



An Introduction to the Port of Portland's Natural Resources Inventory

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The Port of Portland's Natural Resources policy calls for the Port to seek opportunities to enhance and sustain natural resources when we plan, develop, or otherwise operate our marine and aviation facilities and industrial lands. To support the Port's overall transportation mission while helping to implement this policy, the Port maintains a Natural Resources Inventory (NRI) of Port lands. The NRI is a natural resources mapping and inventory tool that enables the Port to make ecologically-sound planning decisions and develop long-term resource management strategies integrated with Port operations.

Overview of the Inventory and How It's Used

The Natural Resources Inventory characterizes and maps Port properties in terms of existing land cover, wildlife habitat, and vegetation. It was completed using geographic information systems (GIS) and on-the-ground observations of Port property to define existing resource habitat type. By assessing natural and anthropogenic resources, we're able to evaluate contextual relationships between different Port properties, the Portland metropolitan area, and the entire region—information that can be used during long-range strategic planning efforts and during design and implementation of environmentally sensitive projects. Information gathered in the NRI is consulted to support day-to-day resource management and monitoring activities as well as project-specific and Port-wide planning initiatives.

As examples, Port Natural Resource staff query the NRI to provide support to project managers in the design and implementation of projects. The NRI also helps Natural Resource staff provide valuable information to planners so that natural resources on Port properties can be considered, in context with the surrounding landscape, during long-range strategic planning efforts.

Resource Inventory and Classification Scheme Creation

For the inventory, the Port wanted to use a systemic, scientifically accepted classification system. We examined several classification schemes used by other agencies and organizations in the Portland area and ultimately settled on a wildlife-habitat relationship schema developed to classify natural resources in the Willamette Valley, the Columbia Basin, and other areas of Oregon, Washington, and Idaho. This vegetation classification system is based on the classification schemes and methodology outlined in *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson, and O'Neil, 2001). Of the 32 classes included in Johnson and O'Neil, only seven apply to the Portland metro area. All seven, plus one additional class, make up the regional classes in the Port's NRI.

The Port also wanted to capture more detail about actual plant communities and species present on Port properties, so we internally developed a local classification system that includes 44 local classes. Definitions of each of the regional and local classes are included in this document.

How Data Were Gathered

The NRI was developed using a combination of GIS data and on-the-ground field work. Aerial photographs were initially used to determine the boundaries of vegetation communities and wildlife habitat on Port-owned property. Digitized wildlife habitat boundaries were then overlaid on aerial photographs and provided to field crews, who groundtruthed data on the various vegetation communities and wildlife habitats. Maps were organized into polygons, and whenever necessary, field crews modified the polygon boundaries to reflect on-ground conditions.

Database

A database was developed to manage the data collected from the resource inventory. Each patch of vegetation represents a distinct community and is tied to a unique site number. For each site, the database contains information such as location, the appropriate regional and local wildlife-habitat classification, dominant vegetation species (trees, shrubs, herbs), dominant tree and shrub characteristics (size, percent cover, number of canopy layers, etc.), structural conditions, proximity to water, type of water present, presence of aquatic or emergent vegetation, bank type, surficial material, presence of snags and down wood, habitat connectivity, barriers to fish and wildlife movement, exotic animals and plants, existing restoration efforts or opportunities, current management activities, observations of wildlife activity, and many other habitat elements.

Mapping

Using data gathered during the inventory process, Port employees created maps of Port properties. These maps identify the location of existing habitat types at both the "regional" and "local" classification levels. Using the database, a search can be performed for any desired data field and that particular type of feature can be mapped (e.g. all polygons that are "connected" to a "wetland" can be selected and mapped). See attached West Hayden Island (WHI) map as an example of maps that can be created using the inventory data.

Regional Wildlife-Habitat Classification Descriptions

The wildlife habitat classification definitions listed below are from the classification descriptions outlined in *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson, D. H. and T. A. O'Neil. 2001). These classifications make up the regional classes of the Port's NRI.

1 - WESTSIDE LOWLAND CONIFER-HARDWOOD FOREST

This is the most extensive habitat in the lowlands on the western side of the Cascades, except in southwestern Oregon, and forms the matrix within which other habitats occur as patches, especially Westside Riparian-Wetlands and less commonly Herbaceous Wetlands or Open Water. It also occurs adjacent to or in a mosaic with Urban or Agriculture habitats. In the driest areas, it occurs adjacent to or in a mosaic with Westside Oak and Dry Douglas-fir Forest and Woodlands. Bordering this habitat at upper elevations is Montane Mixed Conifer Forest. Along the coastline, it often occurs adjacent to Coastal Dunes and Beaches. In southwestern Oregon, it may border Southwest Oregon Mixed Conifer-Hardwood Forest. The primary land use for this habitat is forestry.

