and habitat value, recognizing that current condition and function levels may vary considerably. The relative ranks can inform planning projects and programs, including regulations, design of development or redevelopment projects, and mitigation and restoration activities.

Riparian Areas

The site contains the Willamette River and river bank, flood area, wetlands and riparian vegetation. These features contribute to the riparian functions as detailed in the natural resource descriptions, specifically:

- Microclimate and shade
- Stream flow moderation and water storage
- Bank functions, and sediment, pollution and nutrient control
- Large wood and channel dynamics
- Organic inputs, food web and nutrient cycling
- Riparian wildlife movement corridor

High relative functional ranks are assigned to the Willamette River itself, wetlands and forest vegetation in the floodplain or in proximity to the water bodies. Medium relative functional ranks are assigned to less dense and lower structure vegetation in the floodplain and up to 300 feet from water bodies. Low relative ranks are generally assigned to non-vegetated flood areas.

Wildlife Habitat

Within the context of this inventory model, a wildlife habitat patch is defined as forest and/or wetland areas 2 acres in size or greater, including adjacent woodland vegetation (note: Special Habitat Areas may be smaller and may contain different types of vegetation or other resource features). The model assigns relative ranks to qualifying habitat patches based on their size, interior area, proximity to other patches and proximity to water. Medium relative functional ranks are assigned to wetland and forest patches in this inventory site.

Special Habitat Areas (SHA) consist of rare and declining habitat types and unique features that provide critical habitat for at-risk plant and animal species as described in the Natural Resources Description section above. SHAs receive a high relative rank for wildlife habitat. The SHA ranking supersedes lower rankings generated by the GIS model. Therefore, all SHAs within the site rank high for wildlife habitat, and include:

Willamette River, including shallow water habitat areas, are designated SHA because they meet the following criteria:

(S) – An at-risk species uses the habitat area or feature on more than an incidental basis to complete one or more life history phases
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor

The Ross Island Complex is designated a SHA because it meets the following criteria:

(I) – Islands or the portions of riverine islands that provide habitat for river/island-associated resident and/or migrating wildlife species
(S) – an at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases

(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat

Oaks Bottom is designated a SHA because it meets the following criteria:

(S) – an at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat

Combined Relative Riparian/Wildlife Habitat Ranking

Where areas that are mapped as riparian corridors and wildlife habitat overlap, and their relative ranks differ, the combined relative rank will be the higher of the two ranks. For example, an area that ranks medium for riparian function and low for wildlife habitat will receive a medium combined relative rank.

Table 12: Summary of Ranked Resources in WR19 – Ross Island/Oaks Bottom

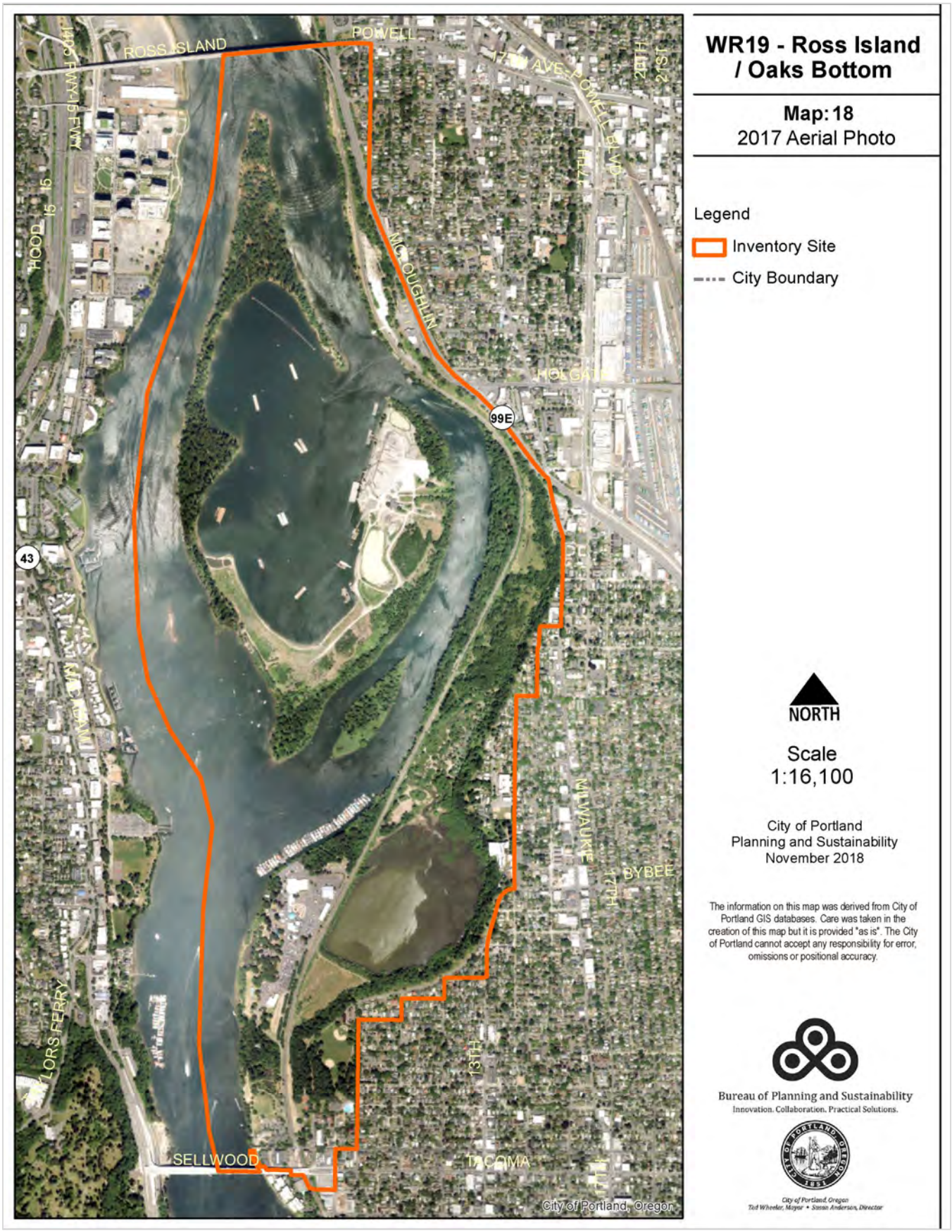
Total Inventory Site = 1,031 acres

	High	Medium	Low	Total
Riparian Resources*				
acres	766	60	87	913
percent total inventory site area	74	6	8	89
Wildlife Habitat				
Wildlife Habitat*				
acres	0	295	7	304
percent total inventory site area	0	29	<1	29
Special Habitat Areas**				
acres	830			
percent total inventory site area	80			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	830	18	2	850
percent total inventory site area	80	2	<1	82
Combined Total***				
acres	846	34	53	933
percent total inventory site area	82	3	5	90

* High-ranked riparian resources, Special Habitat Areas, and wildlife habitat include the Willamette River.

** Special Habitat Areas rank high for wildlife habitat.

*** Because riparian resources, Special Habitat Areas, and wildlife habitat overlap, the results cannot be added together to determine the combined results.



WR19 - Ross Island / Oaks Bottom

Map: 18
2017 Aerial Photo

Legend
- Inventory Site
- City Boundary

NORTH

Scale
1:16,100

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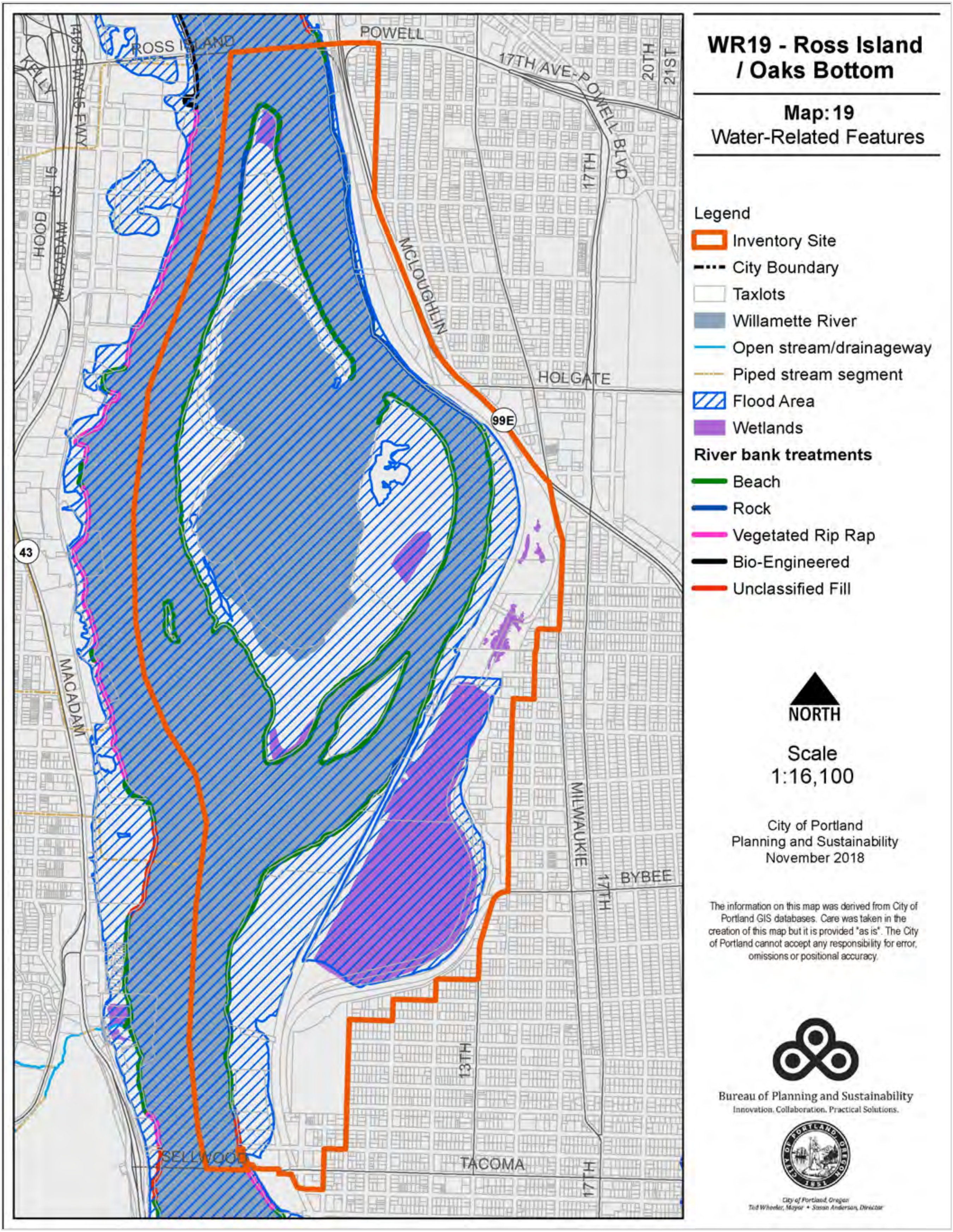
WR19 - Ross Island / Oaks Bottom
Map: 19
Water-Related Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Flood Area
Wetlands
River bank treatments
Beach
Rock
Vegetated Rip Rap
Bio-Engineered
Unclassified Fill
NORTH
Scale
1:16,100
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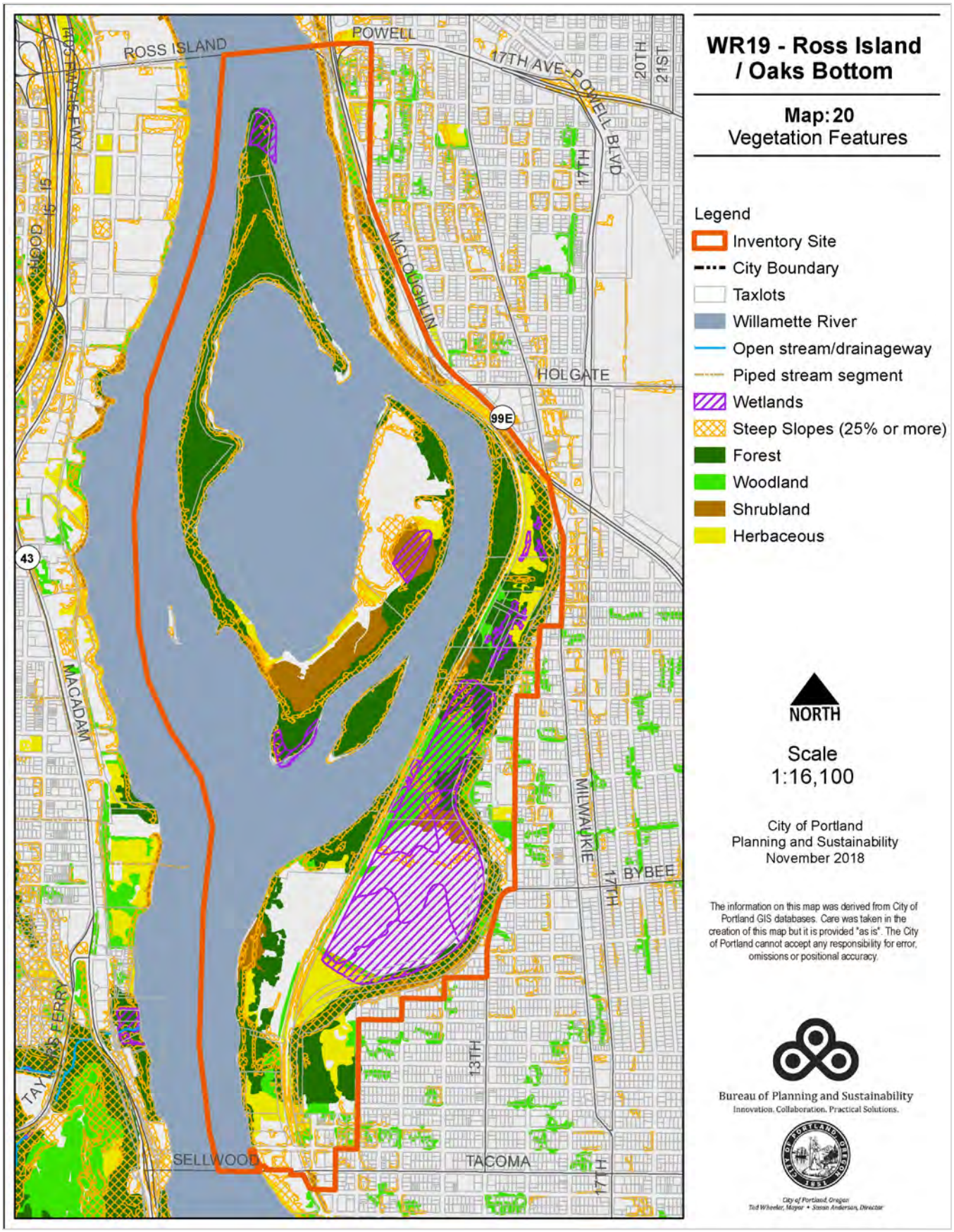
ROSS ISLAND
POWELL
17TH AVE-POWELL BLVD
20TH
21ST
17TH
HOOD
I5
MACADAM
MCLOUGHLIN
HOLGATE
99E
43
MILWAUKIE
17TH
BYBEE
13TH
SELLWOOD
TACOMA
17TH


ROSS ISLAND
POWELL
17TH AVE-POWELL BLVD
20TH
21ST
HWY 99E
I-5
MCLOUGHLIN
17TH
HOLGATE
99E
43
MACADAM
MILWAUKIE
17TH
BYBEE
13TH
SELLWOOD
TACOMA
WR19 - Ross Island / Oaks Bottom
Map: 20
Vegetation Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Wetlands
Steep Slopes (25% or more)
Forest
Woodland
Shrubland
Herbaceous
NORTH
Scale
1:16,100
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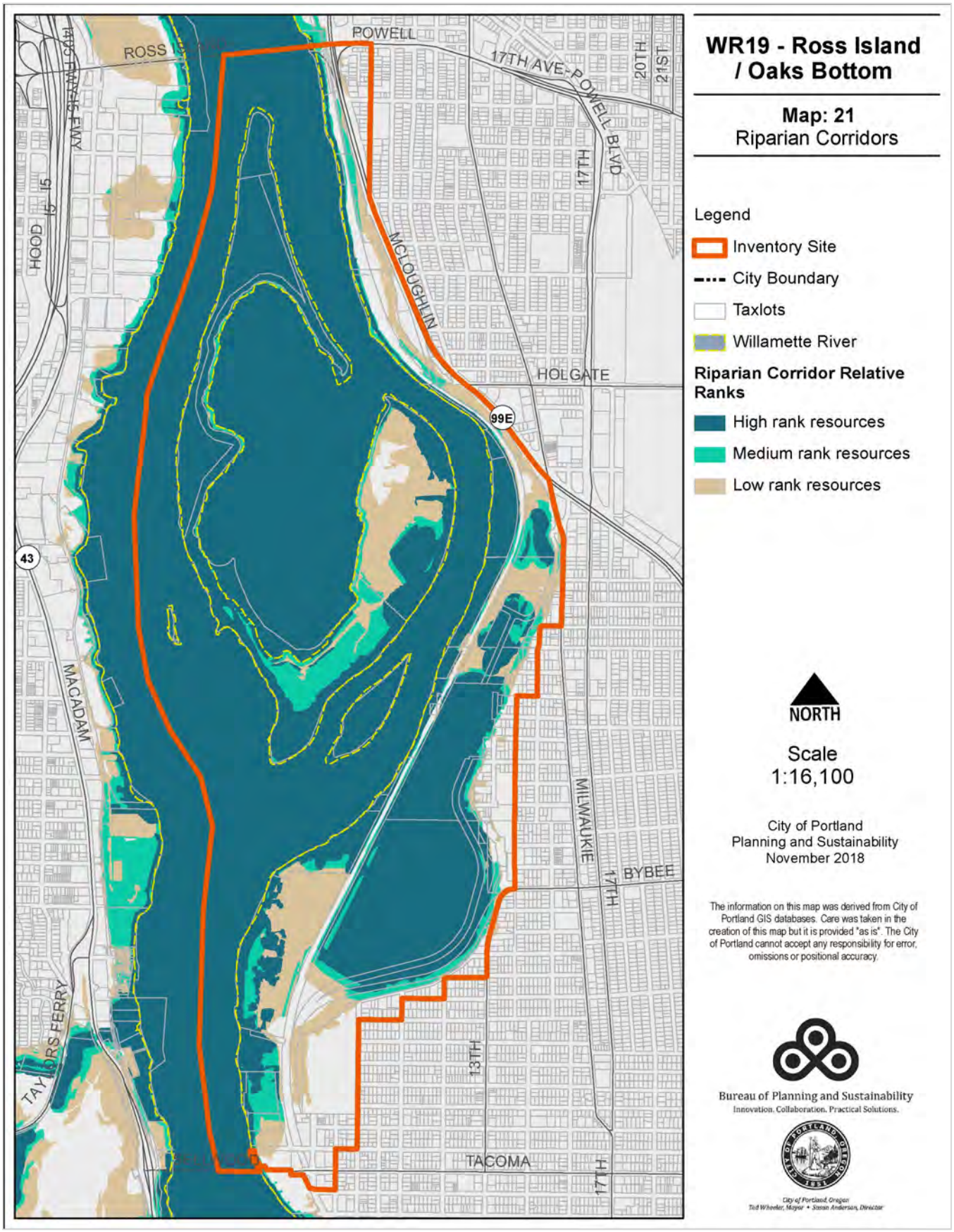
WR19 - Ross Island / Oaks Bottom
Map: 21
Riparian Corridors
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Riparian Corridor Relative Ranks
High rank resources
Medium rank resources
Low rank resources
NORTH
Scale 1:16,100
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BYBEE
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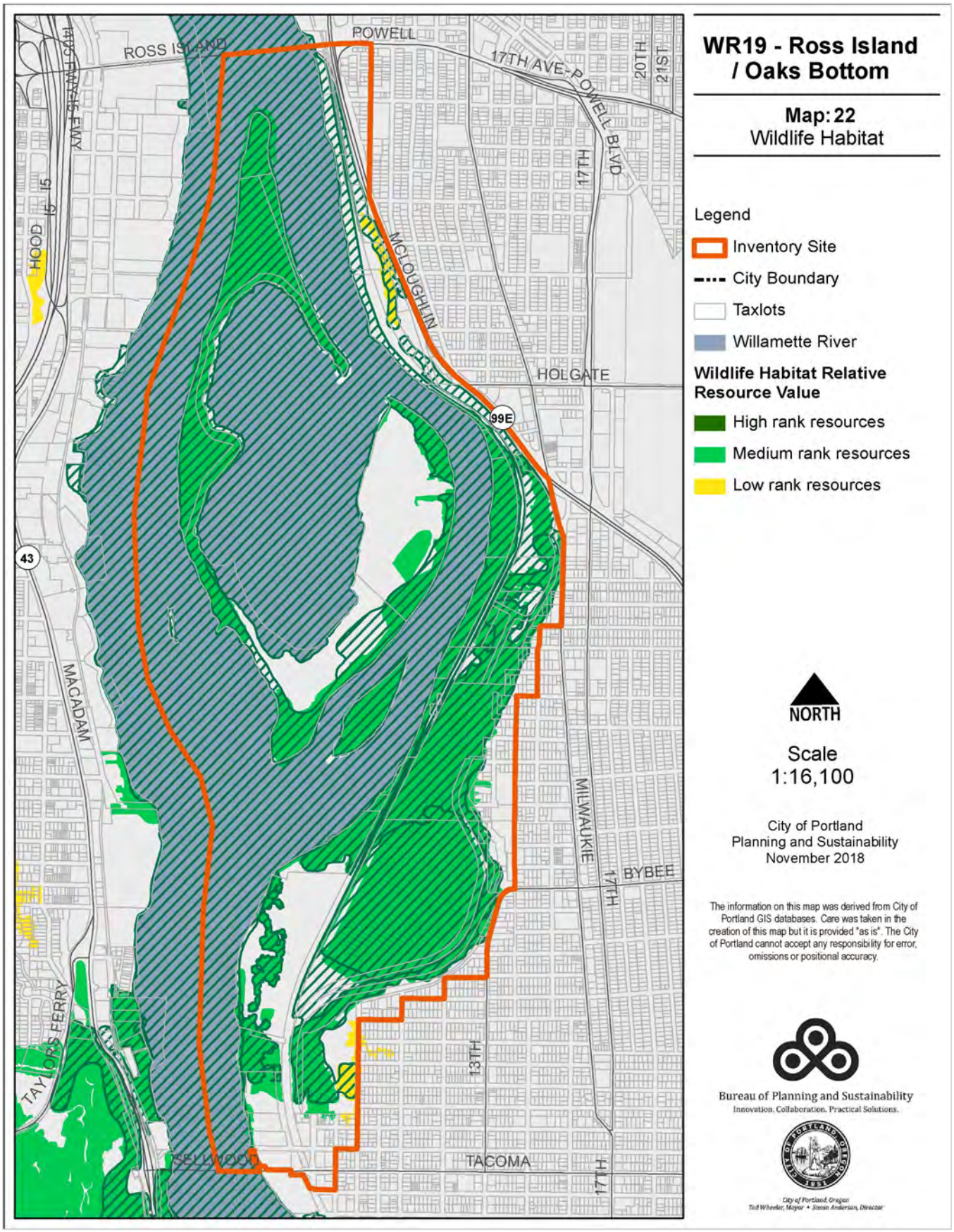
TACOMA


WR19 - Ross Island / Oaks Bottom
Map: 22
Wildlife Habitat
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Wildlife Habitat Relative Resource Value
High rank resources
Medium rank resources
Low rank resources
NORTH
Scale 1:16,100
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17TH
MCLOUGHLIN
HOLGATE
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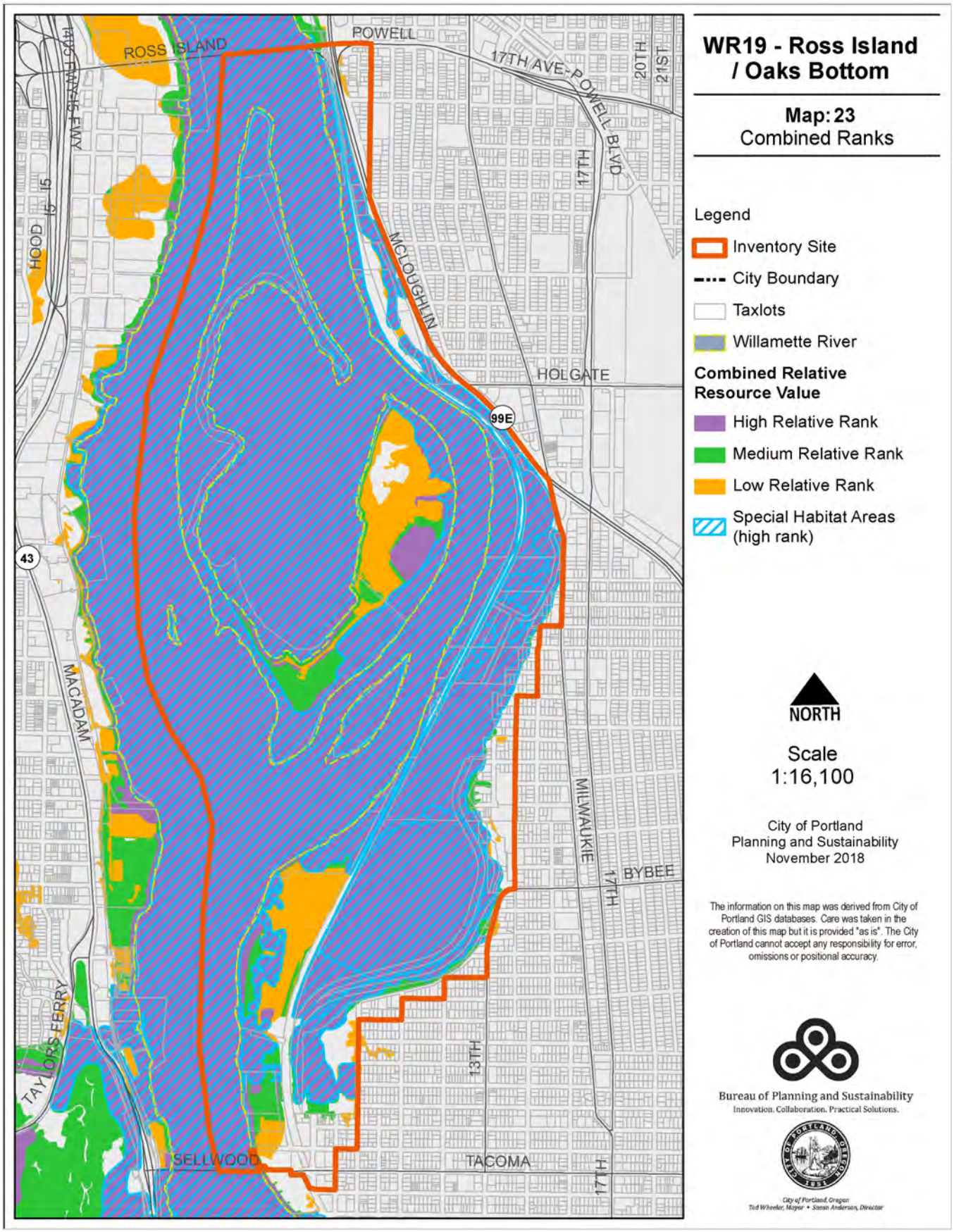
HOOD
I-5
MACADAM
MILWAUKIE
BYBEE
13TH
TACOMA
SELLWOOD
43


WR19 - Ross Island / Oaks Bottom
Map: 23
Combined Ranks
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Combined Relative Resource Value
High Relative Rank
Medium Relative Rank
Low Relative Rank
Special Habitat Areas (high rank)
NORTH
Scale 1:16,100
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17TH AVE-POWELL BLVD
20TH
21ST
I-405 PAYNE FWY
I-5
HOOD
MCLOUGHLIN
17TH
HOLGATE
99E
43
MACADAM
MILWAUKIE
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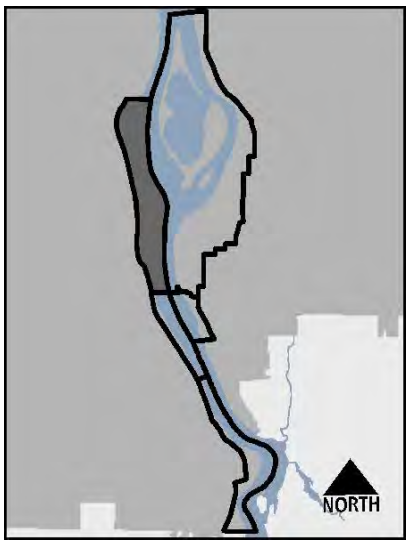
BYBEE
TAYLORS FERRY
13TH
SELLWOOD
TACOMA
17TH

SECTION 3.D.ii: INVENTORY SITE WR20 SW RIVERFRONT PARKS



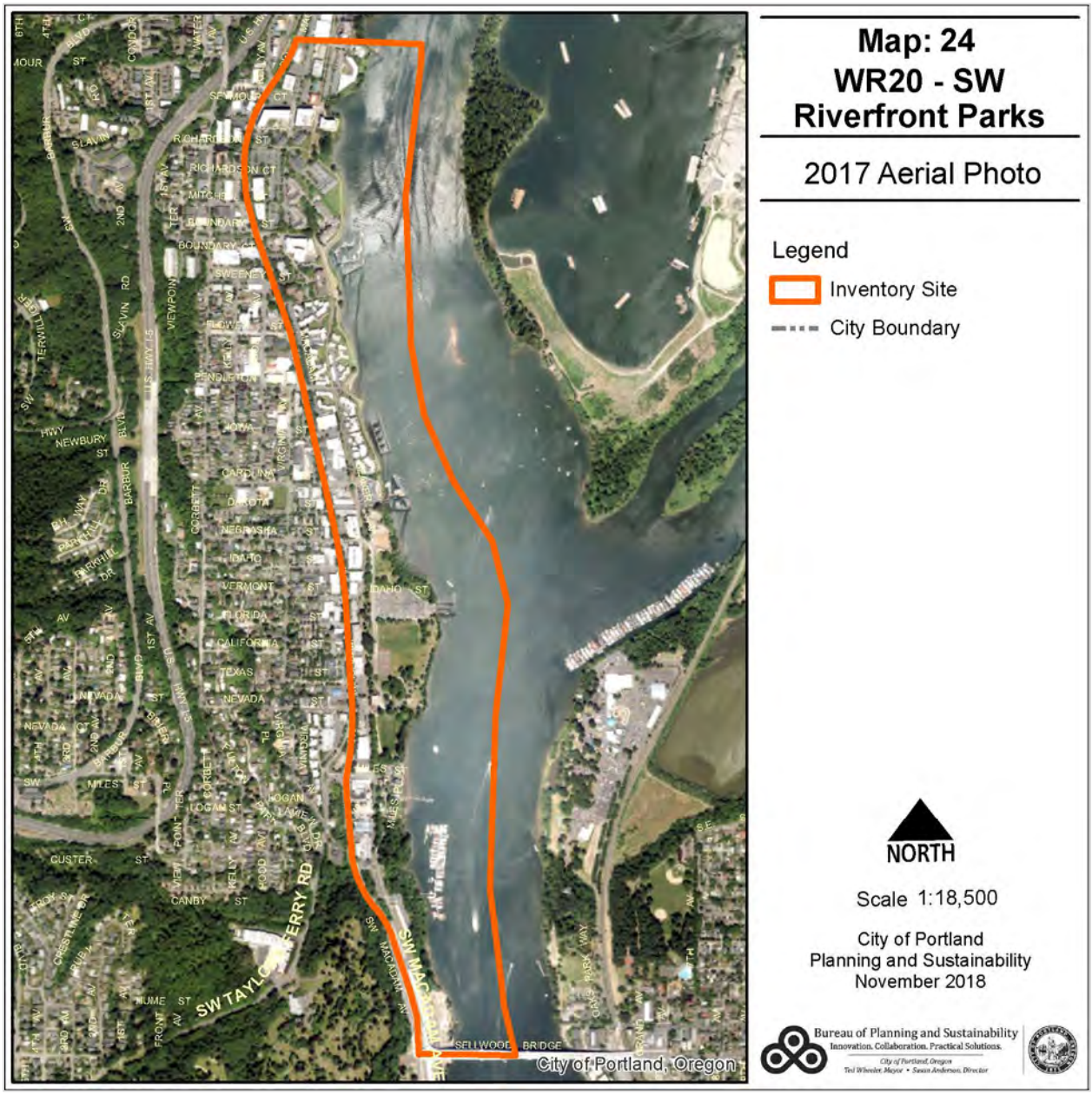
Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	South Portland
USGS Quadrangle and Quarter Section Maps:	1S1E15A, 1S1E15B, 1S1E15C, 1S1E15D, 1S1E 22A, 1S1E22B, 1S1E22C, 1S1E22D
River Mile:	14.7 – 16.5
Site Size:	269 acres (land and water)
Previous Inventory:	Southwest Hills Resource Protection Plan, 1992; Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Commercial Employment (CE) Commercial/Mixed Use 2 (CM2) Residential 1,000 (R1) Residential 2,000 (R2) Residential 5,000 (R5) Open Space (OS) Design Overlay Zone (d) Scenic Overlay zone (s) Willamette Greenway River General Overlay (g) Willamette Greenway River Natural Overlay (n) Willamette Greenway River Recreational Overlay (r)
Existing Land Use:	Commercial, residential, parks and open space, railroad, highway
General Description:	The northern portion of the site is characterized by residential and commercial uses. The southern portion of the site also has commercial uses along Macadam Avenue, but the riverward land is occupied by Willamette Park and Willamette Moorage, which includes the restored confluence to Stephen's Creek. Macadam Ave. runs the entire length of the site.
Resource Features:	Open water, shallow water habitat, river bank, flood plain, wetland, riparian vegetation
Resource Functions:	Microclimate and shade; stream flow moderation and water storage; bank function and sediment, nutrient and pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and wildlife habitat and movement corridor

Special Habitat Area:	**Willamette River:** (S) – provides habitat for at-risk wildlife species; (C) – wildlife connectivity corridor **Cottonwood Bay:** (B) – bottomland hardwood forest; **(M)** – **migratory stopover habitat;** (C) – wildlife connectivity corridor habitat; **(U) – unique feature** **Willamette Moorage:** (S) – provides habitat for at-risk wildlife species; (B) – bottomland hardwood forests; (W) – wetland; **(M)** – **migratory stopover habitat;** (C) – wildlife connectivity corridor habitat
Special Status Species:	**Fish**: Lower Columbia River (LCR) Chinook salmon, LCR coho salmon, LCR steelhead trout, LCR coastal cutthroat trout, Columbia River chum salmon, Upper Willamette River (UWR) Chinook salmon, UWR steelhead trout, Pacific lamprey, Western brook lamprey, white sturgeon. **Amphibians**: Northern red-legged frog **Birds**: American kestrel, bald eagle, band-tailed pigeon, brown creeper, bushtit, downy woodpecker, great blue heron, orange-crowned warbler, Pacific-slope flycatcher, Swainson's thrush, Western sandpiper, Western wood-pewe, willow flycatcher (Little), Wilson's warbler and wood duck. **Mammals:** American beaver, hoary bat, Northern river otter
Natural Hazards:	Flood area, wildfire, landslide, earthquake and liquefaction
Contamination:	Yes

Site Description

This 269-acre site is located between Hamilton Ct. and the Sellwood Bridge, east of Macadam Ave. The northern portion of the site is characterized by residential and commercial uses. The southern portion of the site also has commercial uses along Macadam Ave, but the riverward land is occupied by Willamette Park and Willamette Moorage. Macadam Avenue is the western border for the entire length of the site.



The site contains 63 acres (23 percent) impervious surface coverage. Of the vegetated areas over ½ acre in size, there is are approximately 12 acres of forest, 16 woodland vegetation, 3 acres of shrubland and 17 acres of herbaceous vegetation. There are 193 acres of flood area on this site, most of which is open water.

Table 13: Summary of Natural Resource Features in WR20 – SW Riverfront Parks

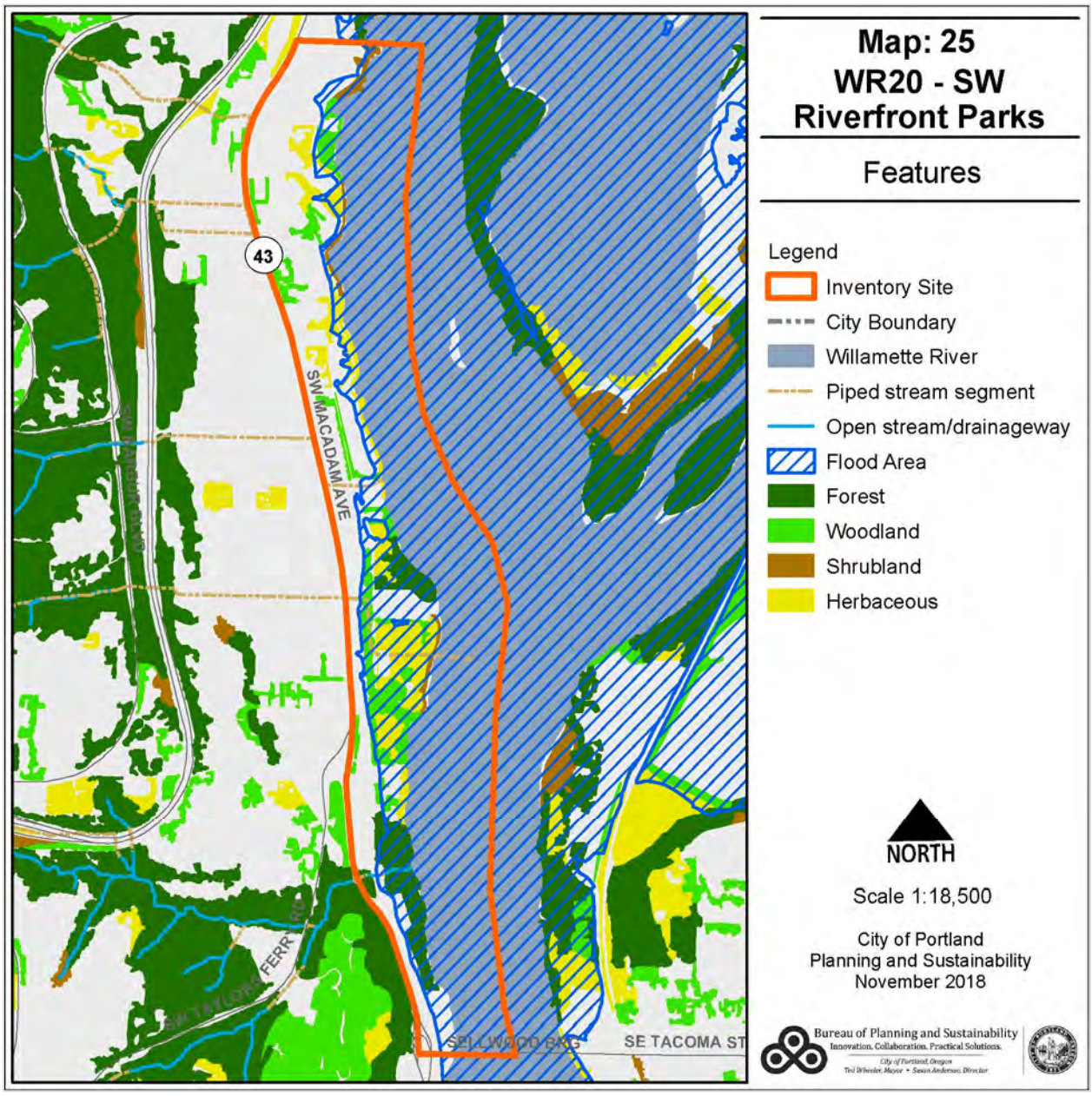
	Study Area (miles/acres)
River (miles/acres)	**2/138**
Stream/Drainageway (miles)	**<1**
Wetlands (acres)	**2**
Flood Area (acres)*	
Vegetated (acres)	36
Non-vegetated (acres)	19
Open Water** (acres)	138
Vegetated Areas >= ½ acre (acres)+	
Forest (acres)	12
Woodland (acres)	16
Shrubland (acres)	3
Herbaceous (acres)	17
Impervious Surfaces (acres)	63

* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.
** Open Water includes portions of the Willamette River.
+ The vegetation classifications are applied in accordance with the National Vegetation Classification System specifications developed by The Nature Conservancy. The data within the primary study area and within 300 feet of all open water bodies in Portland is draft and is currently being updated based on 2008 aerial photography.

Natural Resource Description

Historically, the Portland-area portion of the Willamette River watershed was comprised of an active channel, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Vegetation in bottomland and wetland forests consisted of black cottonwood, Oregon ash and willow with associated native understory. Denser, mixed-conifer forests of Douglas fir, bigleaf maple, western red cedar, western hemlock, grand fir and red alder dominated the west hills and some parts of the east terrace. Savannas of Oregon white oak, Pacific madrone, red alder and bigleaf maple were found in the foothills on the east side of the river.

Today, the land within the South Reach inventory area is comprised largely of parks and open spaces and residential development. There are also commercial uses along Macadam and the moorage. Parks in this inventory site include the southern portion of Cottonwood Bay, Willamette Park, Willamette Moorage, Butterfly Park, Miles Beach and the northern portion of Powers Marine Park. All of these parks, as well as the Willamette River open water and river banks are significant natural resource areas in the inventory site.



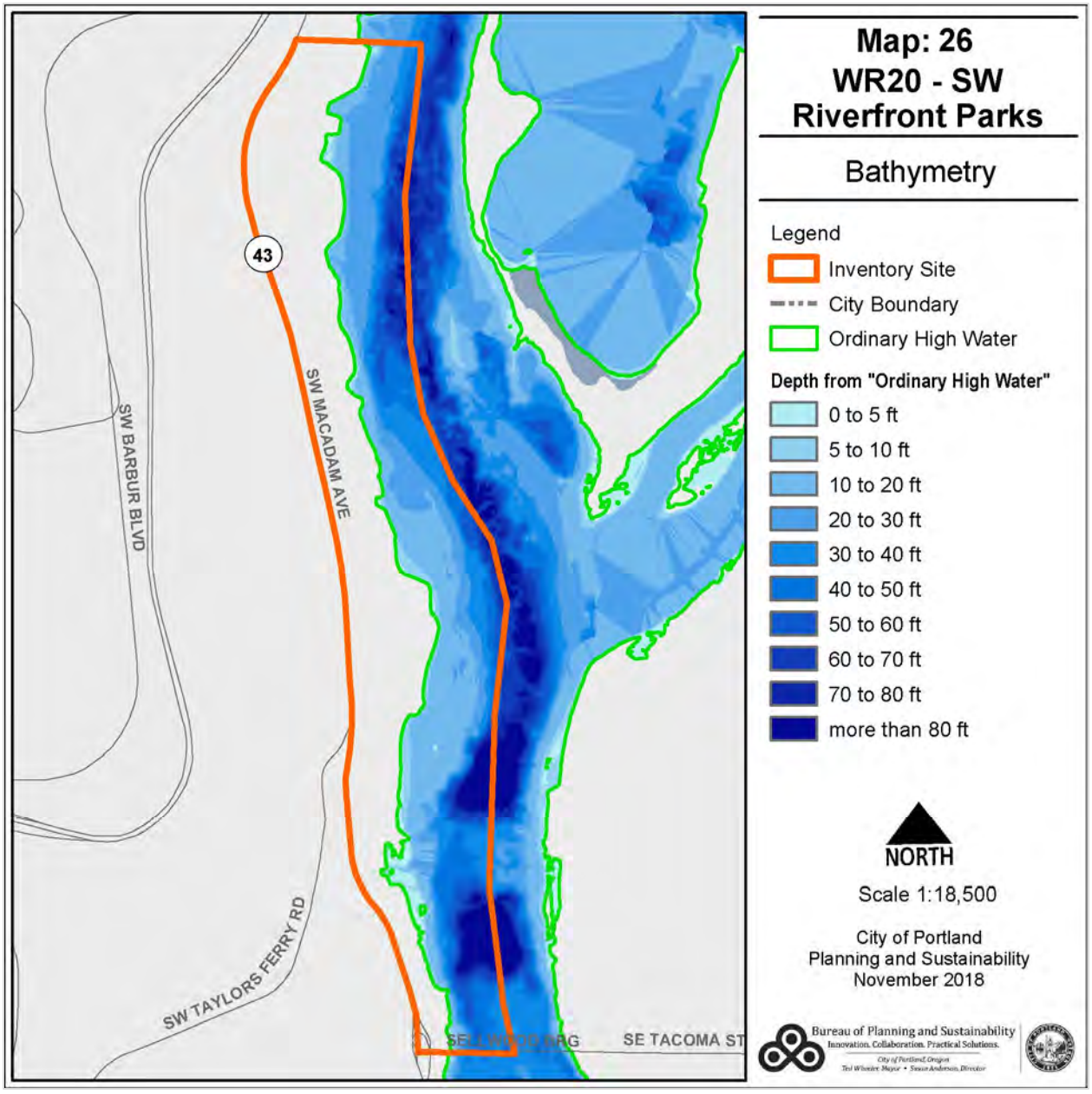
Willamette River

Below is a summary of Lower Willamette River natural resources documented in inventory site WR20. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The South Reach.

Inventory site WR20 includes 138 acres of the Lower Willamette River. The river is the primary habitat link providing connectivity between upstream and downstream aquatic habitats. This connection is critical for fish, resident and migrating birds, and other species.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho and chum salmon, as well as steelhead, and coastal cutthroat trout. These fish enter the Lower Willamette River system both as opportunistic migrants to exploit forage associated with the annual shad run and to spawn in reaches throughout the Willamette River watershed. Shallow water areas, which are found along shoreline margins in this inventory site, are especially important for juvenile fish because they provide opportunities to escape the swift current of the main channel to rest and feed (see Map 26). Seasonal migrants use habitat within the inventory site during multiple life stages, and are usually present during predictable seasonal peaks:

- Juvenile salmon and trout out-migration generally occurs between March and June.
- Spring Chinook out-migration peaks in April.
- Fall Chinook, steelhead and coho out-migration peaks between May and June.



The Columbia eulachon pass through the lower Columbia and Willamette rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

White sturgeon generally move throughout the Columbia River estuary and Lower Willamette River throughout the year. As adults, sturgeon can migrate freely between fresh, brackish and saline water; juveniles and young-of-year cannot, so their rearing range is limited. Recent white sturgeon stock assessment data collected in the Willamette River between Willamette Falls and the Columbia River confluence describe a compromised population of white sturgeon represented by several young age classes.

The historic run of adult Pacific lamprey up and over Willamette Falls numbered in the hundreds of thousands. Today, that run is significantly smaller; however, tribal harvest of these fish for subsistence and ceremonial uses still brings many families to the Willamette Falls every year. Documentation of Pacific lamprey rearing and outmigration patterns in the Lower Willamette River is limited; however, juveniles are often observed in soft substrate samples collected throughout the lower river. The rearing life stage of Pacific lamprey is known to last between 4-7 years in freshwater habitat, before individuals migrate to the ocean for their maturation life stages.

Resident fish assemblages within this reach include native species such as largescale sucker, sculpin (prickly and reticulate), redside shiner and northern pikeminnow. Nuisance species include large and smallmouth bass, Asian carp and several varieties of perch.

The Willamette River within this inventory site plays an important part of the Pacific Flyway migratory route for over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, Peregrine falcon and bald eagle. Species use the open water habitat for foraging and as a migratory corridor. Avian species also use natural and man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl.

The Willamette River in the inventory site does not meet state water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 14). TMDLs for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. The Oregon Water Quality Index values observed between 2001 to 2015 fairing Portland have seen modest improvement and the trend is steady.

Table 14: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries			
Pollutant	**Season**	**Year River was Listed for this Pollutant**	**Risk Factors**
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH, Total Chlordane, Cyanide, Hexachlorobenzene)	Year-round	1998, 2002, 2012	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Heavy Metals (iron, manganese, mercury)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Nutrients (Chlorophyll a)	Summer	2012	Fish and other aquatic life due excessive algal growth and a decrease in dissolved oxygen (DO)
Bacteria (Fecal Coliform)	Fall/Winter/Spring	1998	Water contact recreation
Temperature	Summer	1998	Salmonid fish rearing, anadromous fish passage
Biological Criteria	N/A	1998	Resident fish and aquatic life

(ODEQ, 2015)

Due to the presence of mercury, PCBs, dioxins and legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem river recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming resident and/or fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead, as they are migratory species and do not spend significant time residing in contaminated habitats. The Lower Willamette River in Portland was previously deemed unsafe for swimming during and immediately after rainstorm events due to sewer overflows. However, in 2011, the City completed a large infrastructure project to address combined sewer overflows into the river. The result is that combined sewer overflows should be very infrequent, if not eliminated, during the summer recreating season.

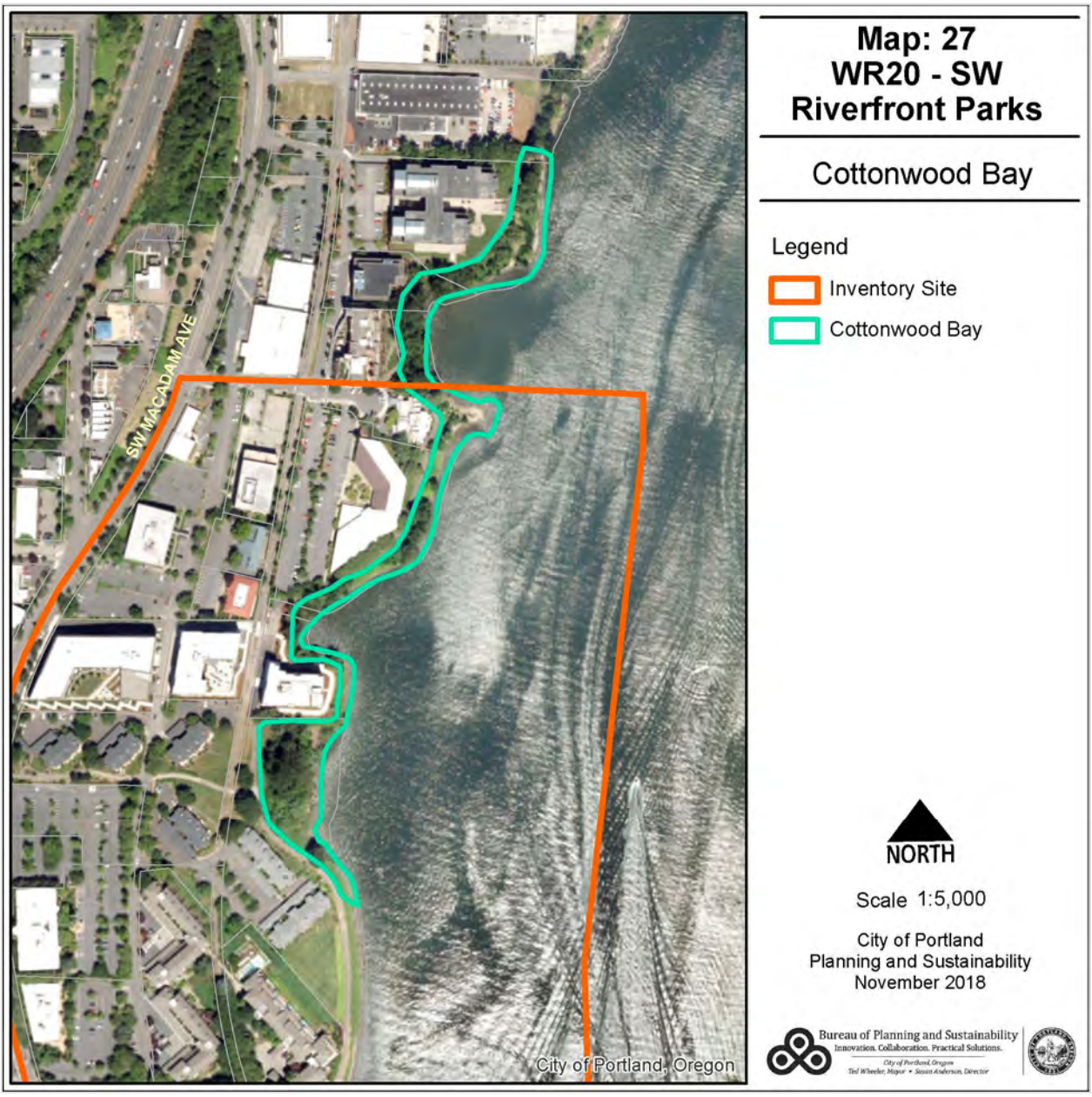
In the inventory site, the flood area is generally confined to the Willamette River itself; but the flood area includes Butterfly and Willamette Parks.

The Willamette River and shallow water habitat are designated Special Habitat Areas because they meet the following criteria:

(S) – An at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(C) – Wildlife connectivity corridor
(M) – Migratory stopover habitat

<u>Cottonwood Bay</u>

Cottonwood Bay spans from the Willamette River Central City into South Reach. The larger northern embayment is approximately 1.2 acres in size and the southern embayment is approximately 0.6 acres. These coves maintain small beach areas with ample cottonwoods and willows; however, river bank function is impaired by extensive riprap (see Map 27).



Cottonwood Bay contains small stands of black cottonwood along the upper riverbanks and within the three embayments. Red alder, Pacific willow, red-osier dogwood, Douglas spirea and scattered ornamental trees also occur along the banks. Interspersed along the banks in the cottonwood stands is a blackberry-dominated shrub association. English ivy covers most of the ground layer at this site. Recent native planting (and blackberry removal) efforts are evident along Cottonwood Bay and the nearby Heron Point development. Native vegetation includes salal, Oregon grape, wild rose, red-osier dogwood, and black cottonwood. A forested wetland dominated by large Pacific willows is located within the southernmost cove. Reed canarygrass and common rush also reside in the wetland.

Wildlife detected at the site includes double-crested cormorant, dark-eyed junco, belted kingfisher, violet-green swallow, house finch, and American crow. The site's proximity to the Ross Island complex makes it an occasional stopover and forage site for herons, osprey, woodpeckers, hawks, waterfowl and other avian species that are common across the river.

Cottonwood Bay is designated a Special Habitat Area for the following:

(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat
(U) – Unique feature

Willamette Park, Butterfly Park, Miles Beach and Willamette Moorage

Butterfly Park, Miles Beach and Willamette Moorage are located on the west bank of the Willamette River between the north end of Willamette Park and Powers Marine Park north of the Sellwood Bridge (see Map 28). The site is approximately one mile long and includes the mouth of Stephens Creek where it joins the Willamette River. Stephens Creek flows through a forested ravine at River View Cemetery and is piped under SW Macadam Avenue before discharging to an open channel at this site near the Willamette Trolley line.

This area contains one of only two west-side forested wetlands directly linked to the Willamette River in Portland. Like its counterpart at Harborton, located at the confluence of the Willamette River and Multnomah Channel, this area provides a primary link to upland forest habitats. There is a new culvert underneath the Willamette Trolley, Regional Trail and Macadam Bay driveway that better connects Stephens Creek to the Willamette River. The culvert is 30-feet wide and 15-feet tall from streambed to top of culvert. It will provide wildlife migration from the river to Macadam Avenue; however, the culvert under the road does not allow for fish passage.

The dominant bottomland forest association in this area is black cottonwood/ Pacific willow. In the low-lying areas near the outfall of Stephens Creek, this community transitions from a riparian forest into a forested wetland. The wetland plant association consists of red-osier dogwood, Douglas spirea, and scattered black hawthorn in the understory shrub layer, and stinging nettle, reed canarygrass, and small-fruited bulrush on the ground layer. The non-wetland forest is similar in composition, but contains no bulrush, little reed canarygrass, and fewer willows. The riparian forest also has a higher proportion of sword fern, red alder, and Oregon white oak (near Butterfly Park). Along the shoreline of Willamette Park, the dominant forest association is cottonwood; other shrub species include red-osier dogwood, Columbia River willow, alder, and Douglas spirea. Stephens Creek and its adjacent forest provide an important link between this site and the upland forest habitats to the west. Most of the trees in this vicinity vary in age between 30 and 80 years old.

Two other small habitats are notable. Offshore from Willamette Park is a rock island which is widely used by river birds as a sheltered resting site along the west shore. Though small in size, this is one of few islands within the Willamette River in Portland. Also of note is the small opening in the forest at the 11-acre Butterfly Park. This area contains a young bottomland hardwood forest.

Avian fauna move freely between the river and wetland habitats and the upland forest. As noted, however, SW Macadam Avenue poses a substantial hazard to terrestrial wildlife movement between the forest and the river. Wildlife that is able to negotiate the concrete barriers and the multiple lanes of traffic typically do so at night. The Stephens Creek basin above this area is largely undeveloped, and over the years the vegetation community was significantly compromised by the rapid spread of English ivy. A major portion of the Stephens Creek canyon area has undergone a significant revegetation enhancement through the efforts of the Burlingame Sanitary Trunk Sewer Pipe Protection Project that was completed in 2008. The English Ivy that was once dominant in the canyon area has been cut down from the large trees and significantly reduced, and control efforts will need to continue to avoid a reoccurrence of the problem.

Table 15: Avian Special Status Species Observed at Willamette Park			
Common Name	**Scientific Name**	**SHA At Risk Species**	**Notes**
American Kestrel	Falco sparverius		
Bald Eagle	Haliaeetus leucocephalus	**X**	
Bushtit	Psaltriparus minimus		
Downy Woodpecker	Picoides pubescens		
Great Blue Heron	Ardea herodias		
Western Sandpiper	Calidris mauri		
Bushtit	Psaltriparus minimus		Known or likely breeding species

Table 16: Avian Special Status Species Observed at Stephens Creek Confluence/Willamette Moorage			
Common Name	**Scientific Name**	**SHA At Risk Species**	**Notes**
Bald Eagle	Haliaeetus leucocephalus	**X**	
Band-tailed Pigeon	Columba fasciata	**X**	X
Brown Creeper	Certhia americana		X
Bushtit	Psaltriparus minimus		X
Downy Woodpecker	Picoides pubescens		
Great Blue Heron	Ardea herodias		
Orange-crowned Warbler	Vermivora celata		
Pacific-slope Flycatcher	Empidonax dificilus		
Swainson's Thrush	Catharus ustulatus		
Western Wood-Pewee	Contopus sordidulus		
Willow Flycatcher (Little)	Empidonax traillii brewsteri	**X**	X
Wilson's Warbler	Wilsonia pusilla		
Wood Duck	Aix sponsa		

Riverbanks along the south are predominantly natural or semi-natural. In the northern half of this area, the banks are composed of riprap and large blocks of concrete. Along Willamette Park the beach consists primarily of small gravels. The beach habitat is most diverse in the southern portion of the area in the vicinity of the mouth of Stephens Creek and areas to the south. Willow communities have established on the beach as the river's hydrology allows. Some large wood is lodged in the sand and willows along the beach.

The banks north of the boat ramp have been the focus of an intensive City revegetation effort. Willows have been established along the banks to help stabilize the banks. Native shrubs and grasses have been planted to

provide a diverse understory to the otherwise ornamental and manicured character of Willamette Park. A stormwater swale mimicking a wetland meadow helps filter runoff from the adjacent parking lot and provides additional habitat complexity.

Willamette Park and Willamette Moorage's proximity to nearby habitat areas at River View Natural Area, Riverview Cemetery, Ross Island and Oaks Bottom Complexes makes the area a frequent stopover and forage site for many wildlife species. Numerous large and small holes at or above the ordinary high water mark at this site indicate the presence of river otter, bank swallows, and/or kingfishers. Barn swallows and violet-green swallows feed and collect nesting materials at the site. Kingfishers were observed foraging at this site during the field survey. Other river bird species detected include cormorant, widgeon, bufflehead, Canada goose, and numerous pairs of mallards. Passerine and other bird species observed include golden crowned kinglet, song sparrow, winter wren, American goldfinch, bushtit, black-capped chickadee, and American crow. Purple martins are seasonal visitors to the site.

Willamette Moorage Complex (includes Stephen's Creek, Miles Beach and Butterfly Park) are designated a Special Habitat Area for the following:

(S) – An at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(B) – Bottomland hardwood forests
(W) – Wetland
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat
(U) – Unique feature

Natural Resource Evaluation

The natural resources located within this site have been evaluated for relative riparian and wildlife habitat quality. Relative quality is presented in the form of relative functional value ranks for riparian corridors, wildlife habitat, and riparian/wildlife habitat value combined (Table 17). The relative ranks are produced using GIS models and information on Special Habitat Areas.

The approach used to generate the relative ranks is summarized in the introduction to the inventory sites. Additional detail is provided in Chapter 2: Methodology Overview of this report and Appendix C: *Natural Resources Inventory: Riparian Corridors and Wildlife Habitat Project Report*.

All of the ranked resource areas provide at least some important riparian and habitat value, recognizing that current condition and function levels may vary considerably. The relative ranks can inform planning projects and programs, including regulations, design of development or redevelopment projects, and mitigation and restoration activities.

<u>Riparian Areas</u>
The site contains the Willamette River and river bank, flood area, wetlands and riparian vegetation. These features contribute to the riparian functions as detailed in the natural resource descriptions, specifically:

- Microclimate and shade

- Stream flow moderation and water storage
- Bank functions, and sediment, pollution and nutrient control
- Large wood and channel dynamics
- Organic inputs, food web and nutrient cycling
- Riparian wildlife movement corridor

High relative functional ranks are assigned to the Willamette River itself, wetlands and forest vegetation in the floodplain or in proximity to the water bodies. Medium relative functional ranks are assigned to less dense and lower structure vegetation in the floodplain and up to 300 feet from water bodies. Low relative ranks are generally assigned to non-vegetated flood areas.

Wildlife Habitat

Within the context of this inventory model, a wildlife habitat patch is defined as forest and/or wetland areas 2 acres in size or greater, including adjacent woodland vegetation (note: Special Habitat Areas may be smaller and may contain different types of vegetation or other resource features). The model assigns relative ranks to qualifying habitat patches based on their size, interior area, proximity to other patches and proximity to water. Medium relative functional ranks are assigned to wetland and forest patches in this inventory site.

Special Habitat Areas (SHA) consist of rare and declining habitat types and unique features that provide critical habitat for at-risk plant and animal species as described in the Natural Resources Description section above. SHAs receive a high relative rank for wildlife habitat. The SHA ranking supersedes lower rankings generated by the GIS model. Therefore, all SHAs within the site rank high for wildlife habitat, and include:

Willamette River, including shallow water habitat areas, are designated SHA because they meet the following criteria:

(S) – An at-risk species uses the habitat area or feature on more than an incidental basis to complete one or more life history phases
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor

Cottonwood Bay is designated a Special Habitat Area for the following:

(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat
(U) – Unique feature

Willamette Moorage Complex is designated a Special Habitat Area for the following:

(S) – An at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(B) – Bottomland hardwood forests
(W) – Wetland
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat
(U) – Unique feature

Combined Relative Riparian/Wildlife Habitat Ranking

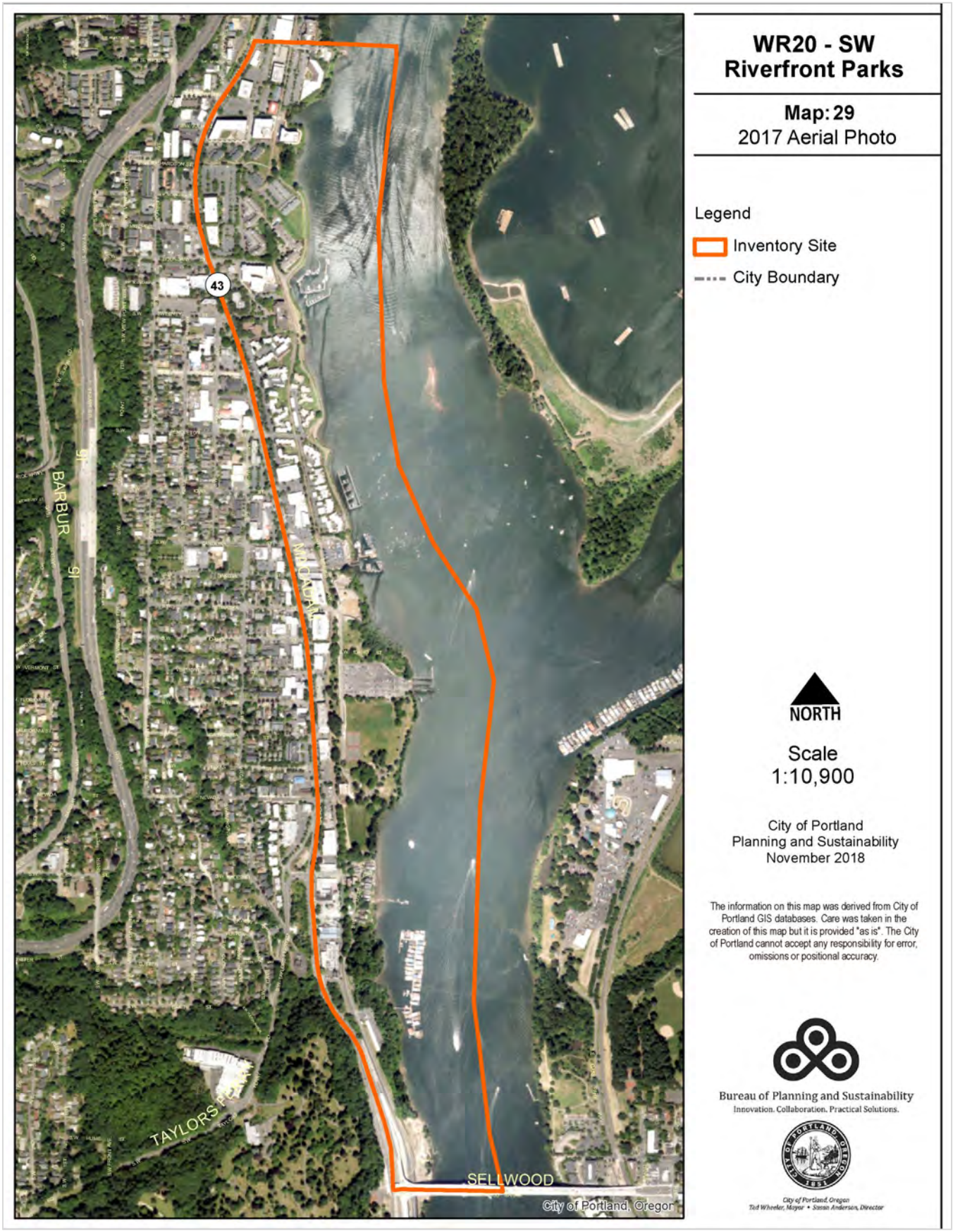
Where areas that are mapped as riparian corridors and wildlife habitat overlap, and their relative ranks differ, the combined relative rank will be the higher of the two ranks. For example, an area that ranks medium for riparian function and low for wildlife habitat will receive a medium combined relative rank.

Table 17: Summary of Ranked Resources in WR20 – SW Riverfront Parks				
Total Inventory Site = 269 acres				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	157	23	18	199
percent total inventory site area	58	9	7	74
Wildlife Habitat				
Wildlife Habitat*				
acres	0	13	0	13
percent total inventory site area	0	5	0	5
Special Habitat Areas**				
acres	152			
percent total inventory site area	57			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	152	5	0	157
percent total inventory site area	57	2	0	58
Combined Total***				
acres	161	22	17	199
percent total inventory site area	60	8	6	74

* High-ranked riparian resources, Special Habitat Areas, and wildlife habitat include the Willamette River.

** Special Habitat Areas rank high for wildlife habitat.

*** Because riparian resources, Special Habitat Areas, and wildlife habitat overlap, the results cannot be added together to determine the combined results.


WR20 - SW Riverfront Parks
Map: 29
2017 Aerial Photo
Legend
Inventory Site
City Boundary
43
BARBUR
MACADAM
TAYLORS FERRY
SELLWOOD
City of Portland, Oregon
NORTH
Scale
1:10,900
City of Portland
Planning and Sustainability
November 2018
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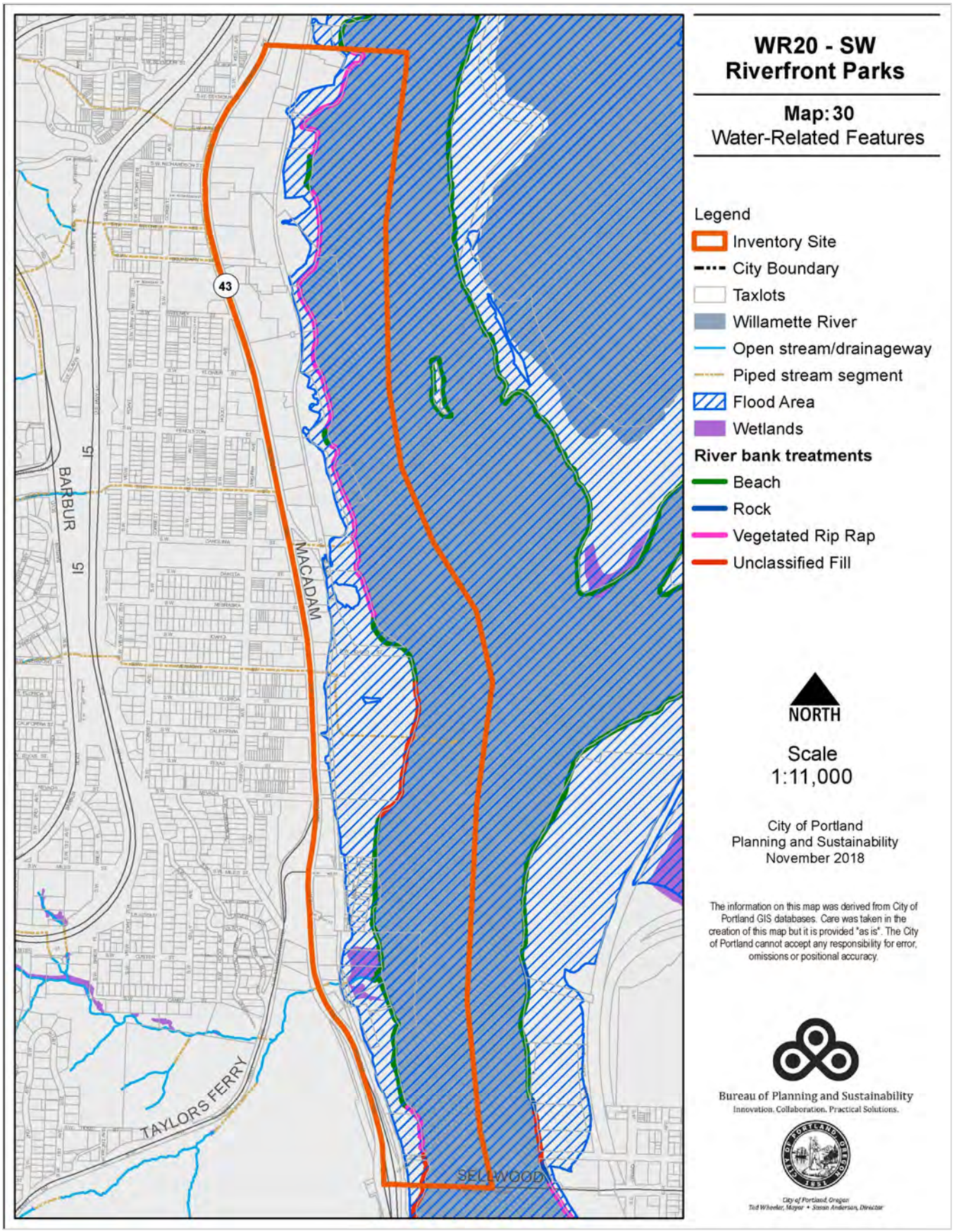
WR20 - SW Riverfront Parks
Map: 30
Water-Related Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Flood Area
Wetlands
River bank treatments
Beach
Rock
Vegetated Rip Rap
Unclassified Fill
43
BARBUR
15
MACADAM
TAYLORS FERRY
SELLWOOD
NORTH
Scale
1:11,000
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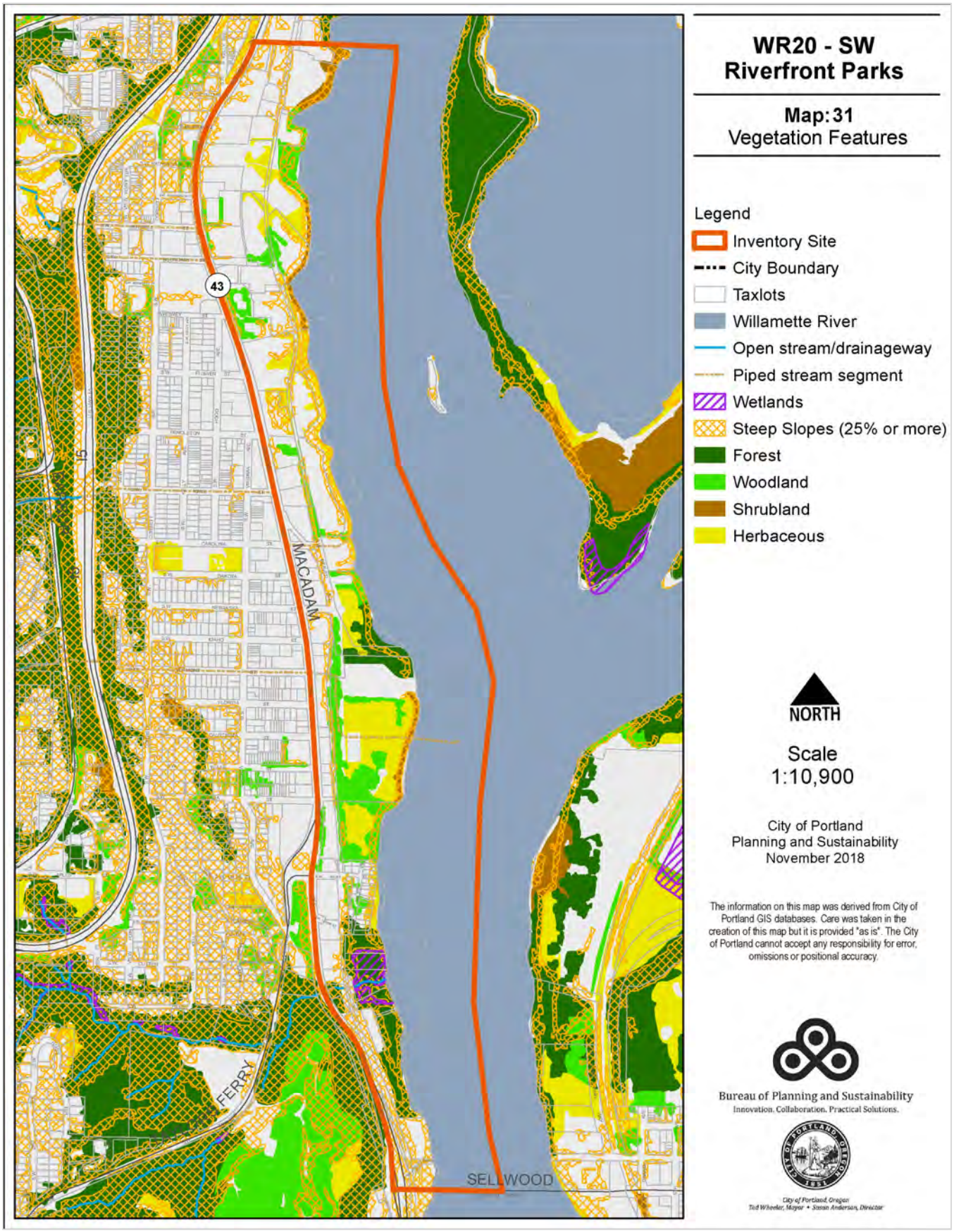
WR20 - SW Riverfront Parks
Map: 31
Vegetation Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Wetlands
Steep Slopes (25% or more)
Forest
Woodland
Shrubland
Herbaceous
43
MACADAM
FERRY
SELLWOOD
NORTH
Scale
1:10,900
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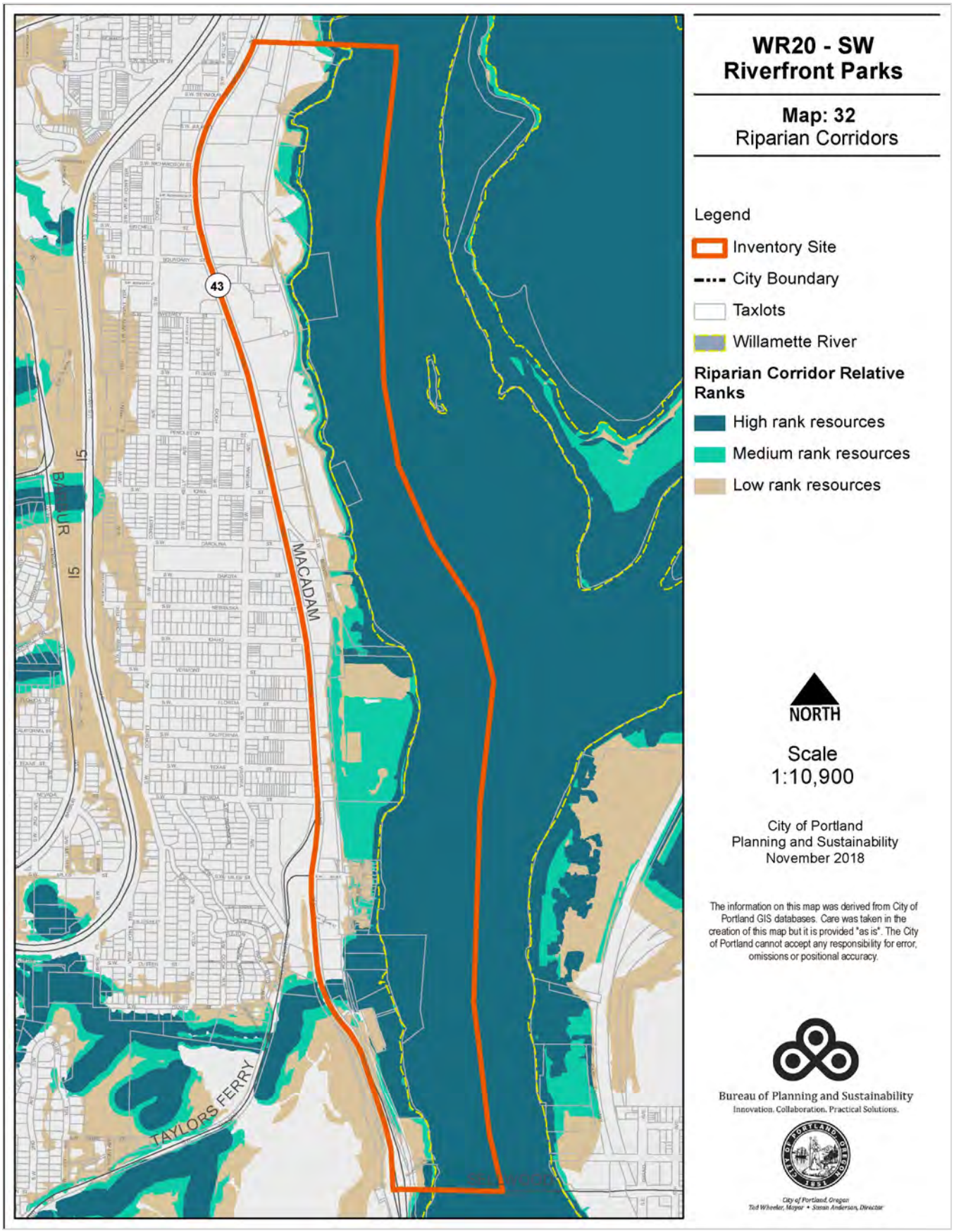
WR20 - SW Riverfront Parks
Map: 32
Riparian Corridors
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Riparian Corridor Relative Ranks
High rank resources
Medium rank resources
Low rank resources
43
MACADAM
TAYLORS FERRY
NORTH
Scale 1:10,900
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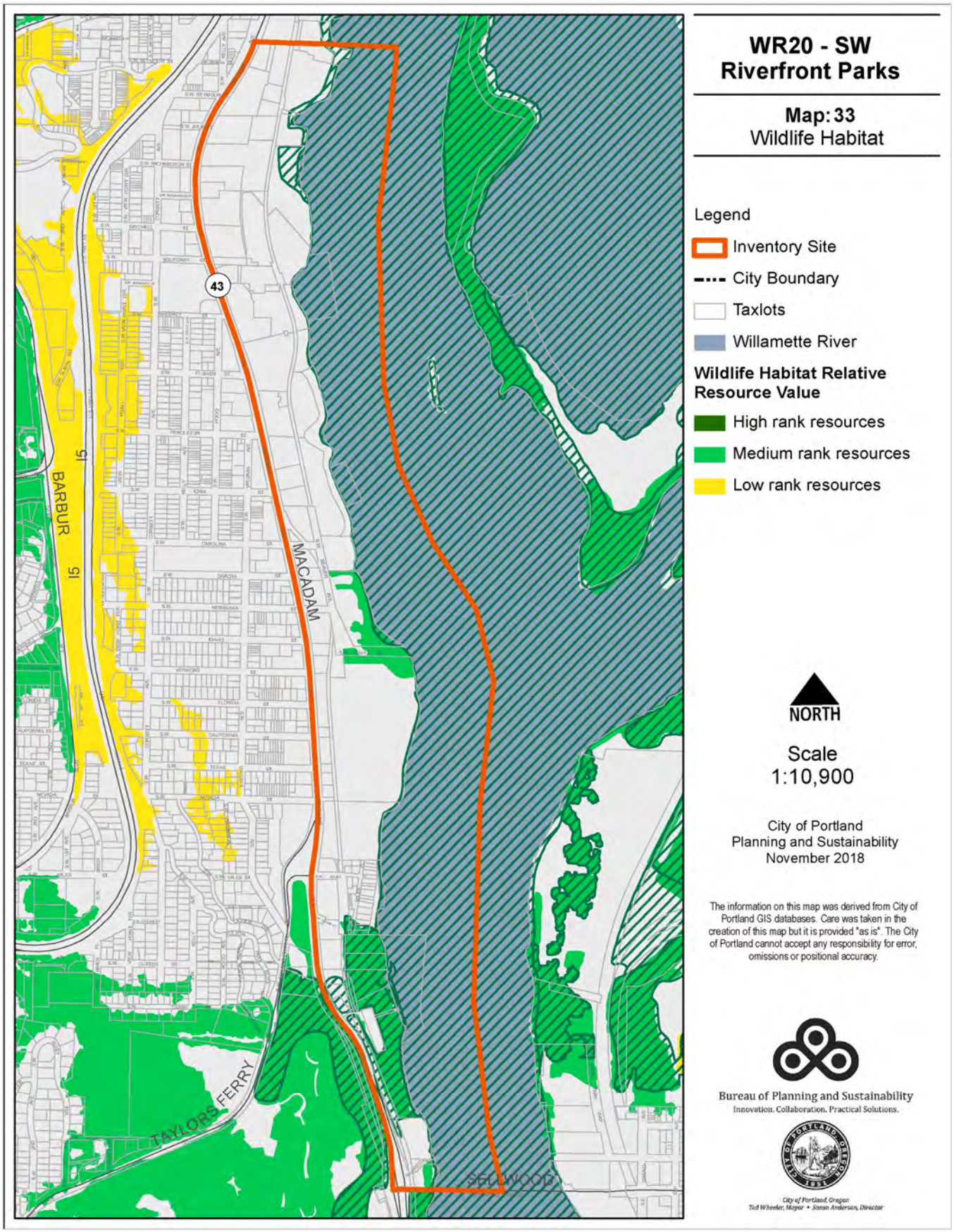
WR20 - SW Riverfront Parks
Map: 33
Wildlife Habitat
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Wildlife Habitat Relative Resource Value
High rank resources
Medium rank resources
Low rank resources
43
BARBUR
15
MACADAM
TAYLORS FERRY
SELLWOOD
NORTH
Scale
1:10,900
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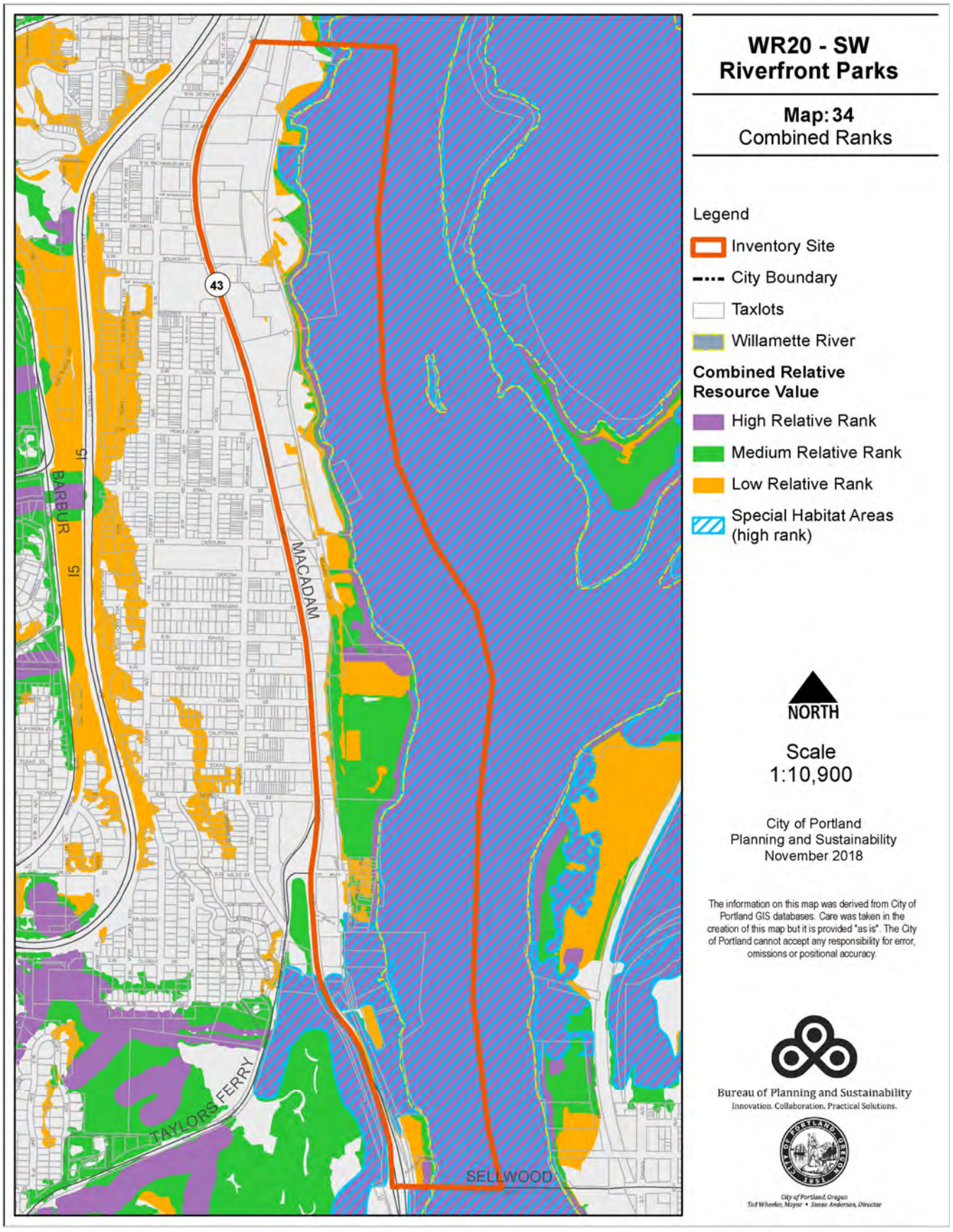
WR20 - SW Riverfront Parks
Map: 34
Combined Ranks
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Combined Relative Resource Value
High Relative Rank
Medium Relative Rank
Low Relative Rank
Special Habitat Areas (high rank)
43
5
BARBUR
5
MACADAM
TAYLORS FERRY
SELLWOOD
NORTH
Scale 1:10,900
City of Portland
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SECTION 3.D.iii: INVENTORY SITE WR21 ROWING CLUB

Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Sellwood-Moreland Improvement League
USGS Quadrangle and Quarter Section Maps:	1S1E22D, 1S1E23c, 1S1E26B, 1S1E27A
River Mile:	16.5 – 17.0
Site Size:	62 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Commercial/Mixed Use 1(CM1) Commercial/Mixed Use 2(CM2) High Density Residential (RH) Residential 5,000 (R5) Design Overlay Zone (d) Willamette Greenway River General Overlay (g) Willamette Greenway River Water Quality Overlay (q)
Existing Land Use:	Commercial, residential, railroad, highway
General Description:	This inventory site is largely developed. Uses include the Portland Rowing Club, condos, and mooring of personal watercrafts. The river banks are hardened with rip rap and have low structure vegetation with only a few scattered trees. There is only stand of Oregon white oaks located behind the Portland Rowing Club and condos located immediately south of the club.
Resource Features:	Open water, shallow water habitat, river bank, flood plain, riparian vegetation
Resource Functions:	Microclimate and shade; stream flow moderation and water storage; bank function and sediment, nutrient and pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and wildlife habitat and movement corridor
Special Habitat Area:	**Willamette River:** (S) – provides habitat for at-risk wildlife species; (C) – wildlife connectivity corridor; (M) – migratory stopover habitat **Rowing Club Oaks:** (O) – Oregon white oak;

Special Status Species:	**Fish**: Lower Columbia River (LCR) Chinook salmon, LCR coho salmon, LCR steelhead trout, LCR coastal cutthroat trout, Columbia River chum salmon, Upper Willamette River (UWR) Chinook salmon, UWR steelhead trout, Pacific lamprey, Western brook lamprey, white sturgeon. **Amphibians**: Northern red-legged frog **Mammals**: American beaver, hoary bat, Northern river otter.
Natural Hazards:	Flood area, landslide, earthquake and liquefaction
Contamination:	Yes

Site Description

This 62 acre site is located on the east side of the Willamette River, between the Sellwood Bridge and Portland city boundary. This inventory site is largely developed. Uses include the Portland Rowing Club, condos, and mooring of personal watercrafts. The river banks are hardened with rip rap and have low structure vegetation with only a few scattered trees. There is only stand of Oregon white oaks located behind the Portland Rowing Club and the condos located immediately south of the club.

The site contains 13 acres (21 percent) impervious surface coverage. Of the vegetated areas over ½ acre in size, there is are approximately 5 acres of forest and woodland vegetation, 2 acres of shrubland and 2 acres of herbaceous vegetation. There are 41 acres of flood area on this site, most of which is open water.

Table 18: Summary of Natural Resource Features in WR21 – Rowing Club

	Study Area (miles/acres)
River (miles/acres)	**0.5/35**
Stream/Drainageway (miles)	**0**
Wetlands (acres)	**0**
Flood Area (acres)*	
Vegetated (acres)	4
Non-vegetated (acres)	3
Open Water** (acres)	35
Vegetated Areas >= ½ acre (acres)⁺	
Forest (acres)	0
Woodland (acres)	5
Shrubland (acres)	2
Herbaceous (acres)	2
Impervious Surfaces (acres)	13

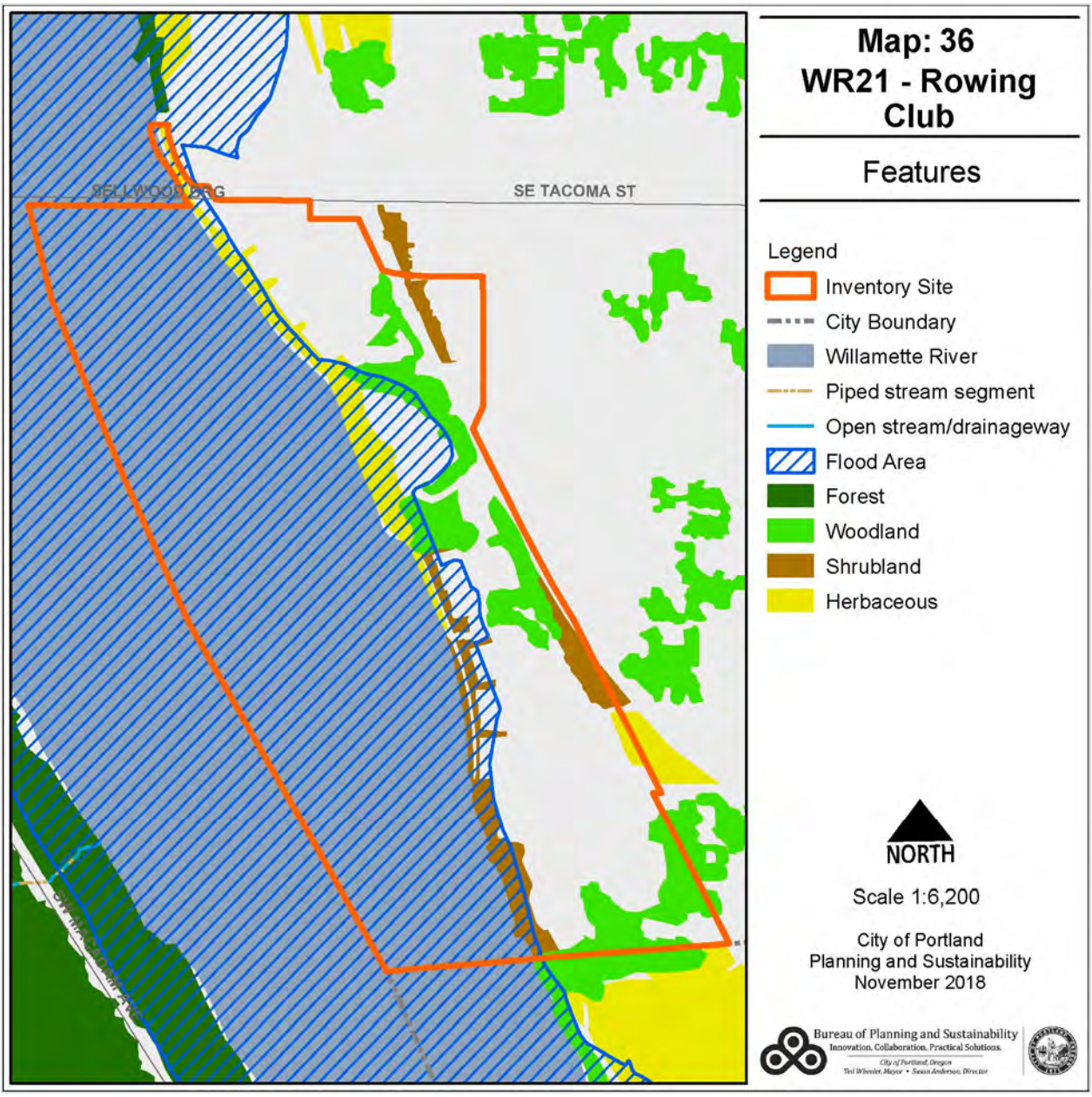
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.
** Open Water includes portions of the Willamette River.
⁺ The vegetation classifications are applied in accordance with the National Vegetation Classification System specifications developed by The Nature Conservancy. The data within the primary study area and within 300 feet of all open water bodies in Portland is draft and is currently being updated based on 2008 aerial photography.

Natural Resources Description

Historically, the Portland-area portion of the Willamette River watershed was comprised of an active channel, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Vegetation in bottomland and wetland forests consisted of black cottonwood, Oregon ash and willow with associated native understory. Denser, mixed-conifer forests of Douglas fir, bigleaf maple, western red cedar, western hemlock, grand fir and red alder dominated the west hills and some parts of the east terrace. Savannas of Oregon white oak, Pacific madrone, red alder and bigleaf maple were found in the foothills on the east side of the river.

Today, the land within the South Reach inventory area is comprised largely of parks and open spaces and residential development. Significant natural resource areas in this inventory site include:

- Willamette River (open water and river banks)
- Oaks and Mature Tree Canopy



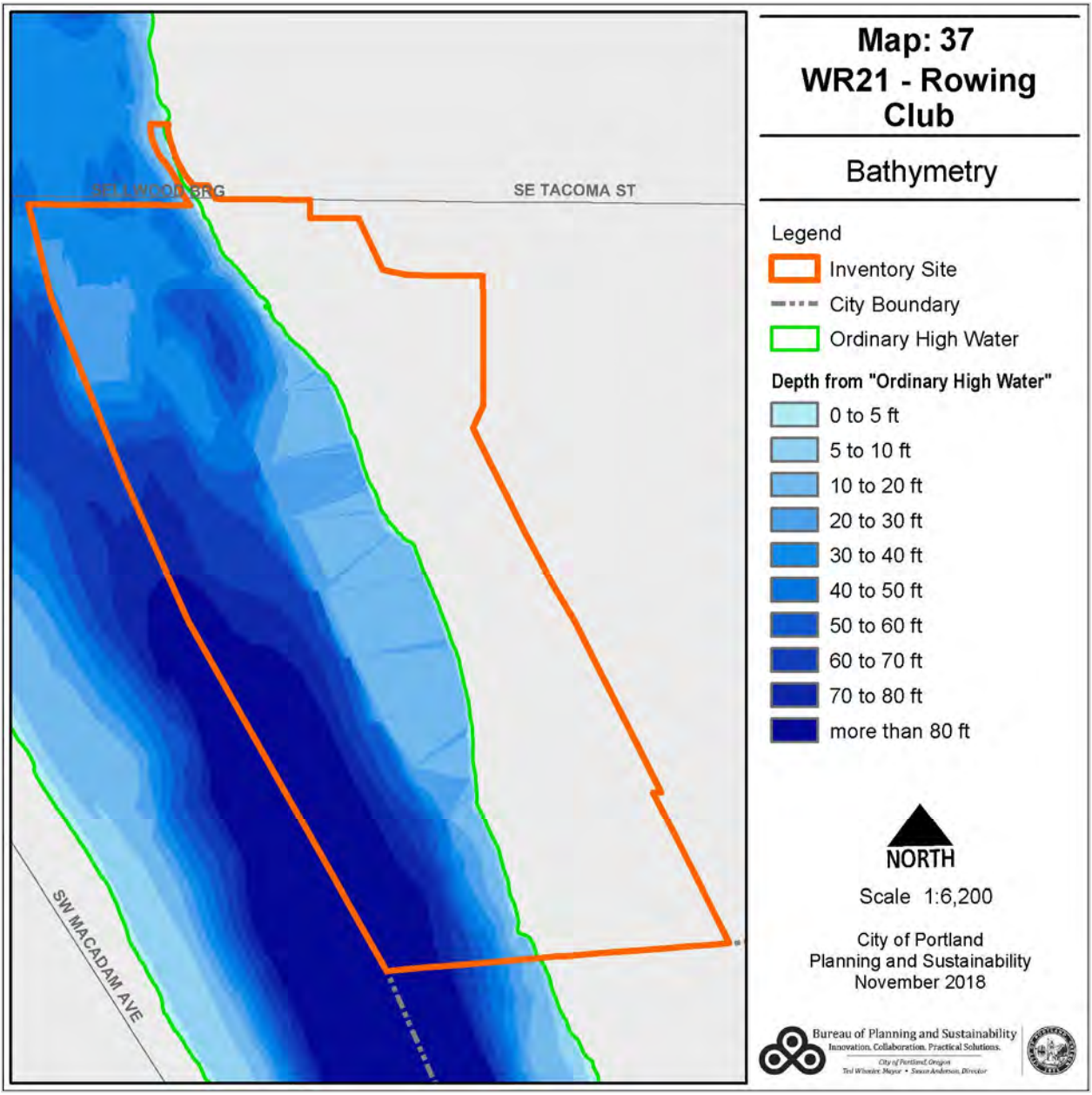
Willamette River

Below is a summary of Lower Willamette River natural resources documented in inventory site WR21. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The South Reach.

Inventory site WR21 includes 35 acres of the Lower Willamette River. The river is the primary habitat link providing connectivity between upstream and downstream aquatic habitats. This connection is critical for fish, resident and migrating birds, and other species.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho and chum salmon, as well as steelhead, and coastal cutthroat trout. These fish enter the Lower Willamette River system both as opportunistic migrants to exploit forage associated with the annual shad run and to spawn in reaches throughout the Willamette River watershed. Shallow water areas, which are found along shoreline margins in this inventory site, are especially important for juvenile fish because they provide opportunities to escape the swift current of the main channel to rest and feed (see Map 37). Seasonal migrants use habitat within the inventory site during multiple life stages, and are usually present during predictable seasonal peaks:

- Juvenile salmon and trout out-migration generally occurs between March and June.
- Spring Chinook out-migration peaks in April.
- Fall Chinook, steelhead and coho out-migration peaks between May and June.



Columbia eulachon pass through the lower Columbia and Willamette rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

White sturgeon generally move throughout the Columbia River estuary and Lower Willamette River throughout the year. As adults, sturgeon can migrate freely between fresh, brackish and saline water; juveniles and young-of-year cannot, so their rearing range is limited. Recent white sturgeon stock assessment data collected in the Willamette River between Willamette Falls and the Columbia River confluence describe a compromised population of white sturgeon represented by several young age classes.

The historic run of adult Pacific lamprey up and over Willamette Falls numbered in the hundreds of thousands. Today, that run is significantly smaller; however, tribal harvest of these fish for subsistence and ceremonial uses still brings many families to the Willamette Falls every year. Documentation of Pacific lamprey rearing and outmigration patterns in the Lower Willamette River is limited; however, juveniles are often observed in soft substrate samples collected throughout the lower river. The rearing life stage of Pacific lamprey is known to last between 4-7 years in freshwater habitat, before individuals migrate to the ocean for their maturation life stages.

Resident fish assemblages within this reach include native species such as largescale sucker, sculpin (prickly and reticulate), redside shiner and northern pikeminnow. Nuisance species include large and smallmouth bass, Asian carp and several varieties of perch.

The Willamette River within this inventory site plays an important part of the Pacific Flyway migratory route for over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, Peregrine falcon and bald eagle. Species use the open water habitat for foraging and as a migratory corridor. Avian species also use natural and man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl.

The Willamette River in the inventory site does not meet state water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 19). TMDLs for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. The Oregon Water Quality Index values observed between 2001 to 2015 fairing Portland have seen modest improvement and the trend is steady.

Table 19: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries			
Pollutant	**Season**	**Year River was Listed for this Pollutant**	**Risk Factors**
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH, Total Chlordane, Cyanide, Hexachlorobenzene)	Year-round	1998, 2002, 2012	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Heavy Metals (iron, manganese, mercury)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Nutrients (Chlorophyll a)	Summer	2012	Fish and other aquatic life due excessive algal growth and a decrease in dissolved oxygen (DO)
Bacteria (Fecal Coliform)	Fall/Winter/Spring	1998	Water contact recreation
Temperature	Summer	1998	Salmonid fish rearing, anadromous fish passage
Biological Criteria	N/A	1998	Resident fish and aquatic life

(ODEQ, 2015)

Due to the presence of mercury, PCBs, dioxins and legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem river recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming resident and/or fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead, as they are migratory species and do not spend significant time residing in contaminated habitats. The Lower Willamette River in Portland was previously deemed unsafe for swimming during and immediately after rainstorm events due to sewer overflows. However, in 2011, the City completed a large infrastructure project to address combined sewer overflows into the river. The result is that combined sewer overflows should be very infrequent, if not eliminated, during the summer recreating season.

In the inventory site, the flood area is generally confined to the Willamette River itself; however, there are some locations where the flood area extends over the bank.

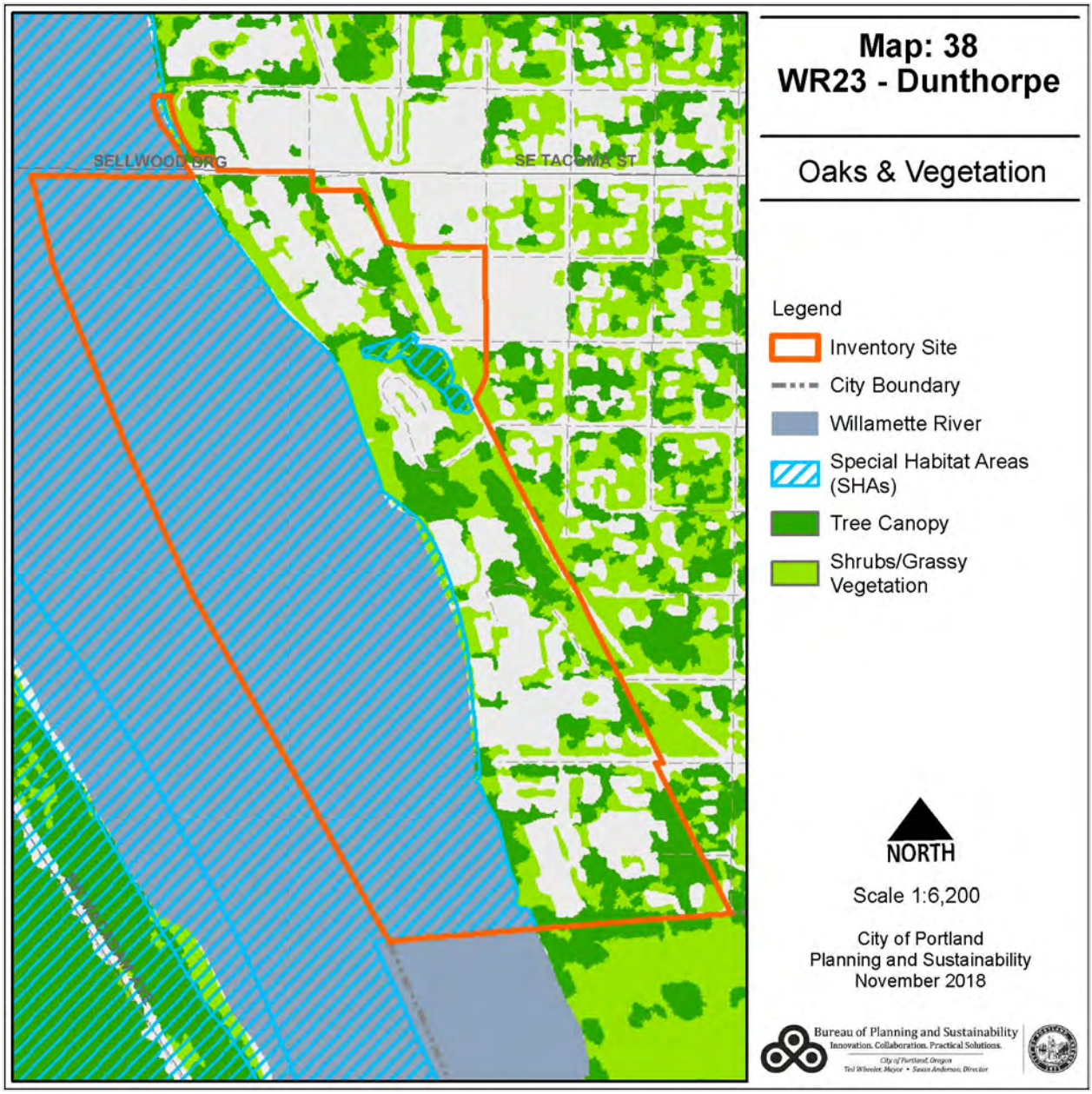
The Willamette River and shallow water habitat are designated Special Habitat Areas because they meet the following criteria:

(S) – An at-risk species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(C) – Wildlife connectivity corridor
(M) – Migratory stopover habitat

<u>Oaks and Mature Tree Canopy</u>

For purposes of the Natural Resources Inventory mapping and modeling, vegetation patches at least ½ acre in size are captured. The model ranks forest/wetland patches at least two acres in size for wildlife habitat; there are no forest/wetland patches in this inventory site. However, there are stands of mature tree canopy that provide functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat (see Map 38).

Located along the rail line behind the Portland Rowing Club and condos located south of the club is a stand of Oregon white oak, which is characteristic of the foothill savanna/oak woodland community type. Other trees species include firs and maples. Although small, the oak stand is one of the only sources of local cover for bird and small mammal species that use this inventory site. Acorns and oak galls, as well as insects found on trees, are a good food source, while tree cavities in the oak provide nesting habitat for birds such as swallows, wrens, and great horned owls.



Natural Resource Evaluation

The natural resources located within this site have been evaluated for relative riparian and wildlife habitat quality. Relative quality is presented in the form of relative functional value ranks for riparian corridors, wildlife habitat, and riparian/wildlife habitat value combined (Table 20). The relative ranks are produced using GIS models and information on Special Habitat Areas.

The approach used to generate the relative ranks is summarized in the introduction to the inventory sites. Additional detail is provided in Chapter 2: Methodology Overview of this report and Appendix C: *Natural Resources Inventory: Riparian Corridors and Wildlife Habitat Project Report*.

All of the ranked resource areas provide at least some important riparian and habitat value, recognizing that current condition and function levels may vary considerably. The relative ranks can inform planning projects and programs, including regulations, design of development or redevelopment projects, and mitigation and restoration activities.

Riparian Areas

The site contains the Willamette River and river bank, flood area, wetlands and riparian vegetation. These features contribute to the riparian functions as detailed in the natural resource descriptions, specifically:

- Microclimate and shade
- Stream flow moderation and water storage
- Bank functions, and sediment, pollution and nutrient control
- Large wood and channel dynamics
- Organic inputs, food web and nutrient cycling
- Riparian wildlife movement corridor

High relative functional ranks are assigned to the Willamette River itself, wetlands and forest vegetation in the floodplain or in proximity to the water bodies. Medium relative functional ranks are assigned to less dense and lower structure vegetation in the floodplain and up to 300 feet from water bodies. Low relative ranks are generally assigned to non-vegetated flood areas.

Wildlife Habitat

Within the context of this inventory model, a wildlife habitat patch is defined as forest and/or wetland areas 2 acres in size or greater, including adjacent woodland vegetation (note: Special Habitat Areas may be smaller and may contain different types of vegetation or other resource features). The model assigns relative ranks to qualifying habitat patches based on their size, interior area, proximity to other patches, and proximity to water.

Site WR21 contains no forests and/or wetland areas 2 acres or larger in size.

Special Habitat Areas (SHA) consist of rare and declining habitat types and unique features that provide critical habitat for at-risk plant and animal species as described in the Natural Resources Description section above. SHAs receive a high relative rank for wildlife habitat. The SHA ranking supersedes lower rankings generated by the GIS model. Therefore, all SHAs within the site rank high for wildlife habitat, and include:

(S) – An at-risk species uses the habitat area or feature on more than an incidental basis to complete one or more life history phases
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor

Combined Relative Riparian/Wildlife Habitat Ranking

Where areas that are mapped as riparian corridors and wildlife habitat overlap, and their relative ranks differ, the combined relative rank will be the higher of the two ranks. For example, an area that ranks medium for riparian function and low for wildlife habitat will receive a medium combined relative rank.

Table 20: Summary of Ranked Resources in WR21 – Rowing Club

Total Inventory Site = 62 acres

	High	Medium	Low	Total
Riparian Resources*				
acres	38	2	4	44
percent total inventory site area	61	3	6	71
Wildlife Habitat				
Wildlife Habitat*				
acres	0	0	0	0
percent total inventory site area	0	0	0	0
Special Habitat Areas**				
acres	36			
percent total inventory site area	58			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	36	0	0	36
percent total inventory site area	58	0	0	58
Combined Total***				
acres	38	2	4	44
percent total inventory site area	61	3	6	71

* High-ranked riparian resources, Special Habitat Areas, and wildlife habitat include the Willamette River.

** Special Habitat Areas rank high for wildlife habitat.

*** Because riparian resources, Special Habitat Areas, and wildlife habitat overlap, the results cannot be added together to determine the combined results.


WR21 - Rowing Club
Map: 39
2017 Aerial Photo
Legend
Inventory Site
City Boundary
SELLWOOD BRIDGE
TACOMA
SHERRET
MACADAM
MACADAM
NORTH
Scale
1:4,500
0
City of Portland
Planning and Sustainability
November 2018
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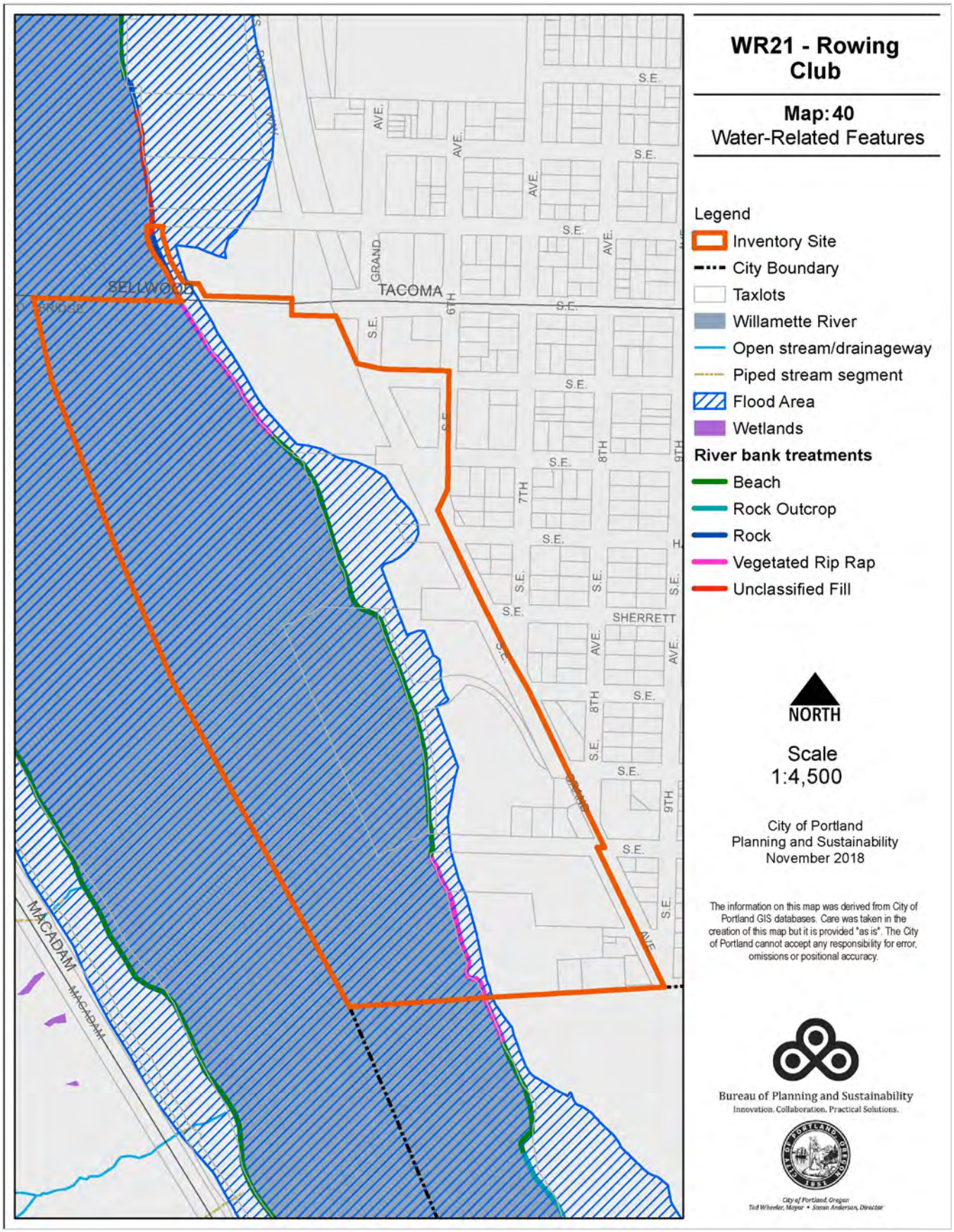
WR21 - Rowing Club
Map: 40
Water-Related Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Flood Area
Wetlands
River bank treatments
Beach
Rock Outcrop
Rock
Vegetated Rip Rap
Unclassified Fill
NORTH
Scale
1:4,500
City of Portland
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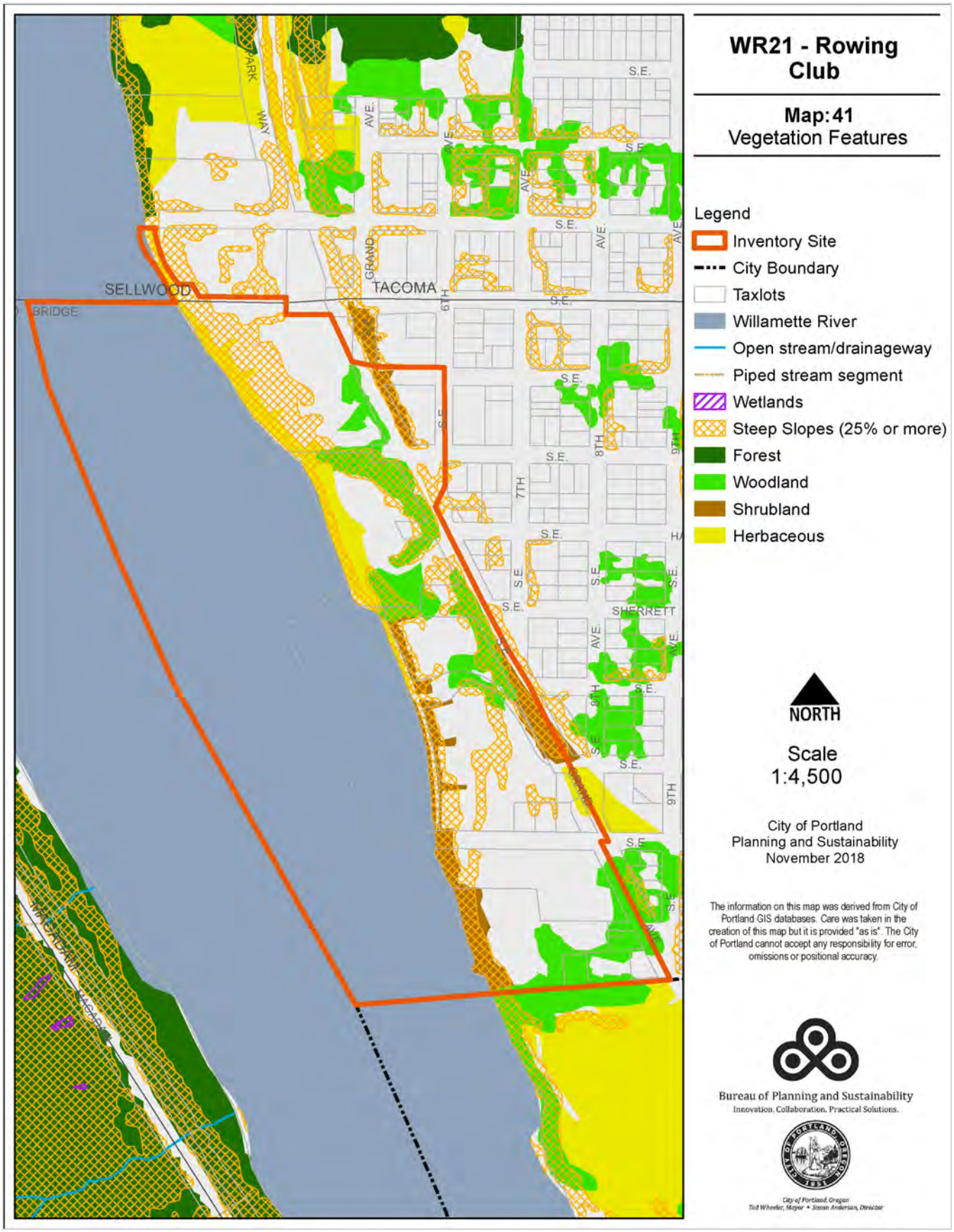
SELLWOOD
BRIDGE
TACOMA
SHERRETT
MACADAM
GRAND
AVE.
S.E.
6TH
7TH
8TH
9TH


WR21 - Rowing Club
Map: 41
Vegetation Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Wetlands
Steep Slopes (25% or more)
Forest
Woodland
Shrubland
Herbaceous
SELLWOOD BRIDGE
TACOMA
SHERRETT
S.E.
NORTH
Scale
1:4,500
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Planning and Sustainability
November 2018
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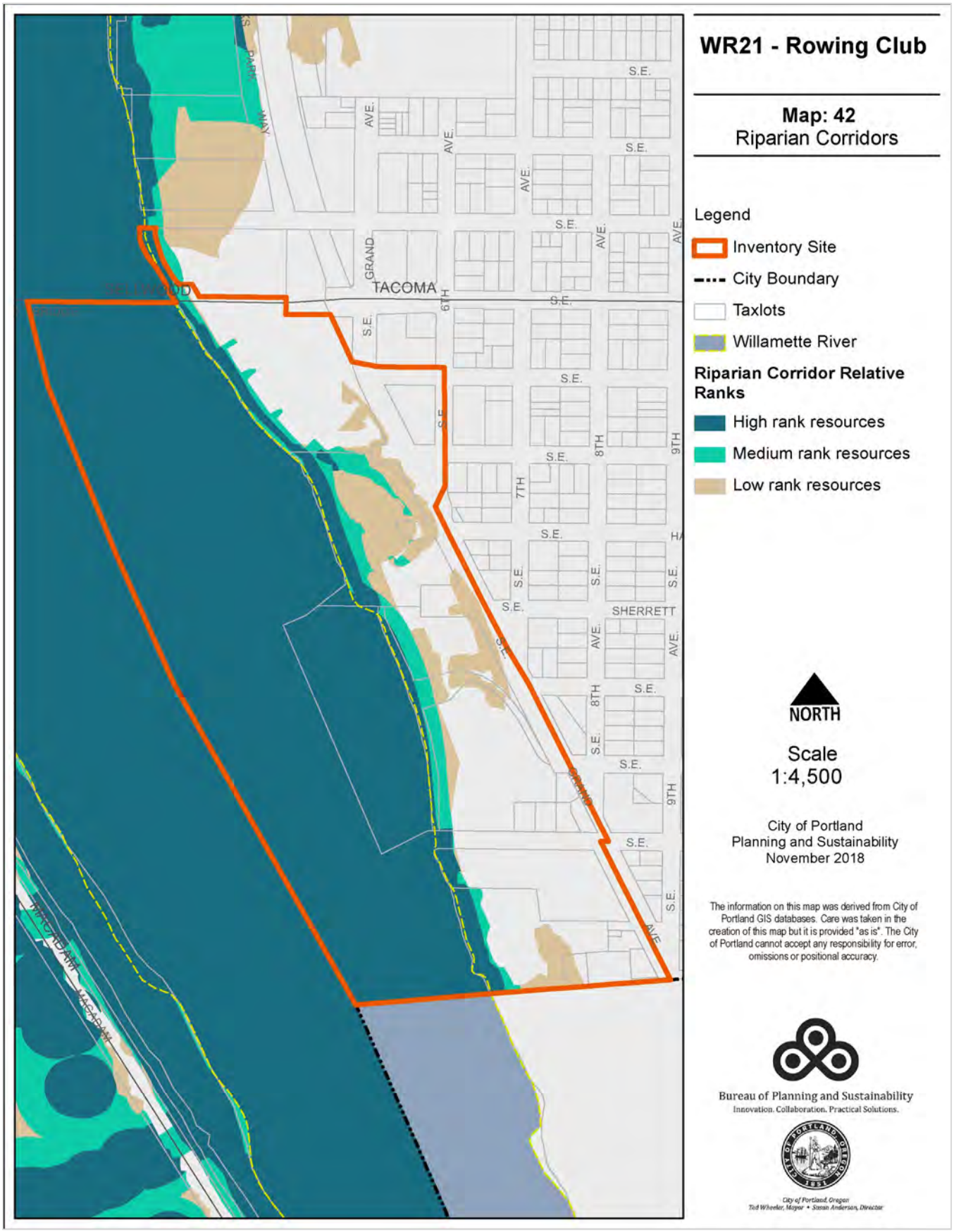
WR21 - Rowing Club
Map: 42
Riparian Corridors
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Riparian Corridor Relative Ranks
High rank resources
Medium rank resources
Low rank resources
TACOMA
SHERRETT
GRAND
6TH
7TH
8TH
9TH
S.E.
AVE.
NORTH
Scale
1:4,500
City of Portland
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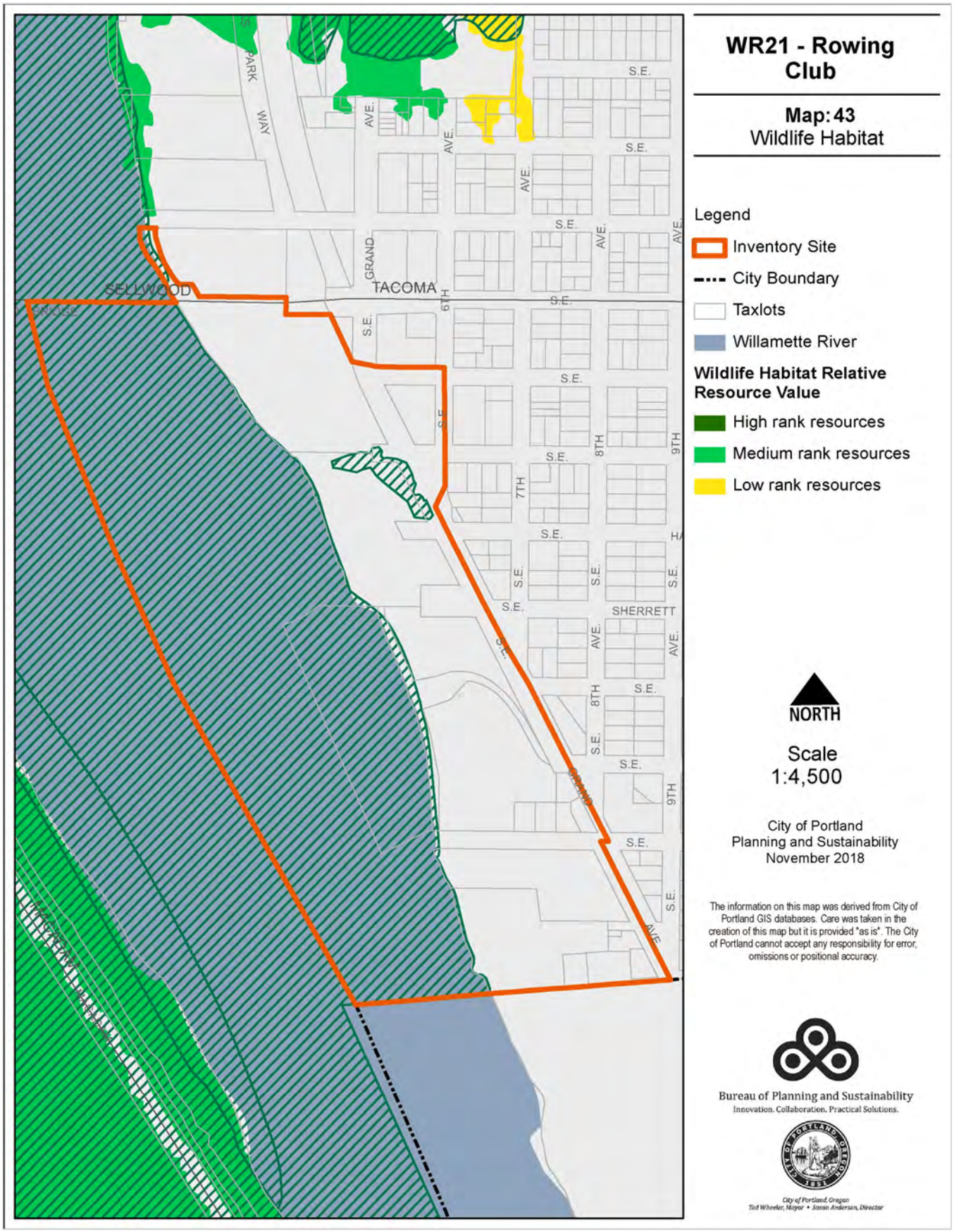
WR21 - Rowing Club
Map: 43
Wildlife Habitat
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Wildlife Habitat Relative Resource Value
High rank resources
Medium rank resources
Low rank resources
TACOMA
SELLWOOD
SHERRETT
S.E.
AVE.
8TH
9TH
7TH
6TH
GRAND
PARK
WAY
NORTH
Scale
1:4,500
City of Portland
Planning and Sustainability
November 2018
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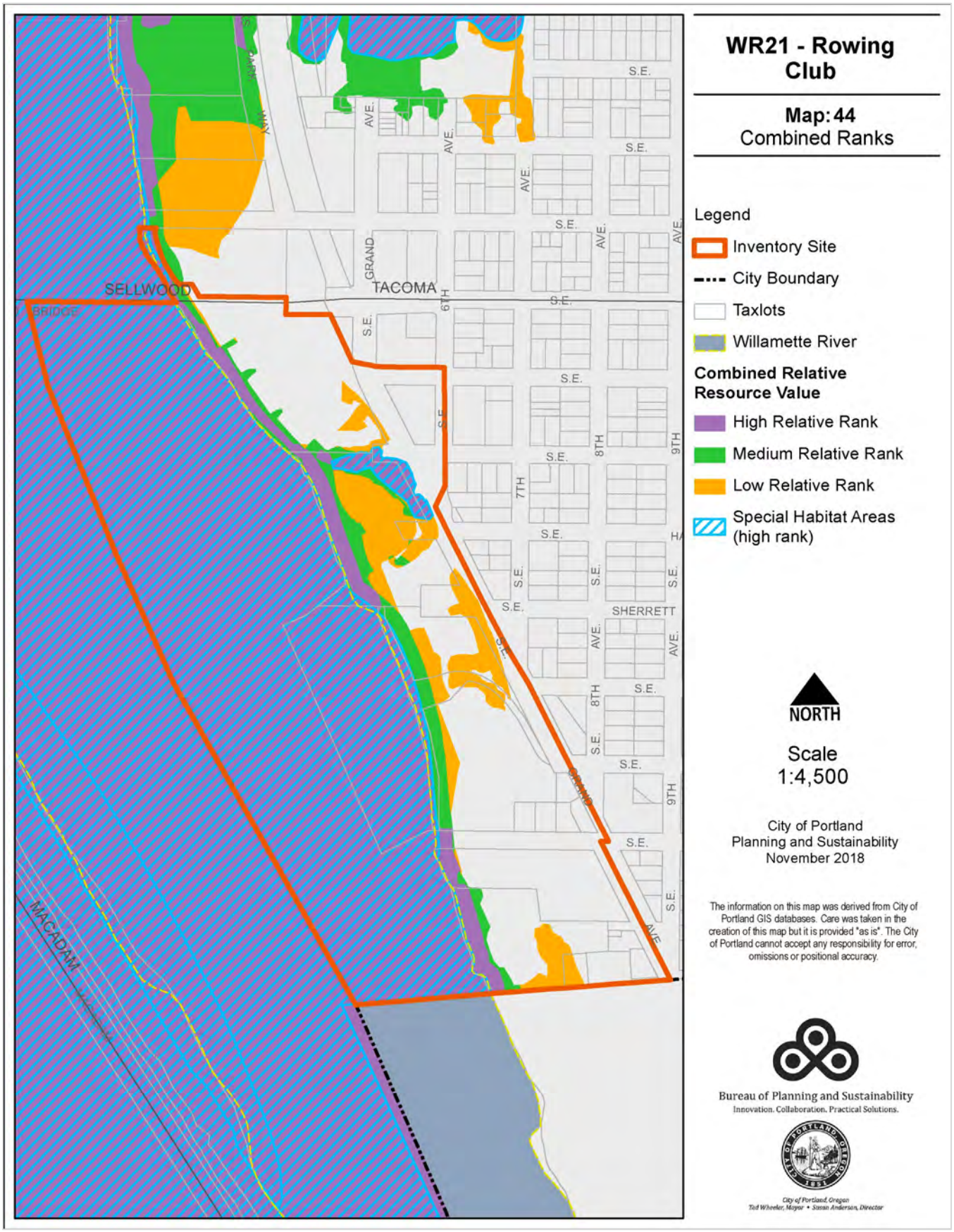
WR21 - Rowing Club
Map: 44
Combined Ranks
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Combined Relative Resource Value
High Relative Rank
Medium Relative Rank
Low Relative Rank
Special Habitat Areas (high rank)
SELLWOOD BRIDGE
TACOMA
SHERRETT
GRAND
MACADAM
S.E.
AVE.
6TH
7TH
8TH
9TH
NORTH
Scale 1:4,500
City of Portland
Planning and Sustainability
November 2018
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SECTION 3.D.iv: INVENTORY SITE WR22 POWERS MARINE

Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	Multnomah County Unclaimed #11
USGS Quadrangle and Quarter Section Maps:	1S1E22D, 1S1E26B, 1s1E26C, 1S1E27A, 1S1E27D
River Mile:	16.7 – 17.3
Site Size:	82 acres (land and water)
Previous Inventory:	Southwest Hills Resource Protection Plan, 1992; Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Residential 10,000 (R10) Residential 20,000 (R20) Open Space (OS) Willamette Greenway River General Overlay (g) Willamette Greenway River Recreational Overlay (r) Willamette Greenway River Water Quality Overlay (q)
Existing Land Use:	Parks and open space, Lewis and Clark College, railroad, highway
General Description:	This inventory site is primarily Powers Marine park and the Willamette River. It contains a significant bottomland hardwood forest, rock outcrops, mud flats and shallow water habitat. Seven unnamed streams cross the site.
Resource Features:	Open water, shallow water habitat, river bank, flood plain, wetland, riparian vegetation
Resource Functions:	Microclimate and shade; stream flow moderation and water storage; bank function and sediment, nutrient and pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and wildlife habitat and movement corridor
Special Habitat Area:	**Willamette River:** (S) – provides habitat for at-risk wildlife species; (C) – wildlife connectivity corridor; (M) – migratory stopover habitat **Powers Marine Park:** (B) – bottomland hardwood forest; (M) – mudflat; (C) wildlife connectivity corridor; (M) – migratory stopover habitat
Special Status Species:	**Fish**: Lower Columbia River (LCR) Chinook salmon, LCR coho salmon, LCR steelhead trout, LCR coastal cutthroat trout, Columbia River chum salmon, Upper Willamette River (UWR) Chinook salmon, UWR steelhead trout, Pacific lamprey, Western brook lamprey, white sturgeon. **Amphibians**: Red-legged frog **Mammals**: American beaver, hoary bat, Northern river otter.
Natural Hazards:	Flood area, wildfire, landslide, earthquake, liquefaction
Contamination:	No

Site Description

This 82 acre site is located on the west side of the Willamette River, south of the Sellwood Bridge with Macadam Avenue (Highway 43) to the west. Almost the entire inventory site is occupied by Powers Marine Park. It contains a significant bottomland hardwood forest, rock outcrops, mudflats and shallow water habitat. Powers Marine is adjacent to River View Cemetery, which contains a complex of forest, wetlands and stream habitats. Wildlife move between River View Cemetery, Powers Marine and the Willamette River.

The site contains 4 acres (5 percent) impervious surface coverage. Of the vegetated areas over ½ acre in size, there is are approximately 18 acres of forest and woodland vegetation, 0 acres of shrubland and 0 acres of herbaceous vegetation (see Table 21). There are 71 acres of flood area on this site, 13 acres of which are vegetated and 57 acres are open water.

Table 21: Summary of Natural Resource Features in WR22 – Powers Marine

	Study Area (miles/acres)
River (miles/acres)	**1/57**
Stream/Drainageway (miles)	**<1**
Wetlands (acres)	**0**
Flood Area (acres)*	
Vegetated (acres)	13
Non-vegetated (acres)	2
Open Water** (acres)	57
Vegetated Areas >= ½ acre (acres)⁺	
Forest (acres)	18
Woodland (acres)	<1
Shrubland (acres)	0
Herbaceous (acres)	0
Impervious Surfaces (acres)	4

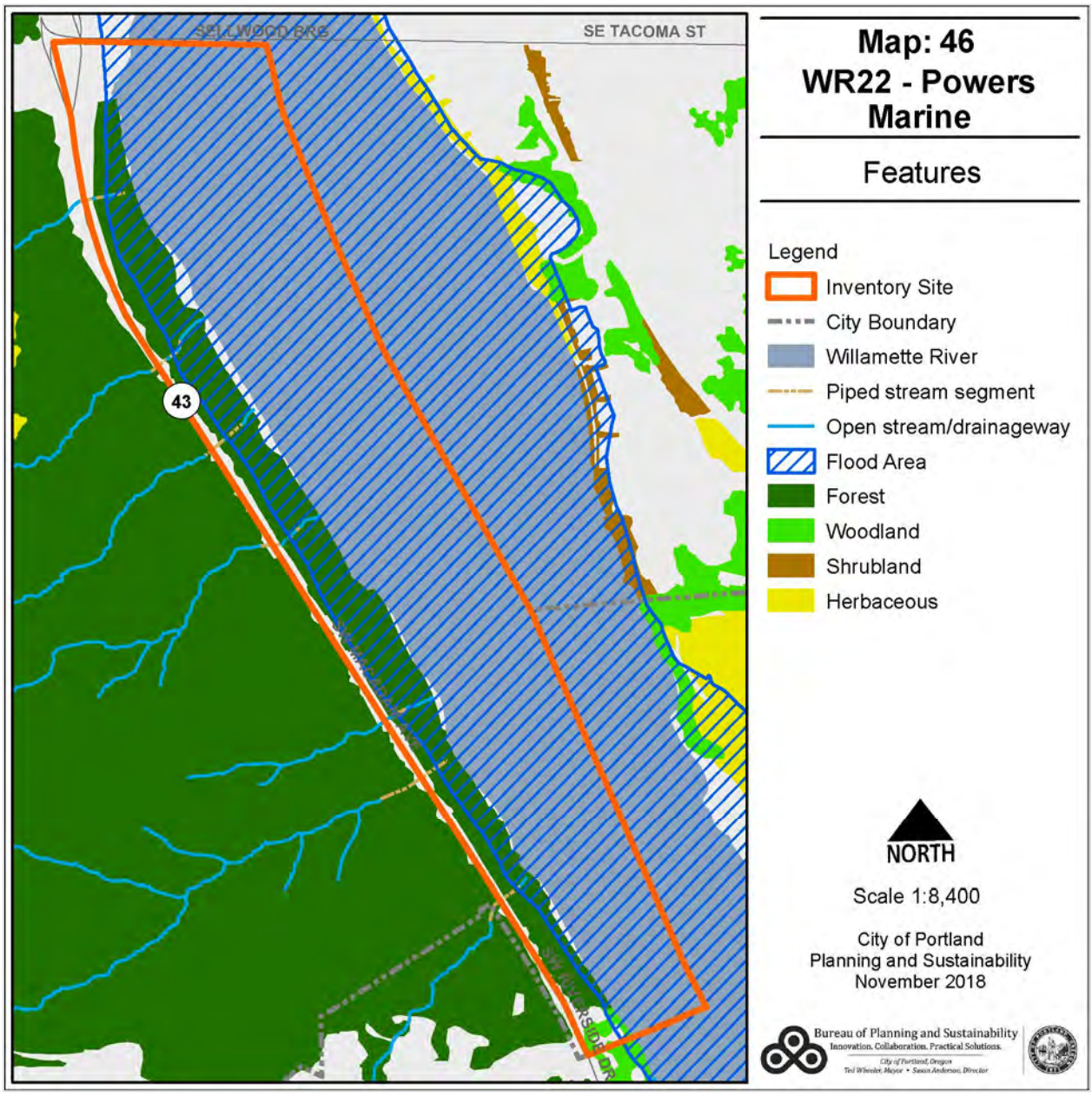
* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.
** Open Water includes portions of the Willamette River.
⁺ The vegetation classifications are applied in accordance with the National Vegetation Classification System specifications developed by The Nature Conservancy. The data within the primary study area and within 300 feet of all open water bodies in Portland is draft and is currently being updated based on 2008 aerial photography.

Natural Resources Description

Historically, the Portland-area portion of the Willamette River watershed was comprised of an active channel, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Vegetation in bottomland and wetland forests consisted of black cottonwood, Oregon ash and Pacific willow with associated native understory. Denser, mixed-conifer forests of Douglas fir, bigleaf maple, western red cedar, western hemlock, grand fir and red alder dominated the west hills and some parts of the east terrace. Savannas of Oregon white oak, Pacific madrone, red alder and bigleaf maple were found in the foothills on the east side of the river.

Today, the land within the South Reach inventory area is comprised largely of parks and open spaces and residential development. Significant natural resource areas in this inventory site include:

- Willamette River (open water and river banks)
- Powers Marine Park



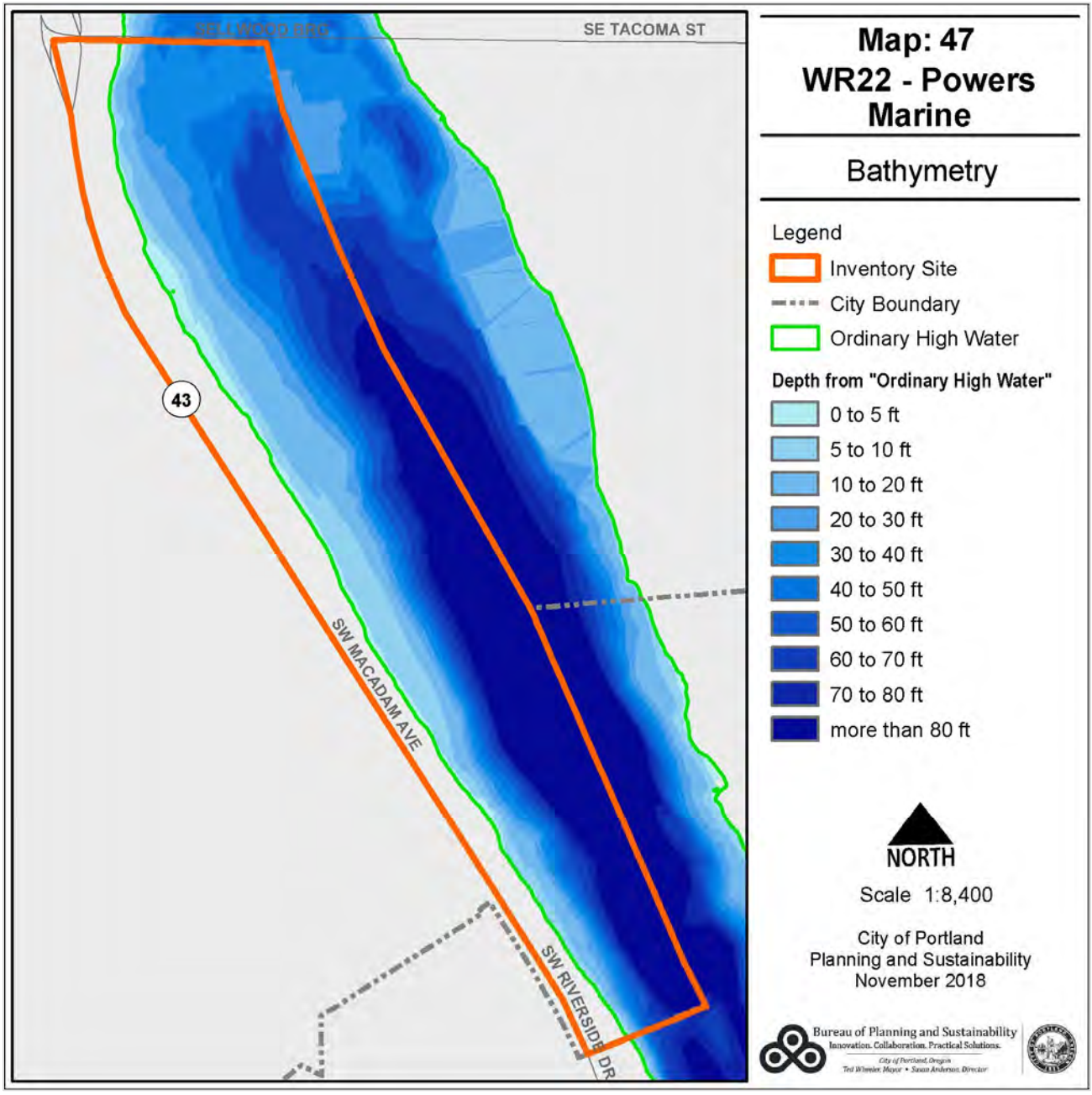
Willamette River

Below is a summary of Lower Willamette River natural resources documented in inventory site WR22. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The South Reach.

Inventory site WR22 includes 57 acres of the Lower Willamette River. The river is the primary habitat link providing connectivity between upstream and downstream aquatic habitats. This connection is critical for fish, resident and migrating birds, and other species.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho and chum salmon, as well as steelhead, and coastal cutthroat trout. These fish enter the Lower Willamette River system both as opportunistic migrants to exploit forage associated with the annual shad run and to spawn in reaches throughout the Willamette River watershed. Shallow water areas, which are found along shoreline margins in this inventory site, are especially important for juvenile fish because they provide opportunities to escape the swift current of the main channel to rest and feed (see Map 47). Seasonal migrants use habitat within the inventory site during multiple life stages and are usually present during predictable seasonal peaks:

- Juvenile salmon and trout out-migration generally occurs between March and June.
- Spring Chinook out-migration peaks in April.
- Fall Chinook, steelhead and coho out-migration peaks between May and June.



Columbia eulachon pass through the lower Columbia and Willamette rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

White sturgeon generally move throughout the Columbia River estuary and Lower Willamette River throughout the year. As adults, sturgeon can migrate freely between fresh, brackish and saline water; juveniles and young-of-year cannot, so their rearing range is limited. Recent white sturgeon stock assessment data collected in the Willamette River between Willamette Falls and the Columbia River confluence describe a compromised population of white sturgeon represented by several young age classes.

The historic run of adult Pacific lamprey up and over Willamette Falls numbered in the hundreds of thousands. Today, that run is significantly smaller; however, tribal harvest of these fish for subsistence and ceremonial uses still brings many families to the Willamette Falls every year. Documentation of Pacific lamprey rearing and outmigration patterns in the Lower Willamette River is limited; however, juveniles are often observed in soft substrate samples collected throughout the lower river. The rearing life stage of Pacific lamprey is known to last between 4-7 years in freshwater habitat, before individuals migrate to the ocean for their maturation life stages.

Resident fish assemblages within this reach include native species such as largescale sucker, sculpin (prickly and reticulate), redside shiner and northern pikeminnow. Nuisance species include large and smallmouth bass, Asian carp and several varieties of perch.

The Willamette River within this inventory site plays an important part of the Pacific Flyway migratory route for over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, Peregrine falcon and bald eagle. Species use the open water habitat for foraging and as a migratory corridor. Avian species also use natural and man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl.

The Willamette River in the inventory site does not meet state water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 22). TMDLs for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. The Oregon Water Quality Index values observed between 2001 to 2015 fairing Portland have seen modest improvement and the trend is steady.

Table 22: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries			
Pollutant	**Season**	**Year River was Listed for this Pollutant**	**Risk Factors**
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH, Total Chlordane, Cyanide, Hexachlorobenzene)	Year-round	1998, 2002, 2012	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Heavy Metals (iron, manganese, mercury)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Nutrients (Chlorophyll a)	Summer	2012	Fish and other aquatic life due excessive algal growth and a decrease in dissolved oxygen (DO)
Bacteria (Fecal Coliform)	Fall/Winter/Spring	1998	Water contact recreation
Temperature	Summer	1998	Salmonid fish rearing, anadromous fish passage
Biological Criteria	N/A	1998	Resident fish and aquatic life

(ODEQ, 2015)

Due to the presence of mercury, PCBs, dioxins and legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem river recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming resident and/or fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead, as they are migratory species and do not spend significant time residing in contaminated habitats. The Lower Willamette River in Portland was previously deemed unsafe for swimming during and immediately after rainstorm events due to sewer overflows. However, in 2011, the City completed a large infrastructure project to address combined sewer overflows into the river. The result is that combined sewer overflows should be very infrequent, if not eliminated, during the summer recreating season.

In the inventory site, the flood area is generally confined to the Willamette River itself.

The Willamette River and shallow water habitat are designated Special Habitat Areas because they meet the following criteria:

(S) – An *at-risk* species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(C) – Wildlife connectivity corridor
(M) – Migratory stopover habitat

Powers Marine Park

The inventory site is almost entirely within the boundaries of Powers Marine Park, located between the Willamette River and SW Macadam Avenue from the Sellwood Bridge to a Lewis and Clark property to the south. This area became a City of Portland public park in 1926 when it was donated by Ira Powers, owner of the Powers Furniture Company.

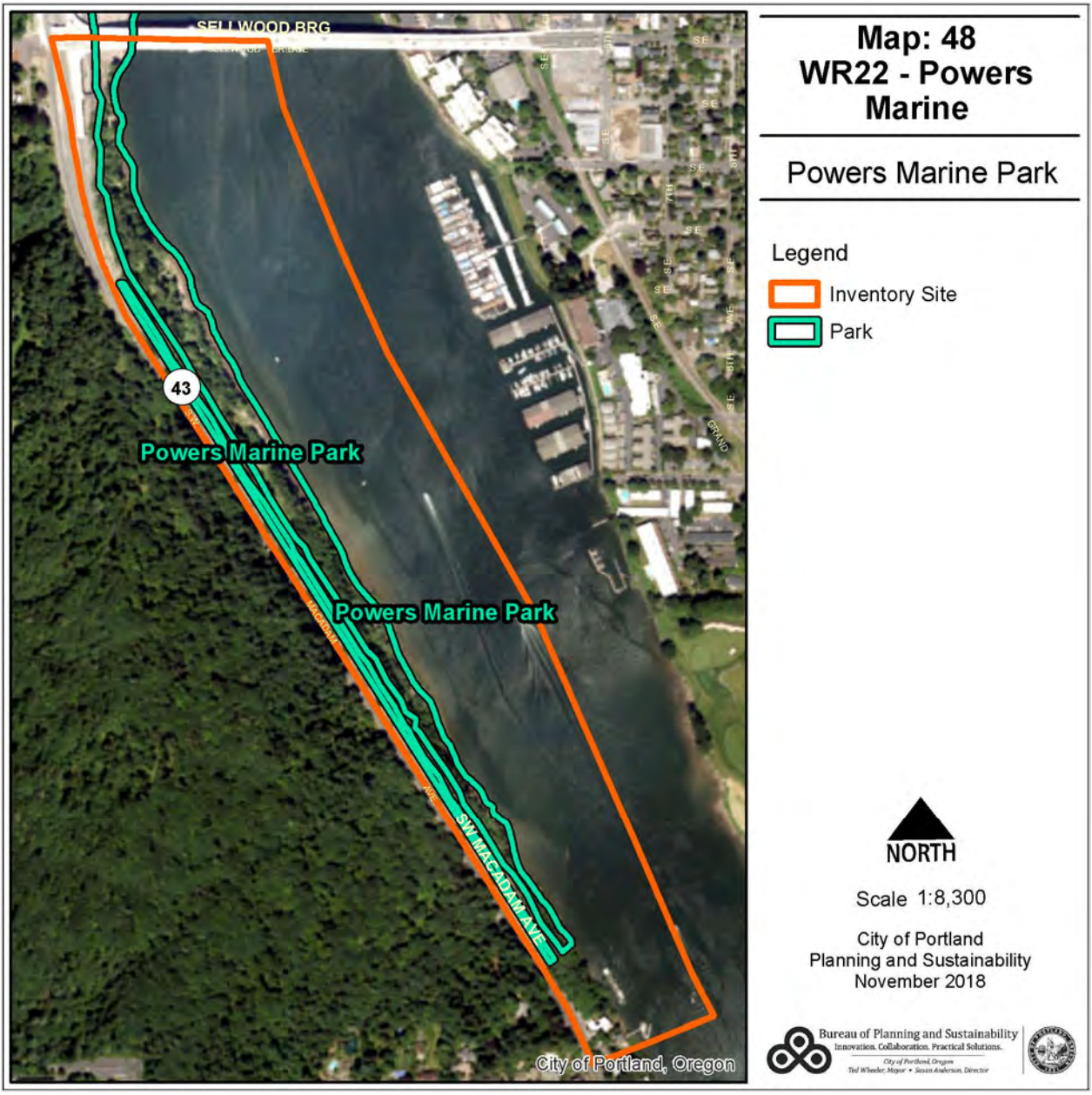
Historic photo of Powers Marine Park, 1935

The landscape here is narrow. It is dominated to the west by the forested Tualatin Mountain which rises to heights of 500 feet within one half mile of the river. In addition, several rock outcroppings and a natural beach are found along the river's shoreline. The geomorphology of this inventory site remains largely unchanged, due to strong river currents and a narrow rocky channel that have prevented substantial channel modifications.

A nearly continuous forest canopy extends to the water's edge, bisected by SW Macadam Avenue (Highway 43), the main transportation corridor between Lake Oswego and Portland. Seven unnamed streams provide a partial connection between the uplands at River View Natural Area and the Willamette River; several of which contribute cool perennial flows to the mainstem below. An additional linkage exists, at least for avian species, between the Tualatin Mountain, the Willamette River, and the Waverly Country Club, which is south of the city limits on the east bank of the river.

Vegetation in Powers Marine Park consists of areas of bottomland forest, conifer forest, and grassland habitats. The majority of the vegetation is in an early to mid-successional stage (40 to 70 years) with some older conifers and black cottonwoods that are remnants of more mature historic communities. The bottomland forest contains a narrow strip of the black cottonwood/Pacific willow association, with red alder, and bitter cherry support. Conifer forest species are found primarily near SW Macadam Avenue, but some Douglas fir and western red cedar are located throughout the floodplain area. Several large snags in the river's floodplain provide habitat diversity. The canopy closure in some areas of this forest is only 45 percent, allowing for open grassland and shrub communities in the lower strata. These two forest communities are generally separated by the railroad tracks that traverse the site, with the bottomland forest community located on the riverside of the tracks.

The shrub community is dominated by snowberry and includes some Indian plum and red elderberry. Cover in the shrub stratum is less than 10 percent, with an invasive herbaceous understory. The understory cover exceeds 90 percent and is dominated by English ivy and annual and perennial grasses planted as lawn. Other species include western sword fern, reed canarygrass, and some rushes. Several areas of open grassland are located near the railroad.



On the hillside above the site, the City owns the 146-acre River View Natural Area and the Riverview Cemetery, where there are scattered trees over 100 years of age. The cemetery was established in 1882 and rises several hundred feet above the Willamette River. Seven unnamed streams originate in the River View Natural Area flowing down from the uplands through a series of culverts near their confluence with the river. Many large and moderately mature Douglas fir, western red cedar, and Pacific dogwood trees are located throughout the natural area and cemetery; most are remnants of the dense upland forest that used to dominate the western slopes of the Willamette River in the Portland area. The forested slopes and ravines of River View Natural Area and Riverview Cemetery continue to provide important food and forage, nesting and breeding, rest and cover, and movement corridors for wildlife. This upland area continues for a brief distance downslope from SW Macadam Avenue, where it blends with the bottomland forest and grassland habitats.

The shoreline includes areas of natural sand and gravel beach with scattered boulders, driftwood, and large wood as well as two small rock outcrops (basalt) that extend to the river edge.

Bird species observed in Powers Marine Park include osprey, bald eagle, dark eyed junco, fox and white crowned sparrow, golden-crowned kinglet, starling, and American robin. The area maintains habitat for many migratory passerines and the long stretch of shoreline is likely utilized by many of the common river birds and mammals found throughout the study area and within the cemetery.

Powers Marine is designated a Special Habitat Area for the following:

(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat

Natural Resource Evaluation

The natural resources located within this site have been evaluated for relative riparian and wildlife habitat quality. Relative quality is presented in the form of relative functional value ranks for riparian corridors, wildlife habitat, and riparian/wildlife habitat value combined (Table 23). The relative ranks are produced using GIS models and information on Special Habitat Areas.

The approach used to generate the relative ranks is summarized in the introduction to the inventory sites. Additional detail is provided in Chapter 2: Methodology Overview of this report, and Appendix C: *Natural Resources Inventory: Riparian Corridors and Wildlife Habitat Project Report*.

All of the ranked resource areas provide at least some important riparian and habitat value, recognizing that current condition and function levels may vary considerably. The relative ranks can inform planning projects and programs, including regulations, design of development or redevelopment projects, and mitigation and restoration activities.

<u>Riparian Areas</u>
The site contains the Willamette River and river bank, flood area, wetlands and riparian vegetation. These features contribute to the riparian functions as detailed in the natural resource descriptions, specifically:

- Microclimate and shade
- Stream flow moderation and water storage
- Bank functions, and sediment, pollution and nutrient control
- Large wood and channel dynamics
- Organic inputs, food web and nutrient cycling
- Riparian wildlife movement corridor

High relative functional ranks are assigned to the Willamette River itself, wetlands and forest vegetation in the floodplain or in proximity to the water bodies. Medium relative functional ranks are assigned to less dense and lower structure vegetation in the floodplain and up to 300 feet from water bodies. Low relative ranks are generally assigned to non-vegetated flood areas.

Wildlife Habitat

Within the context of this inventory model, a wildlife habitat patch is defined as a forest and/or wetland area two acres in size or greater, including adjacent woodland vegetation (note: Special Habitat Areas may be smaller and may contain different types of vegetation or other resource features). The model assigns relative ranks to qualifying habitat patches based on their size, interior area, proximity to other patches and proximity to water. Medium relative functional ranks are assigned to wetland and forest patches in this inventory site.

Special Habitat Areas (SHAs) consist of rare and declining habitat types and unique features that provide critical habitat for at-risk plant and animal species as described in the Natural Resources Description section above. SHAs receive a high relative rank for wildlife habitat. The SHA ranking supersedes lower rankings generated by the GIS model.

The Willamette River, including shallow water habitat areas, are designated as SHAs because they meet the following criteria:

(S) – An *at-risk* species uses the habitat area or feature on more than an incidental basis to complete one or more life history phases
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor

Powers Marine is designated a Special Habitat Area for the following:

(B) – Bottomland hardwood forests
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor habitat

Combined Relative Riparian/Wildlife Habitat Ranking

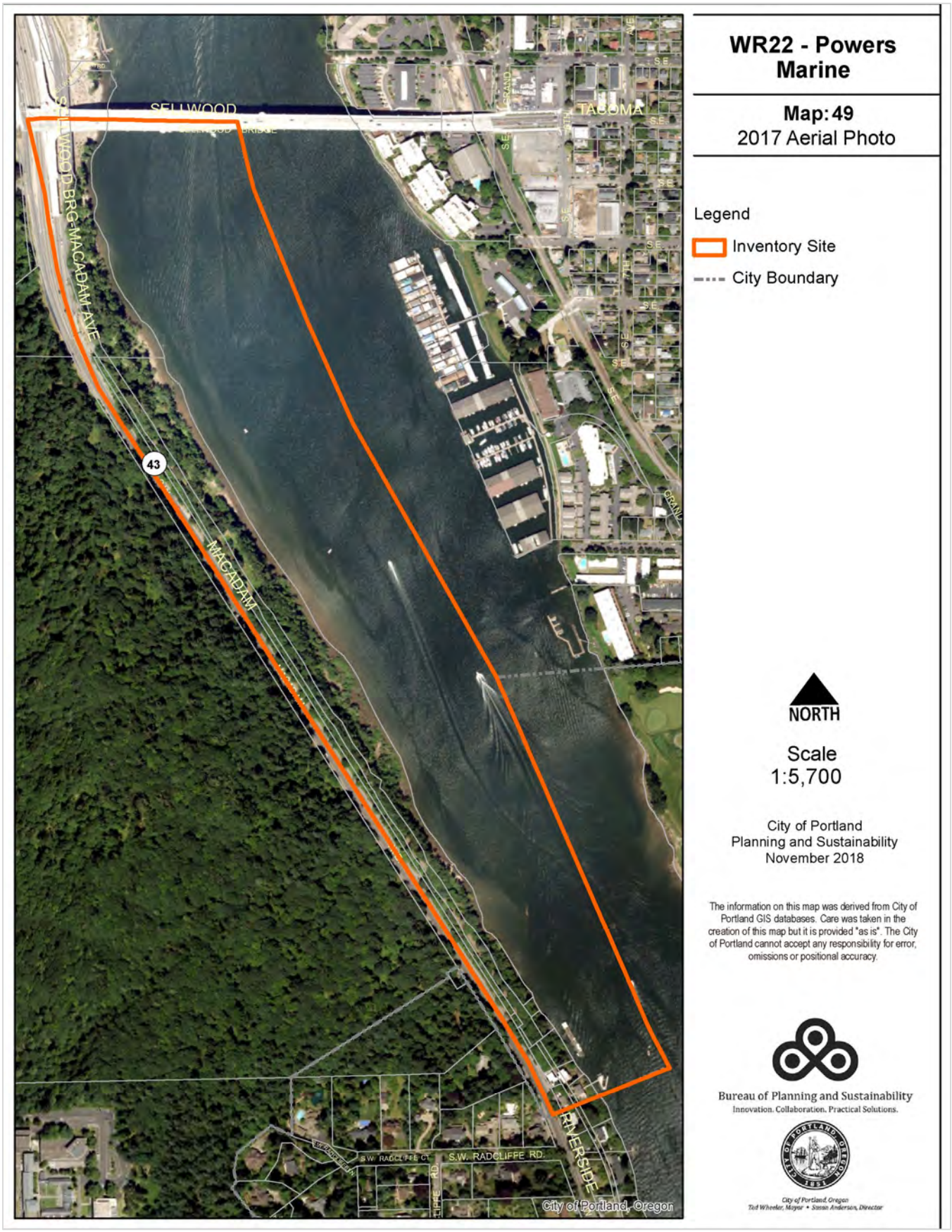
Where areas that are mapped as riparian corridors and wildlife habitat overlap, and their relative ranks differ, the combined relative rank will be the higher of the two ranks. For example, an area that ranks medium for riparian function and low for wildlife habitat will receive a medium combined relative rank.

Table 23: Summary of Ranked Resources in WR22 – Powers Marine				
Total Inventory Site = 82 acres				
	High	**Medium**	**Low**	**Total**
Riparian Resources*				
acres	73	4	1	78
percent total inventory site area	89	5	>1	95
Wildlife Habitat				
Wildlife Habitat*				
acres	0	20	0	20
percent total inventory site area	0	24	0	24
Special Habitat Areas**				
acres	79			
percent total inventory site area	96			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	79			79
percent total inventory site area	96	1	0	96
Combined Total***				
acres	79	<1	<1	80
percent total inventory site area	96	<1	<1	98

* High-ranked riparian resources, Special Habitat Areas, and wildlife habitat include the Willamette River.

** Special Habitat Areas rank high for wildlife habitat.

*** Because riparian resources, Special Habitat Areas, and wildlife habitat overlap, the results cannot be added together to determine the combined results.


WR22 - Powers Marine
Map: 49
2017 Aerial Photo
Legend
Inventory Site
City Boundary
SELLWOOD
TACOMA
SELLWOOD BRG-MACADAM AVE
MACADAM
43
S.W. RADCLIFFE CT.
S.W. RADCLIFFE RD.
RIVERSIDE
City of Portland, Oregon
NORTH
Scale
1:5,700
City of Portland
Planning and Sustainability
November 2018
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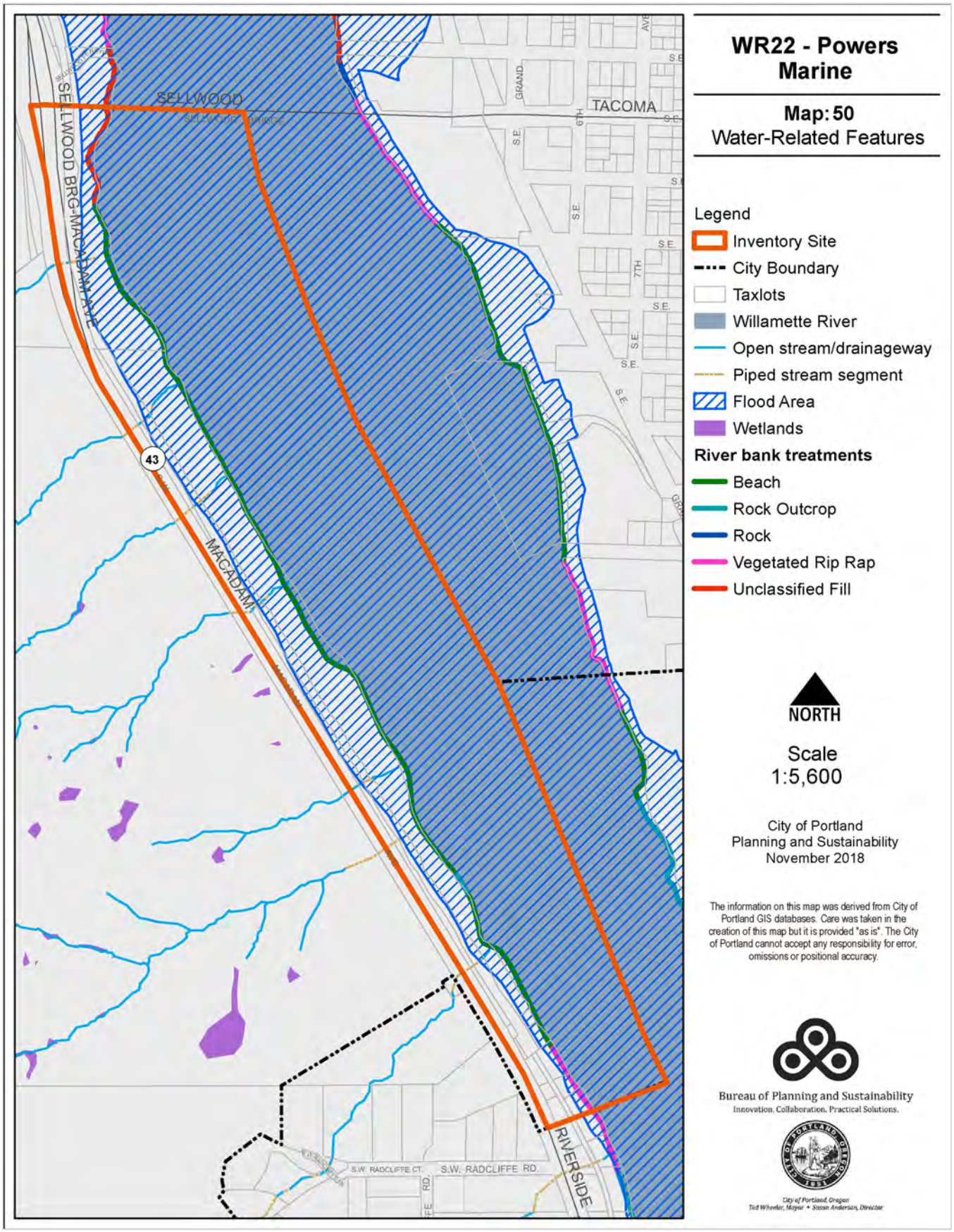
WR22 - Powers Marine
Map: 50
Water-Related Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Flood Area
Wetlands
River bank treatments
Beach
Rock Outcrop
Rock
Vegetated Rip Rap
Unclassified Fill
NORTH
Scale
1:5,600
City of Portland
Planning and Sustainability
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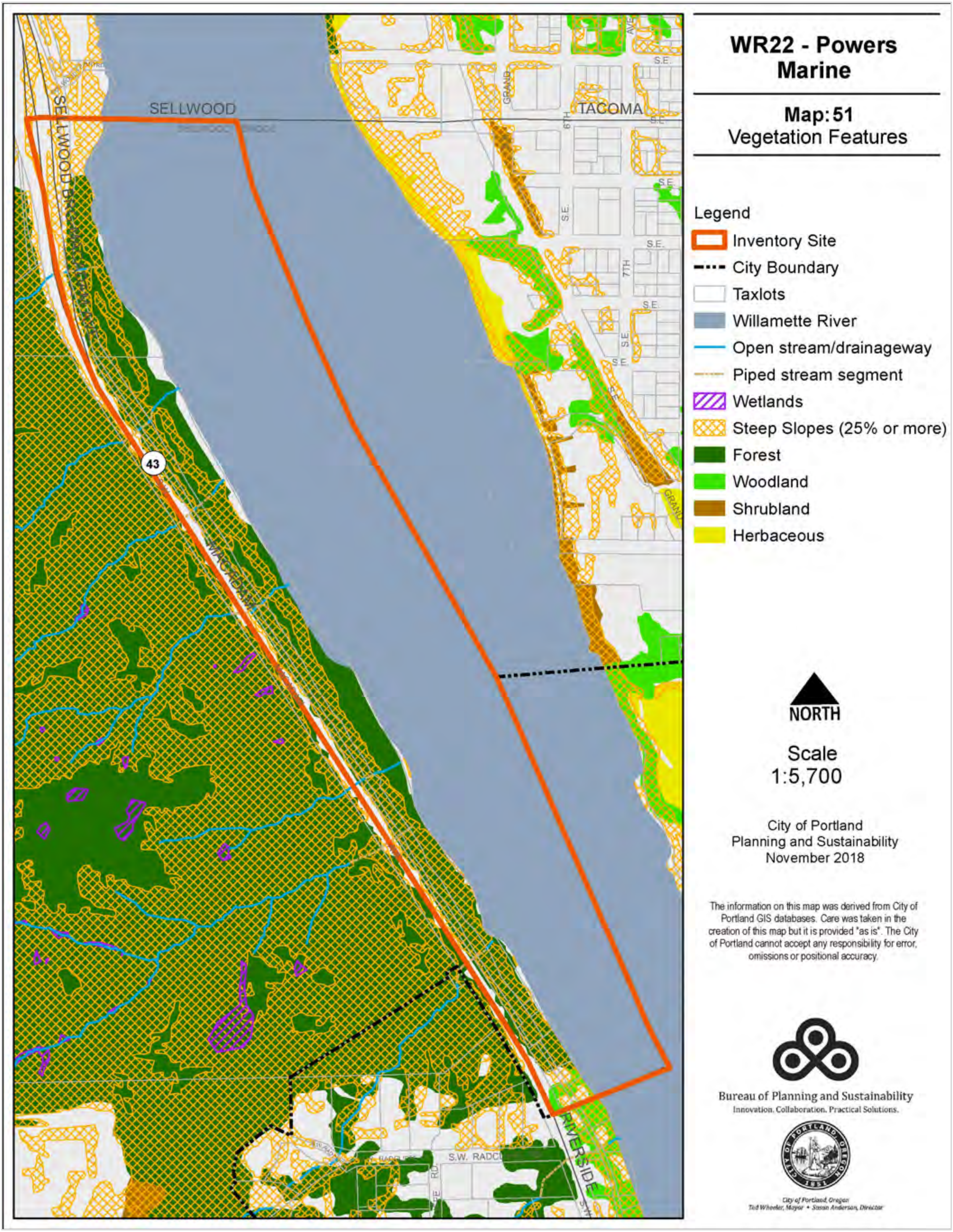
SELLWOOD
TACOMA
SELLWOOD BRG-MACADAM AVE
MACADAM
43
RIVERSIDE
S.W. RADCLIFFE CT.
S.W. RADCLIFFE RD.
GRAND
6TH
7TH
S.E.


WR22 - Powers Marine
Map: 51
Vegetation Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Wetlands
Steep Slopes (25% or more)
Forest
Woodland
Shrubland
Herbaceous
NORTH
Scale
1:5,700
City of Portland
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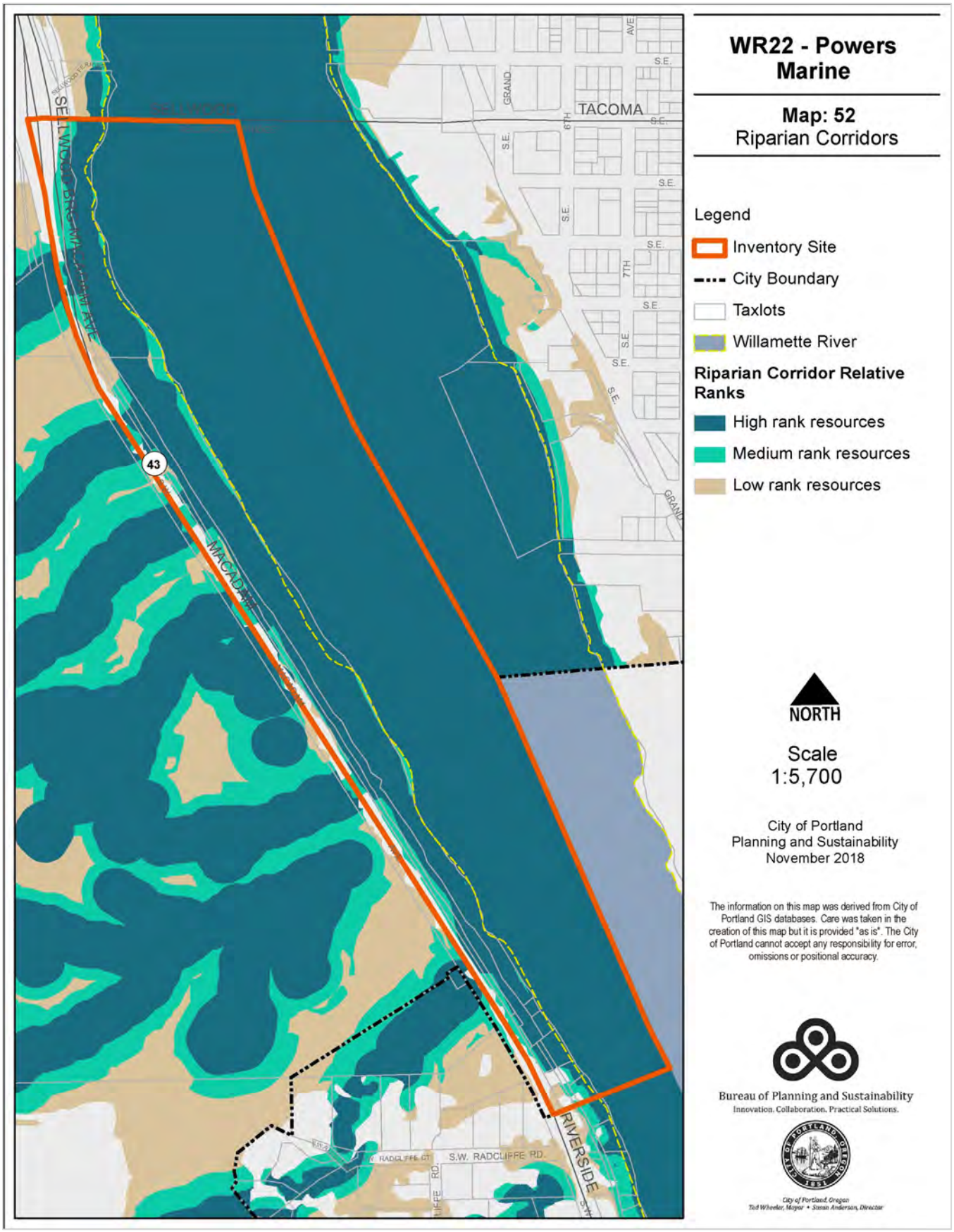
SELLWOOD
TACOMA
SELLWOOD
43
MACADAM
RIVERSIDE
S.W. RADC
GRAND
6TH
7TH
S.E.


WR22 - Powers Marine
Map: 52
Riparian Corridors
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Riparian Corridor Relative Ranks
High rank resources
Medium rank resources
Low rank resources
NORTH
Scale
1:5,700
City of Portland
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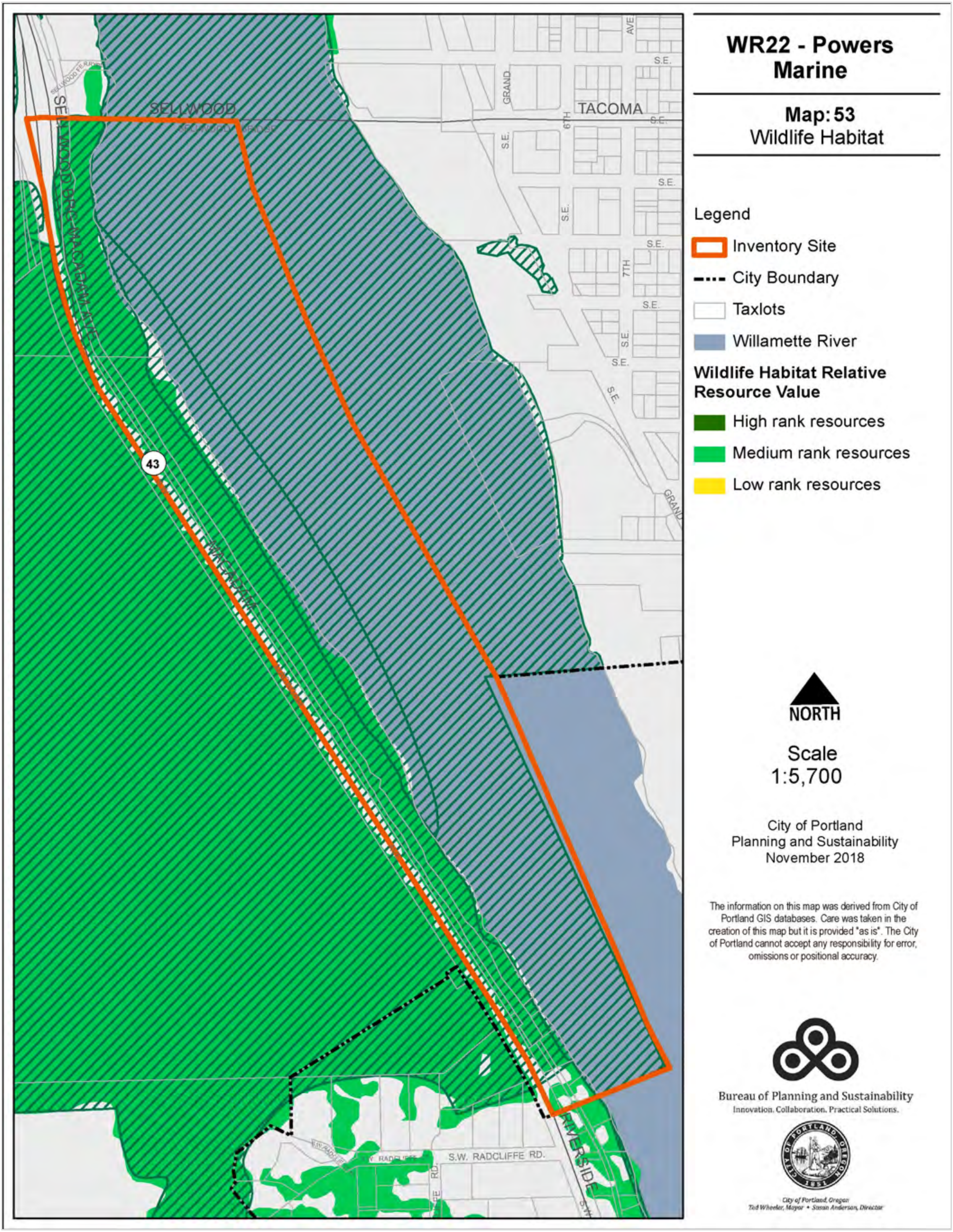
TACOMA
SELLWOOD
MACADAM
S.W. RADCLIFFE RD.
RIVERSIDE
43


WR22 - Powers Marine
Map: 53
Wildlife Habitat
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Wildlife Habitat Relative Resource Value
High rank resources
Medium rank resources
Low rank resources
NORTH
Scale
1:5,700
City of Portland
Planning and Sustainability
November 2018
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Bureau of Planning and Sustainability
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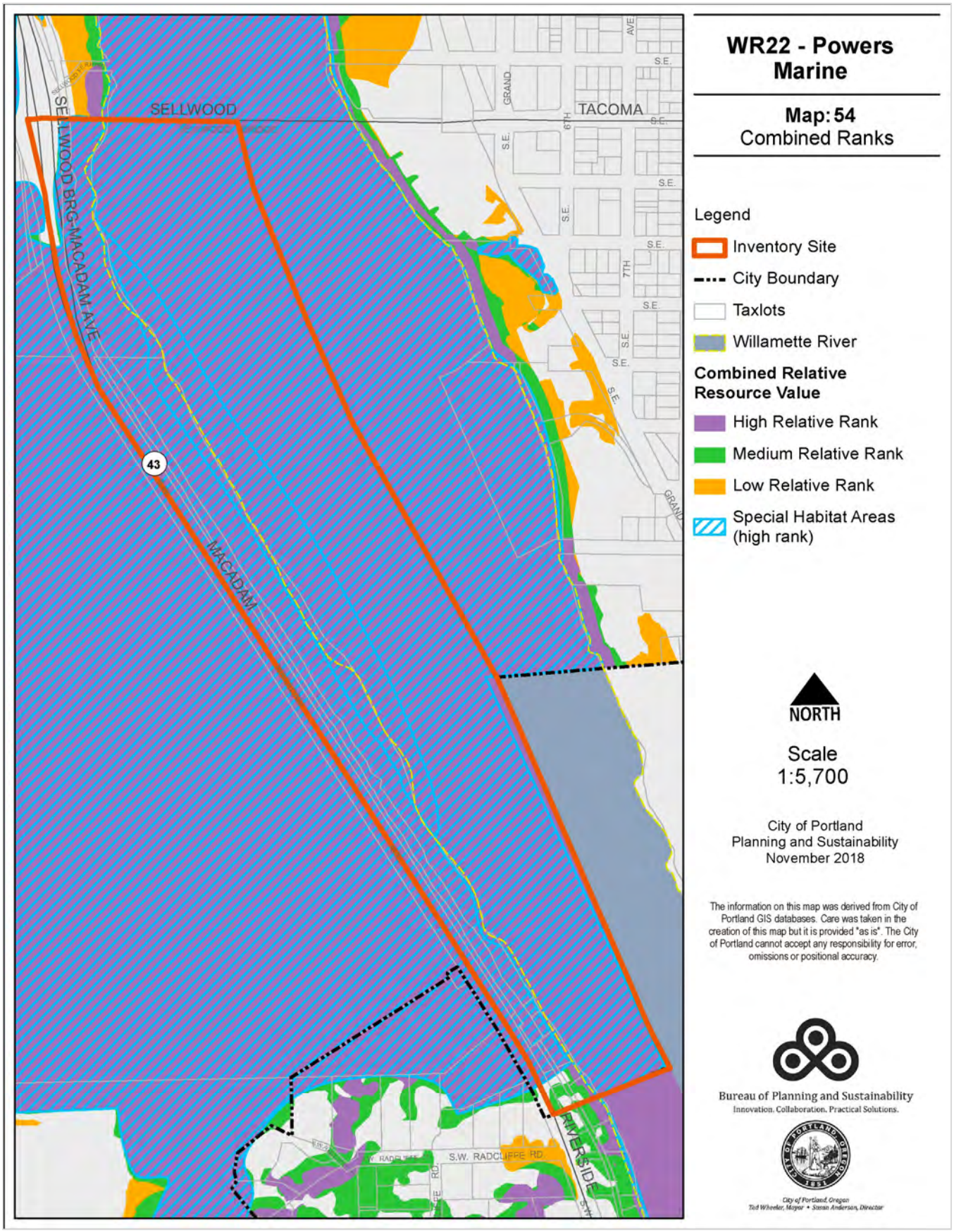
SELLWOOD
TACOMA
GRAND
6TH
7TH
S.E.
AVE
43
MACADAM
S.W. RADCLIFFE RD.
RIVERSIDE


WR22 - Powers Marine
Map: 54
Combined Ranks
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Combined Relative Resource Value
High Relative Rank
Medium Relative Rank
Low Relative Rank
Special Habitat Areas (high rank)
SELLWOOD
TACOMA
SELLWOOD BRG-MACADAM AVE
MACADAM
43
S.W. RADCLIFFE RD.
RIVERSIDE
NORTH
Scale 1:5,700
City of Portland
Planning and Sustainability
November 2018
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SECTION 3.D.v: INVENTORY SITE WR23 DUNTHORPE

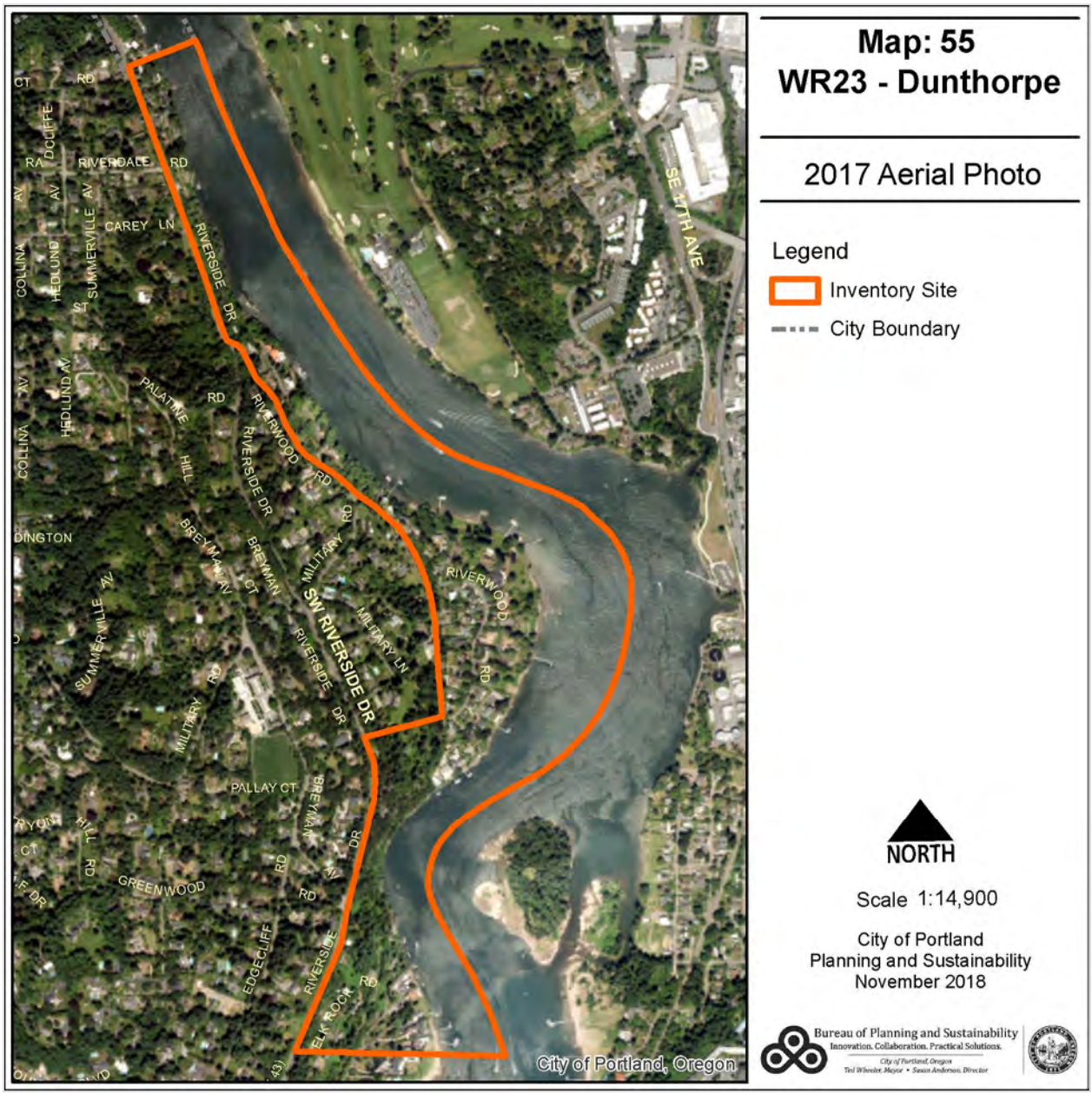
Summary Information

Watershed:	Willamette River Watershed
Neighborhood:	N/A
USGS Quadrangle and Quarter Section Maps:	1S1E26C, 1S1E26D, 1S1E35A, 1S1E35B, 1S1E35C, 1S1E35D
River Mile:	17.4 – 19.1
Site Size:	170 acres (land and water)
Previous Inventory:	Lower Willamette River Wildlife Habitat Inventory, March 1986
Zoning:	Residential 20,000 (R20) Open Space (OS) Environmental Conservation Overlay Zone (c) Environmental Protection Overlay Zone (p) Willamette Greenway River General Overlay (g)
Existing Land Use:	Residential, railroad
General Description:	The majority of this site is developed with single family residential uses. There are steep slopes and major tree canopy, including Oregon white oak and Pacific madrone. Three streams cross the site.
Resource Features:	Open water, shallow water habitat, river bank, flood plain, wetland, riparian vegetation
Resource Functions:	Microclimate and shade; stream flow moderation and water storage; bank function and sediment, nutrient and pollution control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and wildlife habitat and movement corridor
Special Habitat Area:	**Willamette River:** (S) – provides habitat for at-risk wildlife species; (C) – wildlife connectivity corridor **Dunthorpe Oak Escarpment:** (O) – Oregon White Oak; (C) – wildlife connectivity corridor; (U) – unique feature
Special Status Species:	**Fish**: Lower Columbia River (LCR) Chinook salmon, LCR coho salmon, LCR steelhead trout, LCR coastal cutthroat trout, Columbia River chum salmon, Upper Willamette River (UWR) Chinook salmon, UWR steelhead trout, Pacific lamprey, Western brook lamprey, white sturgeon. **Amphibians**: Northern red-legged frog **Birds**: Bald eagle, brown creeper, bushtit, common yellowthroat, downy woodpecker, great blue heron, house wren, orange-crowned warbler, Pacific-slope flycatcher, peregrine falcon, Swainson's thrush, Western wood-pewee, white-breasted nuthatch (slender-billed) **Mammals**: American beaver, hoary bat, Northern river otter.

Natural Hazards:	Flood area, landslide, earth quake
Contamination:	No

Site Description

This 170 acre site is located on the west side of the Willamette River between Powers Marine Park and the southern end of the Dunthorpe neighborhood in unincorporated Multnomah County. Much of the inventory site is characterized by steep slopes with a mix of vegetation including residential landscaping. Three streams cross the inventory site from the hills to the Willamette River; two of which are in an open channel through parts of the site. Douglas fir is the dominate tree species; however, there is a significant oak/madrone escarpment in the lower portion of the site at the Garden at Elk Rock and City of Portland properties. Other tree species include bigleaf maple, western red cedar, red alder and western hemlock.



The site contains 13 acres (7 percent) impervious surface coverage. Of the vegetated areas over ½ acre in size, there is are approximately 31 acres of forest, 16 acres of woodland, 0 acres of shrubland and 1 acre of herbaceous vegetation. There are 113 acres of flood area on this site, of which 12 acres are vegetated and 93 acres are open water.

Table 24: Summary of Natural Resource Features in WR23 – Dunthorpe	
	Study Area (miles/acres)
River (miles/acres)	**2/94**
Stream/Drainageway (miles)	**<1**
Wetlands (acres)	**0**
Flood Area (acres)*	
Vegetated (acres)	12
Non-vegetated (acres)	8
Open Water** (acres)	93
Vegetated Areas >= ½ acre (acres)[+]	
Forest (acres)	31
Woodland (acres)	16
Shrubland (acres)	0
Herbaceous (acres)	1
Impervious Surfaces (acres)	13

* The flood area includes the FEMA 100-year flood plain plus the adjusted 1996 flood inundation area.
** Open Water includes portions of the Willamette River.
[+] The vegetation classifications are applied in accordance with the National Vegetation Classification System specifications developed by The Nature Conservancy. The data within the primary study area and within 300 feet of all open water bodies in Portland is draft and is currently being updated based on 2008 aerial photography.

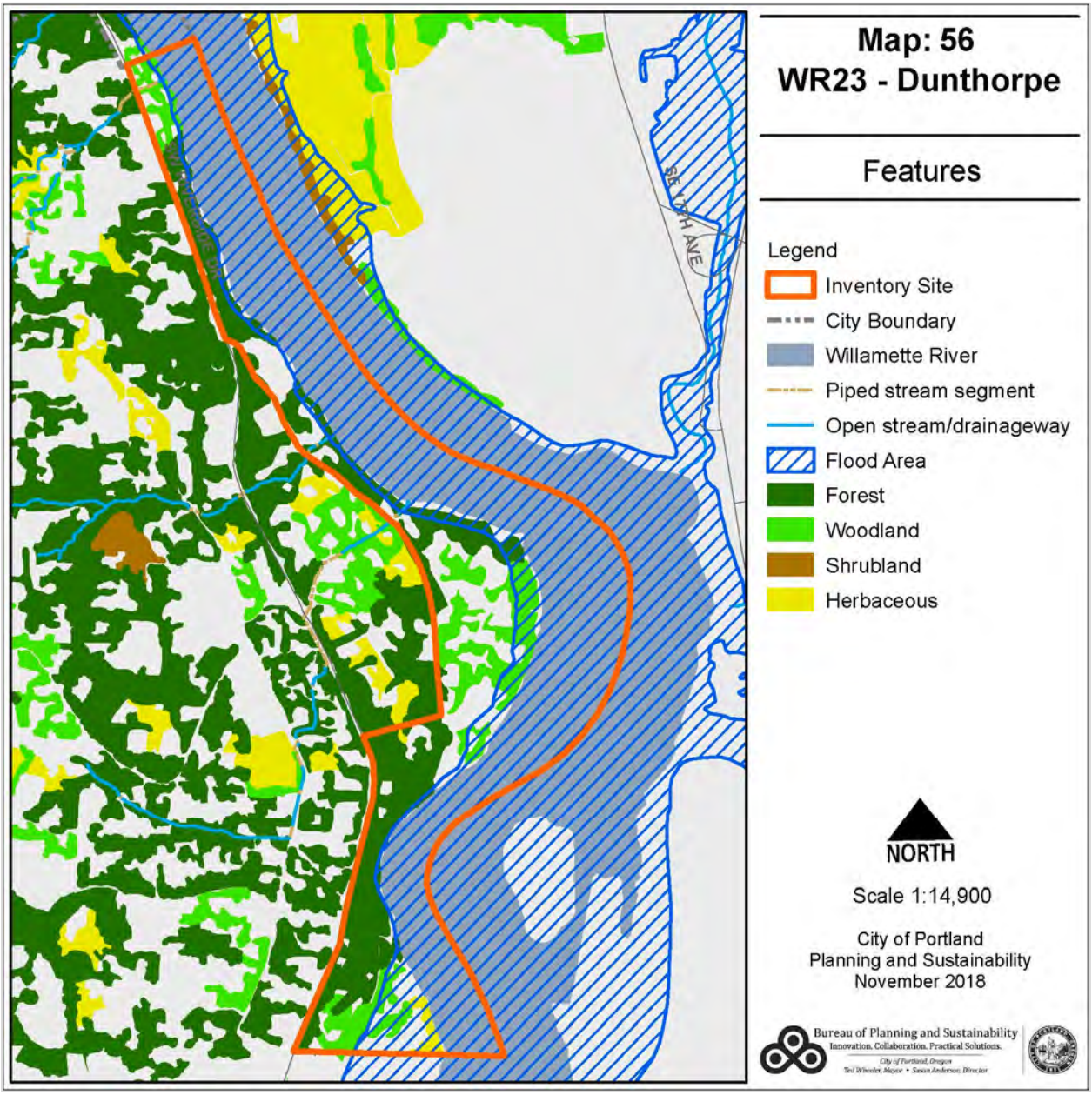
Natural Resources Description

Historically, the Portland-area portion of the Willamette River watershed was comprised of an active channel, open slack waters, emergent wetlands, riparian forests and adjacent upland forests. Vegetation in bottomland and wetland forests consisted of black cottonwood, Oregon ash and Pacific willow with associated native understory. Denser, mixed-conifer forests of Douglas fir, bigleaf maple, western red cedar, western hemlock, grand fir and red alder dominated the west hills and some parts of the east terrace. Savannas of Oregon white oak, Pacific madrone, red alder and bigleaf maple were found in the foothills on the east side of the river.

Today, the land within the South Reach inventory area is comprised largely of parks and open spaces and residential development. Parks in this inventory site include the southern portion of Cottonwood Bay, Willamette Park, Willamette Moorage, and the northern portion of Powers Marine Park. There are also commercial uses along Macadam Avenue and the Willamette moorage.

Significant natural resource areas in this inventory site include:

- Willamette River (open water and river banks)
- Dunthorpe Oak Escarpment
- Mature Tree Canopy



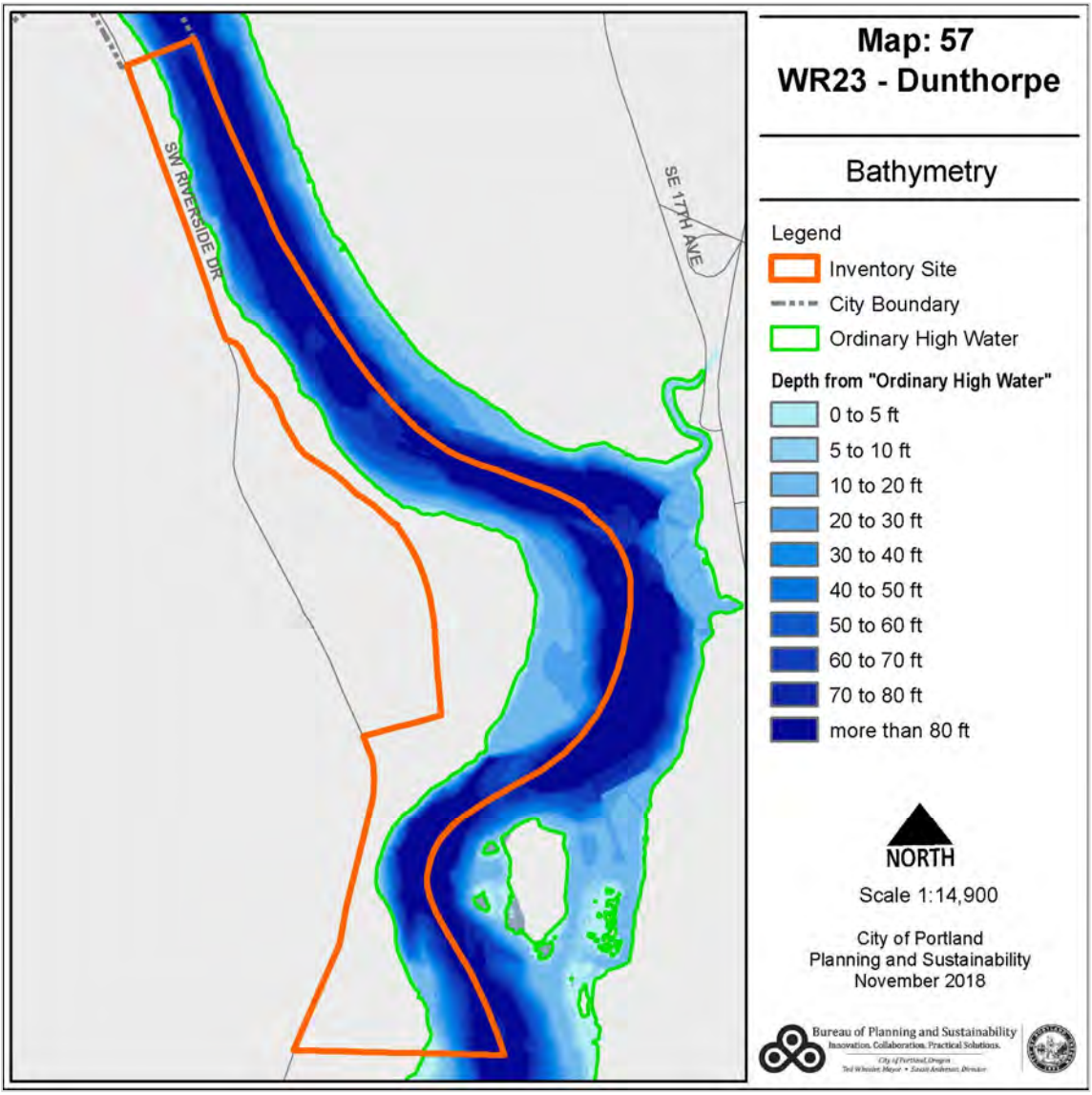
Willamette River

Below is a summary of Lower Willamette River natural resources documented in inventory site WR23. Additional information about the water quality, hydrology, and fish and wildlife use of the Willamette River is provided in Section 3.c: The South Reach.

Inventory site WR23 includes 94 acres of the Lower Willamette River. The river is the primary habitat link providing connectivity between upstream and downstream aquatic habitats. This connection is critical for fish, resident and migrating birds, and other species.

The Willamette River is the primary migration corridor for ESA-listed Chinook, coho and chum salmon, as well as steelhead, and coastal cutthroat trout. These fish enter the Lower Willamette River system both as opportunistic migrants to exploit forage associated with the annual shad run and to spawn in reaches throughout the Willamette River watershed. Shallow water areas, which are found along shoreline margins in this inventory site, are especially important for juvenile fish because they provide opportunities to escape the swift current of the main channel to rest and feed (see Map 57). Seasonal migrants use habitat within the inventory site during multiple life stages and are usually present during predictable seasonal peaks:

- Juvenile salmon and trout out-migration generally occurs between March and June.
- Spring Chinook out-migration peaks in April.
- Fall Chinook, steelhead and coho out-migration peaks between May and June.



Columbia eulachon pass through the lower Columbia and Willamette rivers as opportunistic migrants as well. Adults return to their natal river every winter; however, their out-migration timing is not as well documented.

White sturgeon generally move throughout the Columbia River estuary and Lower Willamette River throughout the year. As adults, sturgeon can migrate freely between fresh, brackish and saline water; juveniles and young-of-year cannot, so their rearing range is limited. Recent white sturgeon stock assessment data collected in the Willamette River between Willamette Falls and the Columbia River confluence describe a compromised population of white sturgeon represented by several young age classes.

The historic run of adult Pacific lamprey up and over Willamette Falls numbered in the hundreds of thousands. Today, that run is significantly smaller; however, tribal harvest of these fish for subsistence and ceremonial uses still brings many families to the Willamette Falls every year. Documentation of Pacific lamprey rearing and outmigration patterns in the Lower Willamette River is limited; however, juveniles are often observed in soft substrate samples collected throughout the lower river. The rearing life stage of Pacific lamprey is known to last between 4-7 years in freshwater habitat, before individuals migrate to the ocean for their maturation life stages.

Resident fish assemblages within this reach include native species such as largescale sucker, sculpin (prickly and reticulate), redside shiner and northern pikeminnow. Nuisance species include large and smallmouth bass, Asian carp and several varieties of perch.

The Willamette River within this inventory site plays an important part of the Pacific Flyway migratory route for over 200 resident and migratory bird species, including iconic species such as great blue heron, osprey, Peregrine falcon and bald eagle. Species use the open water habitat for foraging and as a migratory corridor. Avian species also use natural and man-made structures for perching, resting and foraging. Shallow water areas and exposed sand and mud are used by shorebirds and waterfowl.

The Willamette River in the inventory site does not meet state water quality standards for bacteria, mercury, dioxin, temperature, and various other toxics and heavy metals (see Table 25). TMDLs for bacteria and temperature, as well as a phased TMDL for mercury, were established in 2006. The Oregon Water Quality Index values observed between 2001 to 2015 fairing Portland have seen modest improvement and the trend is steady.

Table 25: Water Quality (303(d)) Listings in the Lower Willamette River and Tributaries			
Pollutant	**Season**	**Year River was Listed for this Pollutant**	**Risk Factors**
Pesticides and Toxics (DDT/DDE, Dieldrin, Aldrin, Pentachlorophenol, PCB, PAH, Total Chlordane, Cyanide, Hexachlorobenzene)	Year-round	1998, 2002, 2012	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Heavy Metals (iron, manganese, mercury)	Year-round	1998, 2002	Fishing, drinking water, resident fish and aquatic life, anadromous fish passage
Nutrients (Chlorophyll a)1	Summer	2012	Fish and other aquatic life due excessive algal growth and a decrease in dissolved oxygen (DO)
Bacteria (Fecal Coliform)	Fall/Winter/Spring	1998	Water contact recreation
Temperature	Summer	1998	Salmonid fish rearing, anadromous fish passage
Biological Criteria	N/A	1998	Resident fish and aquatic life

(ODEQ, 2015)

Due to the presence of mercury, PCBs, dioxins and legacy pesticides (DDT, dieldrin) in Willamette River fish tissue, a fish advisory for the mainstem river recommends that people, especially pregnant or breastfeeding women, limit or avoid consuming resident and/or fatty fish such as carp, bass and catfish. There is no restriction on the consumption of salmon or steelhead, as they are migratory species and do not spend significant time residing in contaminated habitats. The Lower Willamette River in Portland was previously deemed unsafe for swimming during and immediately after rainstorm events due to sewer overflows. However, in 2011, the City completed a large infrastructure project to address combined sewer overflows into the river. The result is that combined sewer overflows should be very infrequent, if not eliminated, during the summer recreating season.

In the inventory site, the flood area is generally confined to the Willamette River itself.

The Willamette River and shallow water habitat are designated Special Habitat Areas because they meet the following criteria:

(S) – An *at-risk* species uses the habitat area or feature on more than incidental basis to complete one or more life history phases
(C) – Wildlife connectivity corridor
(M) – Migratory stopover habitat

Dunthorpe Oak Escarpment and Mature Tree Canopy

Beginning at the Garden at Elk Rock and heading south along the ridge line is a remnant stand of Oregon white oak and Pacific madrone (see Map 58). This tree assemblage is rare and declining in the Metro area. On the Garden of Elk Rock property, the Oregon white oaks are between 200 and 300 years old and the Pacific madrone stand is one of the oldest in Portland. The grounds keepers are actively removing invasive species, particularly English ivy, from the slopes and supporting oak recruitment and native understory plants.

The Dunthorpe Oak Escarpment is designated a Special Habitat Area for the following:

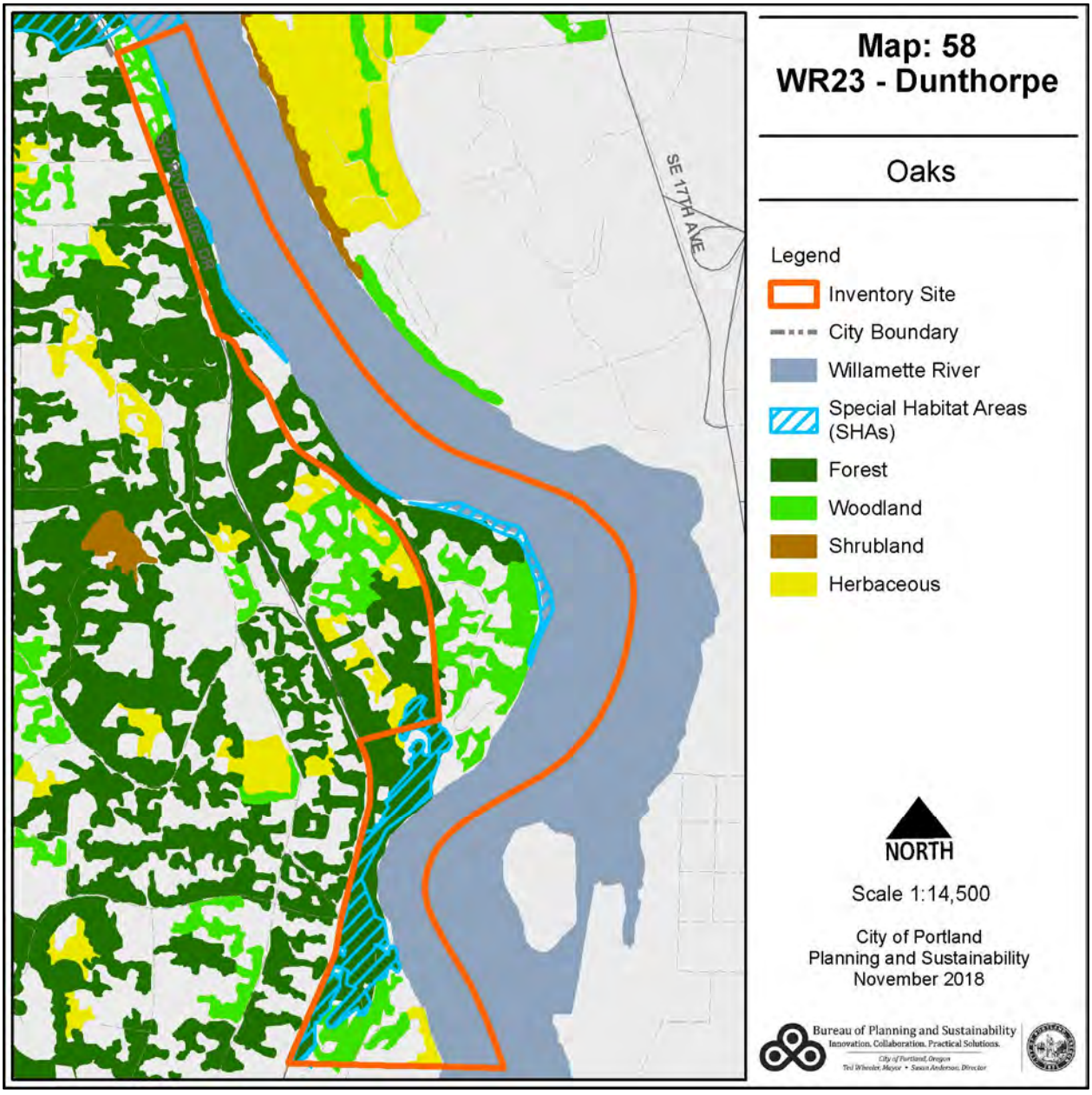
(O) – Oregon White Oak

(C) – Wildlife connectivity corridor habitat

(U) – Unique feature

In addition to the Dunthorpe Oak Escarpment there are stands of mature tree canopy throughout the site. Douglas fir and bigleaf maple are the dominate species. The tree canopy is fragmented by large-lot residential development and most of the native understory has been removed. However, the large trees still provide numerous functions, including cleaning and cooling the air and water, capturing greenhouse gases, capturing and uptaking stormwater, reducing energy demand and providing wildlife habitat. Birds observed include black-capped chickadee, song sparrow, Oregon junco, winter wren, northern flicker, bald eagle and peregrine falcon (BES, 2010).

Photos of Oregon White Oak and Pacific Madrone at the Garden at Elk Rock



Natural Resource Evaluation

The natural resources located within this site have been evaluated for relative riparian and wildlife habitat quality. Relative quality is presented in the form of relative functional value ranks for riparian corridors, wildlife habitat, and riparian/wildlife habitat value combined (Table 26). The relative ranks are produced using GIS models and information on Special Habitat Areas.

The approach used to generate the relative ranks is summarized in the introduction to the inventory sites. Additional detail is provided in Chapter 2: Methodology Overview of this report and Appendix C: *Natural Resources Inventory: Riparian Corridors and Wildlife Habitat Project Report*.

All of the ranked resource areas provide at least some important riparian and habitat value, recognizing that current condition and function levels may vary considerably. The relative ranks can inform planning projects and programs, including regulations, design of development or redevelopment projects, and mitigation and restoration activities.

Riparian Areas

The site contains the Willamette River and river bank, flood area, wetlands and riparian vegetation. These features contribute to the riparian functions as detailed in the natural resource descriptions, specifically:

- Microclimate and shade
- Stream flow moderation and water storage
- Bank functions, and sediment, pollution and nutrient control
- Large wood and channel dynamics
- Organic inputs, food web and nutrient cycling
- Riparian wildlife movement corridor

High relative functional ranks are assigned to the Willamette River itself, wetlands and forest vegetation in the floodplain or in proximity to the water bodies. Medium relative functional ranks are assigned to less dense and lower structure vegetation in the floodplain and up to 300 feet from water bodies. Low relative ranks are generally assigned to non-vegetated flood areas.

Wildlife Habitat

Within the context of this inventory model, a wildlife habitat patch is defined as forest and/or wetland areas 2 acres in size or greater, including adjacent woodland vegetation (note: Special Habitat Areas may be smaller and may contain different types of vegetation or other resource features). The model assigns relative ranks to qualifying habitat patches based on their size, interior area, proximity to other patches and proximity to water. Medium relative functional ranks are assigned to wetland and forest patches in this inventory site.

Special Habitat Areas (SHA) consist of rare and declining habitat types and unique features that provide critical habitat for at-risk plant and animal species as described in the Natural Resources Description section above. SHAs receive a high relative rank for wildlife habitat. The SHA ranking supersedes lower rankings generated by the GIS model.

The Willamette River, including shallow water habitat areas, are designated as SHAs because they meet the following criteria:

(S) – An *at-risk* species uses the habitat area or feature on more than an incidental basis to complete one or more life history phases
(M) – Migratory stopover habitat
(C) – Wildlife connectivity corridor

Dunthorpe Oak Escarpment is designated a Special Habitat Area for the following:

(O) – Oregon White Oak
(C) – Wildlife connectivity corridor habitat
(U) – Unique feature

Combined Relative Riparian/Wildlife Habitat Ranking

Where areas that are mapped as riparian corridors and wildlife habitat overlap, and their relative ranks differ, the combined relative rank will be the higher of the two ranks. For example, an area that ranks medium for riparian function and low for wildlife habitat will receive a medium combined relative rank.

Table 26: Summary of Ranked Resources in WR23 – Dunthorpe

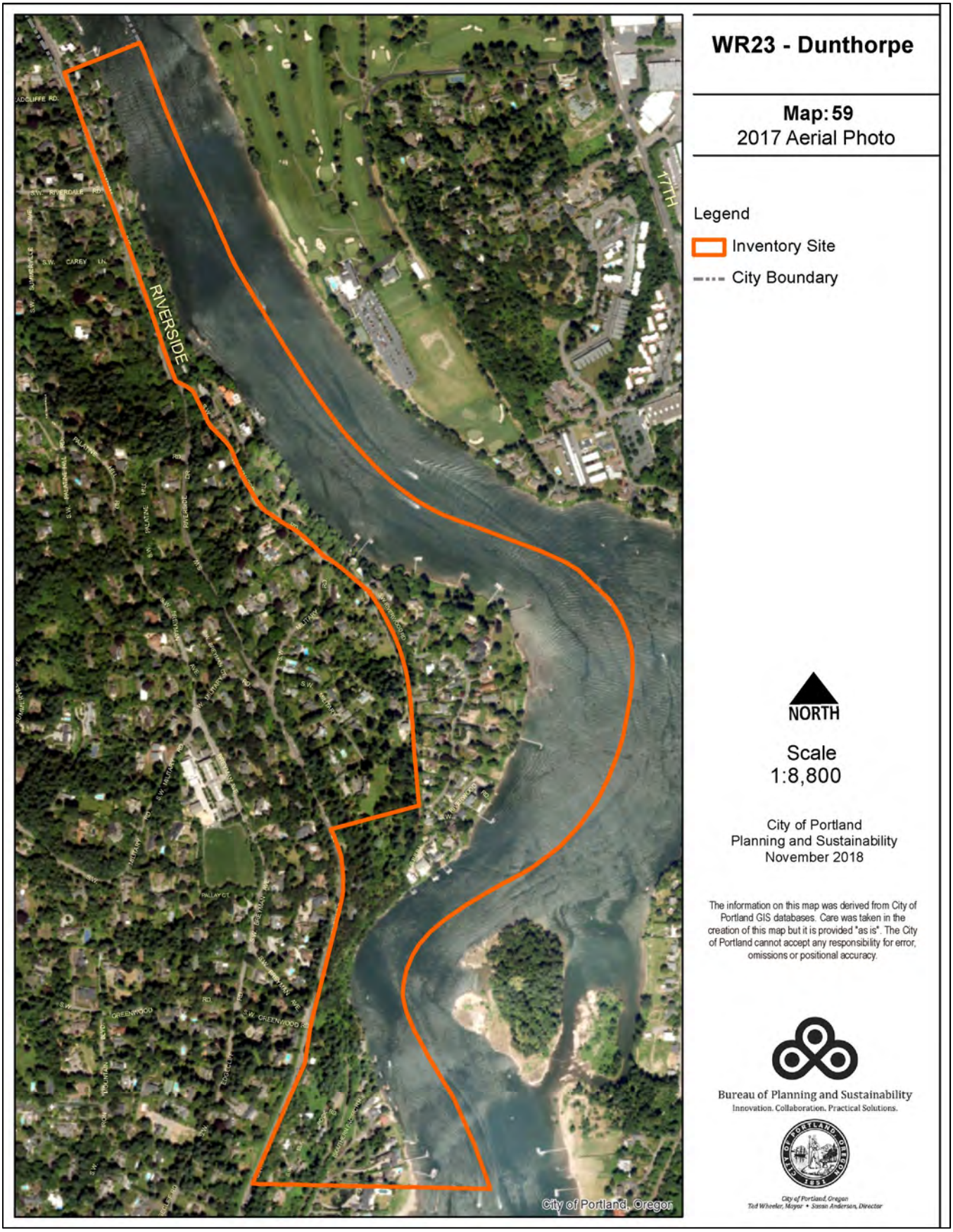
Total Inventory Site = 170 acres

	High	Medium	Low	Total
Riparian Resources*				
acres	107	18	22	146
percent total inventory site area	63	11	13	86
Wildlife Habitat				
Wildlife Habitat*				
acres	0	46	0	46
percent total inventory site area	0	27	0	27
Special Habitat Areas**				
acres	15			
percent total inventory site area	9			
Wildlife Habitat - adjusted by Special Habitat Areas***				
acres	15	34	0	48
percent total inventory site area	9	20	0	28
Combined Total***				
acres	117	29	4	150
percent total inventory site area	69	17	2	88

* High-ranked riparian resources, Special Habitat Areas, and wildlife habitat include the Willamette River.

** Special Habitat Areas rank high for wildlife habitat.

*** Because riparian resources, Special Habitat Areas, and wildlife habitat overlap, the results cannot be added together to determine the combined results.


WR23 - Dunthorpe
Map: 59
2017 Aerial Photo
Legend
Inventory Site
City Boundary
RIVERSIDE
17TH
NORTH
Scale
1:8,800
City of Portland
Planning and Sustainability
November 2018
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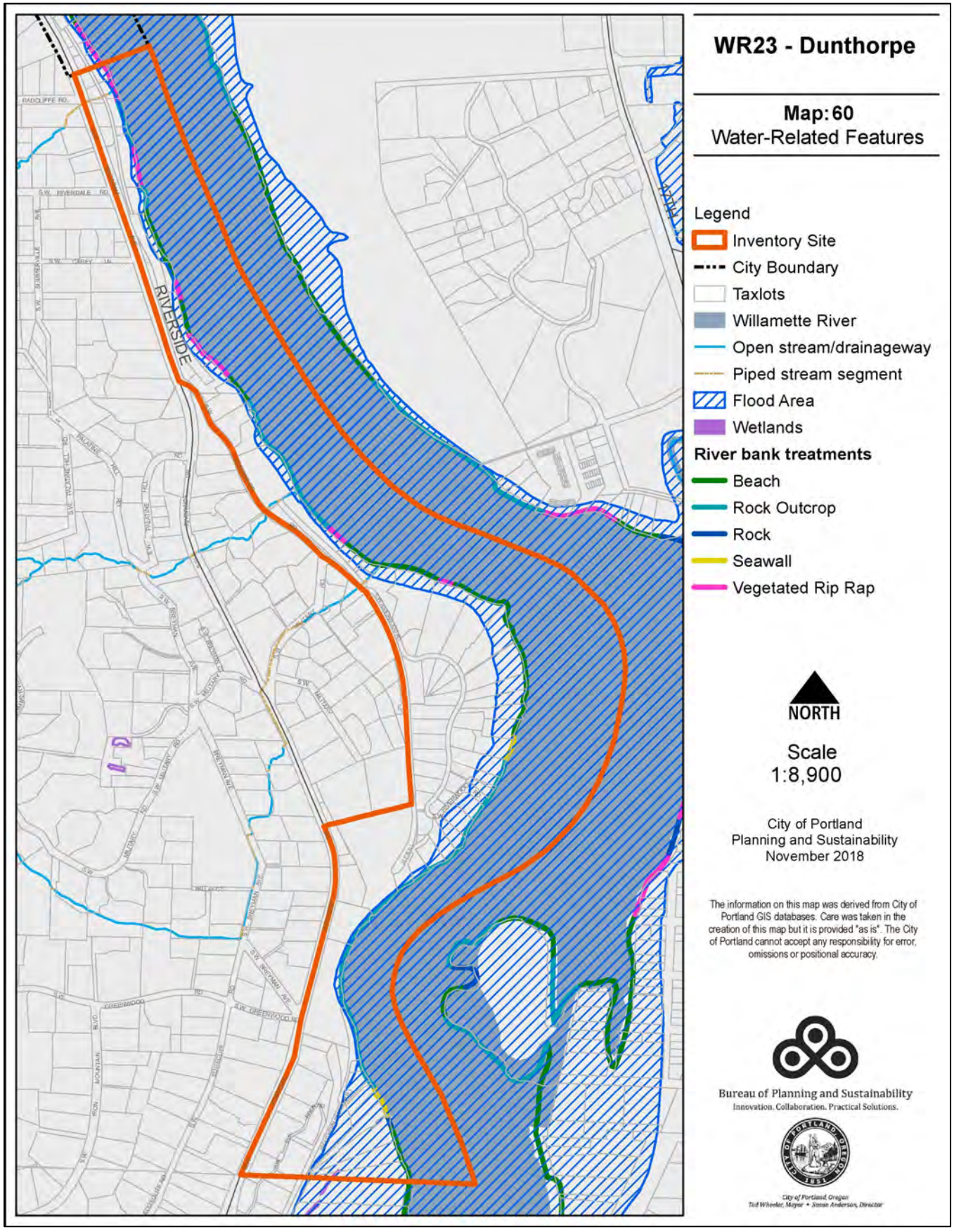
WR23 - Dunthorpe
Map: 60
Water-Related Features
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Flood Area
Wetlands
River bank treatments
Beach
Rock Outcrop
Rock
Seawall
Vegetated Rip Rap
RIVERSIDE
NORTH
Scale
1:8,900
City of Portland
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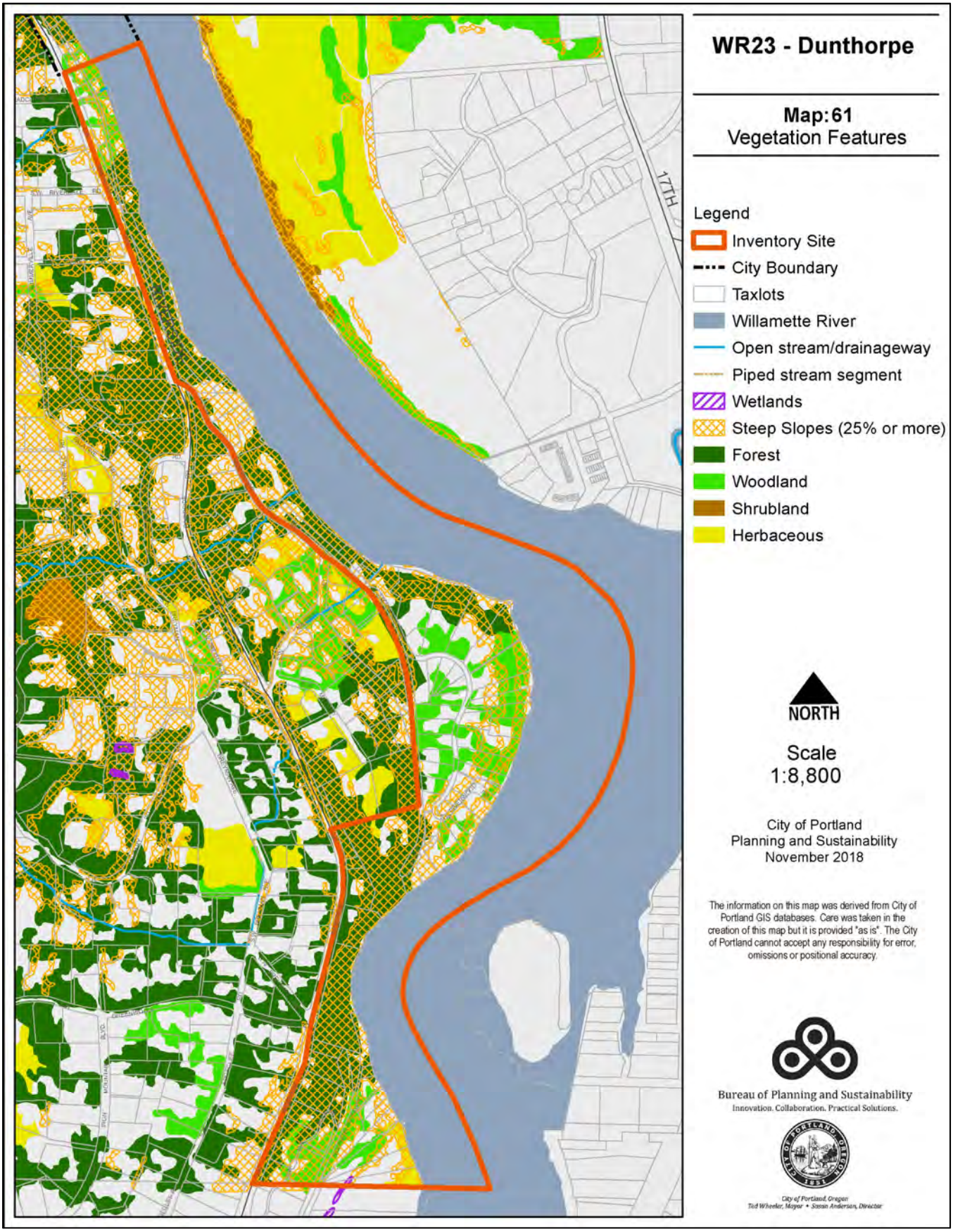
WR23 - Dunthorpe
Map:61
Vegetation Features
17TH
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Open stream/drainageway
Piped stream segment
Wetlands
Steep Slopes (25% or more)
Forest
Woodland
Shrubland
Herbaceous
NORTH
Scale
1:8,800
City of Portland
Planning and Sustainability
November 2018
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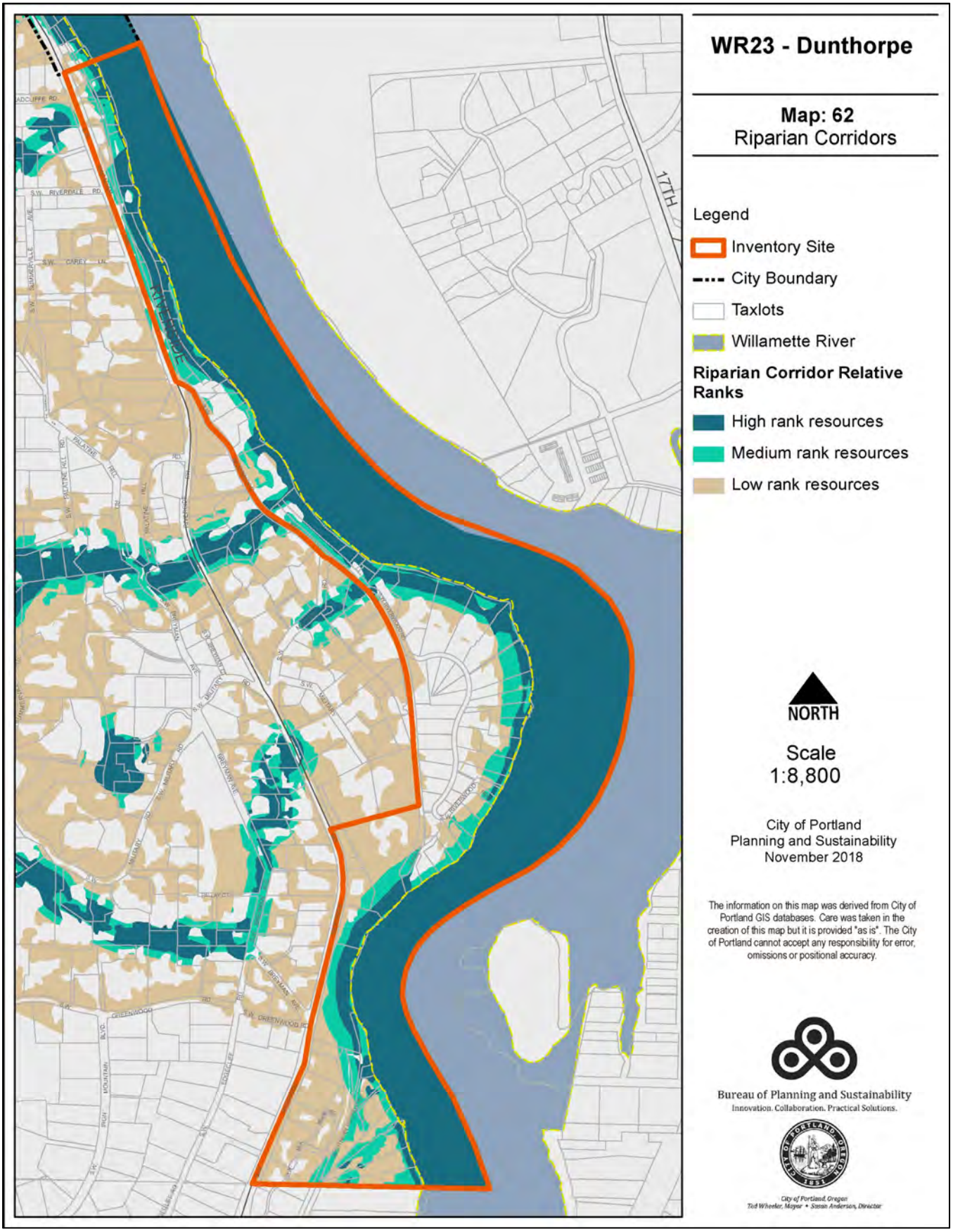
WR23 - Dunthorpe
Map: 62
Riparian Corridors
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Riparian Corridor Relative Ranks
High rank resources
Medium rank resources
Low rank resources
17TH
RIVERDALE
NORTH
Scale
1:8,800
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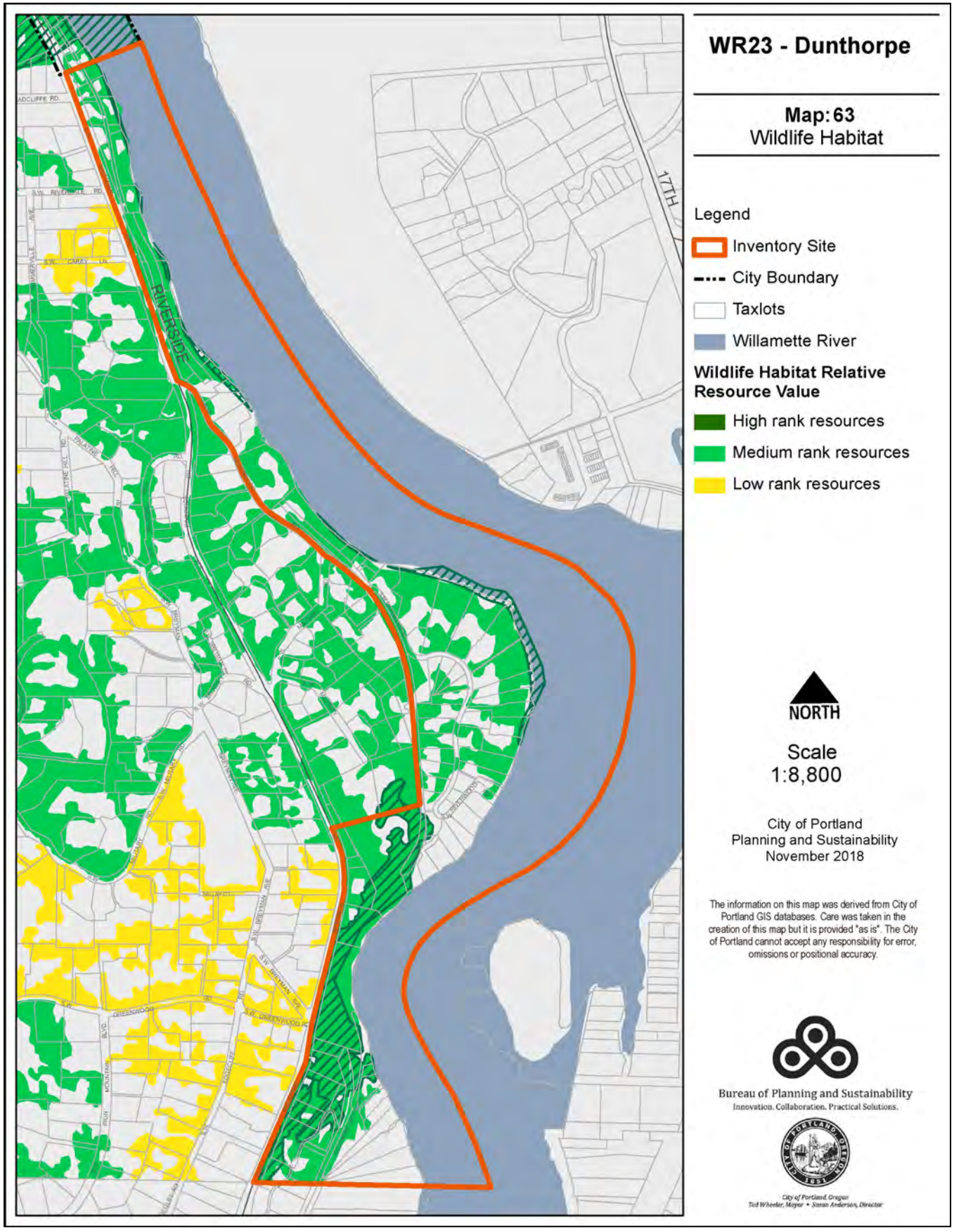
WR23 - Dunthorpe
Map: 63
Wildlife Habitat
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Wildlife Habitat Relative Resource Value
High rank resources
Medium rank resources
Low rank resources
RIVERSIDE
17TH
NORTH
Scale
1:8,800
City of Portland
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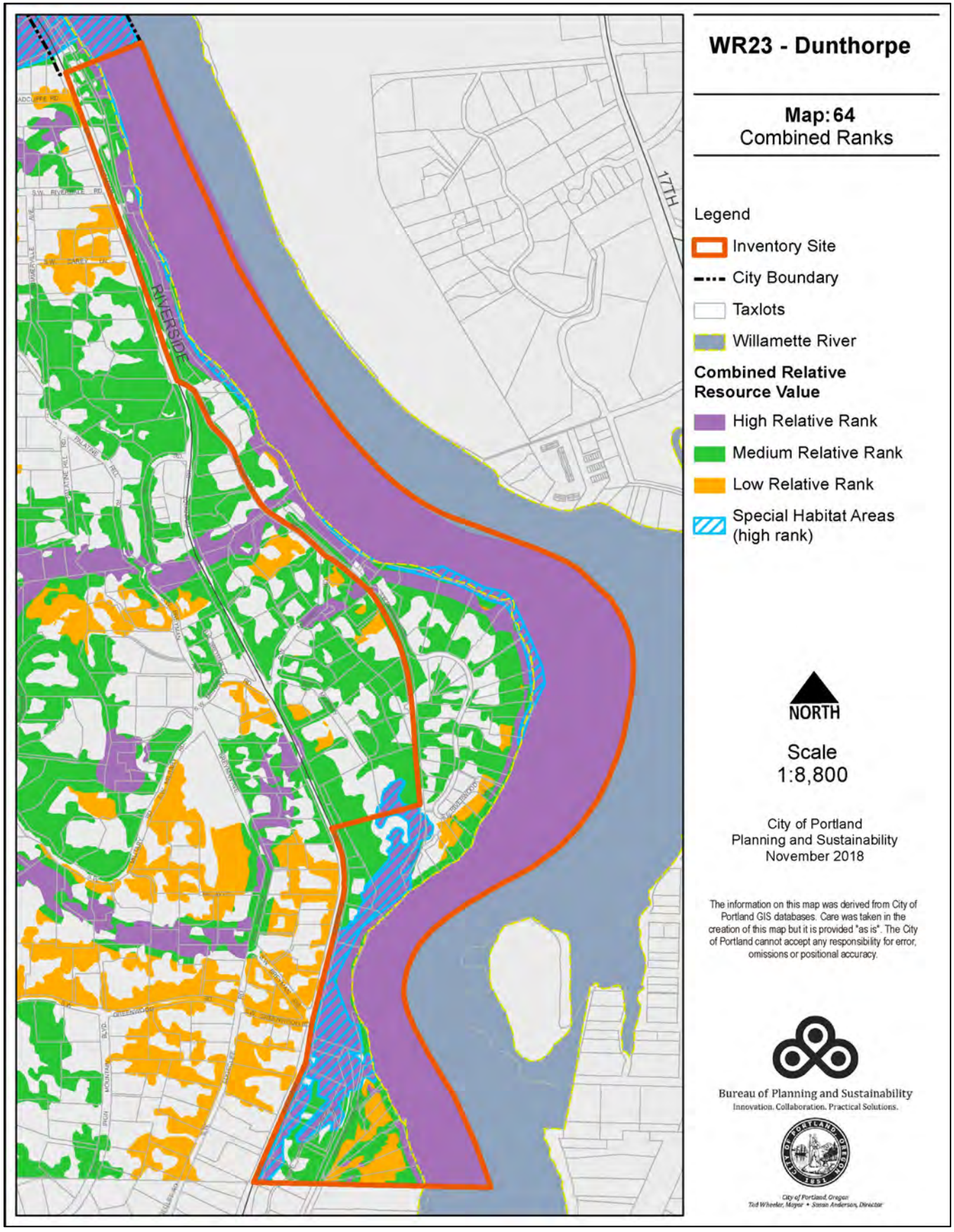
WR23 - Dunthorpe
Map: 64
Combined Ranks
Legend
Inventory Site
City Boundary
Taxlots
Willamette River
Combined Relative Resource Value
High Relative Rank
Medium Relative Rank
Low Relative Rank
Special Habitat Areas (high rank)
RIVERSIDE
17TH
NORTH
Scale 1:8,800
City of Portland
Planning and Sustainability
November 2018
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