2 - WESTSIDE OAK AND DRY DOUGLAS-FIR FOREST AND WOODLANDS

This habitat is found in a mosaic with, or adjacent to, Westside Grasslands, Westside Lowlands, Conifer-Hardwood Forest, Westside Riparian-Wetlands, Southwest Oregon Mixed Conifer-Hardwood Forest, Urban, and Agriculture. Inclusions of Open Water or Herbaceous Wetlands sometimes occur. In the Puget Lowland, this habitat is sometimes found adjacent to Puget Sound (Nearshore Marine). Land use of this habitat includes forestry (generally small scale), livestock grazing, and low-density rural residential.

19 - AGRICULTURE, PASTURE, AND MIXED ENVIRONS

Agricultural habitat occurs within a matrix of other habitat types at low to mid-elevations, including Eastside grasslands, Shrubsteppe, Westside Lowlands, Conifer-Deciduous Forest and other low- to mid-elevation forest and woodland habitats. This habitat often dominates the landscape in flat or gently rolling terrain, on well-developed soils, broad river valleys, and areas with access to

abundant irrigation water. Unlike other habitat types, agricultural habitat is often characterized by regular landscape patterns (squares, rectangles, and circles) and straight borders because of ownership boundaries and multiple crops within a region. Edges can be abrupt along the habitat borders within agricultural habitat and with other adjacent habitats.

20 - URBAN AND MIXED ENVIORNNS

Urban development occurs within or adjacent to nearly every habitat type in Oregon and Washington, and often replaces habitats that are valuable for wildlife. The highest urban densities normally occur in lower elevations along natural or human-made transportation corridors, such as rivers, railroad lines, coastlines, or interstate highways. These areas often contain good soils with little or no slope and lush vegetation. Once level areas become crowded, growth continues along rivers or shores of lakes or oceans, and eventually up elevated sites with steep slopes or rocky outcrops. Because early settlers often modified the original landscape for agricultural purposes, many of our urban areas are surrounded by agricultural and grazing lands.

21 - LAKES, RIVERS, PONDS, AND RESERVOIRS

This habitat occurs throughout Washington and Oregon. Ponds, lakes, and reservoirs are typically adjacent to Herbaceous Wetlands, while rivers and streams adjoin the Westside Riparian-Wetlands, Eastside Riparian-Wetlands, Herbaceous Wetlands, and Bays and Estuaries habitats.

22 - HERBACEOUS WETLANDS

Herbaceous wetlands are found in all terrestrial habitats except Subalpine Parkland, Alpine Grassland, and Shrublands habitats. Herbaceous wetlands commonly form a pattern with Westside and Eastside Riparian-Wetland and Montane Coniferous Wetlands habitats along stream corridors. These marshes and wetlands also occur in closed basins in a mosaic with open water by lakeshores or ponds. Extensive deflation plain wetlands have developed between Coastal Dunes and Beaches habitat and the Pacific Ocean. Herbaceous wetlands are found in a mosaic with alkali grasslands in the Desert Playa and Salt Scrub habitat.

23 - WESTSIDE RIPARIAN – WETLAND

This habitat typically occupies patches or linear strips within a matrix of forest or regrowing forest. The most frequent matrix habitat is Westside Lowlands Conifer-Hardwood Forest. If not forest, the matrix can be Agricultural, Urban, or Coastal Dunes and Beaches habitats, or rarely Westside Grasslands or Ceanothus-Manzanita Shrublands. This habitat also forms mosaics with or includes small patches of Herbaceous Wetlands. Open Water habitat is often adjacent to Westside Riparian-Wetlands. The major land use of the forested portions of this habitat is timber harvest. Livestock grazing occurs in some areas. Peat mining occurs in some bogs.

23.1 - WESTSIDE RIPARIAN – NONWETLAND

This habitat is the same as the Westside Riparian –Wetland described above with the exception that wetland hydrology and hydric soils are absent and the flora is dominated by non-hydrophytic, upland species.

Local Wildlife-Habitat Classification Descriptions

This classification system was developed internally at the Port to help define natural resources characteristics of Port-owned property.

Wildlife Habitats - Local	Definitions
Blackberry Scrub-Shrub	Typically occurs in recently disturbed upland areas and in upland areas adjacent to riparian zones and ponds, however may occur in wetlands. This habitat is dominated by dense thickets of Himalayan blackberry (<i>Rubus discolor</i>), often interspersed with other ruderal species, sparse willow (<i>Salix</i> spp.) and/or black cottonwood (<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>).

Channel	Bed and banks of waterway, usually used to describe waterways that are dry for portions of the year and that do not fit ditch, stream, or river definitions. May include abandoned (permanently dry) streambed or ditch.
Conifer	Areas dominated by coniferous trees of various sizes, including species such as Douglas fir and Western red cedar etc.
Conifer (Planted)	Areas dominated by coniferous trees of various sizes, including species such as Douglas fir and Western red cedar etc. Planting project.
Cottonwood	Dominated primarily by cottonwood trees; may include trees of various sizes.
Cottonwood, Willow Scrub-Shrub	Dominated by cottonwood and/or willow trees less than 6 meters high. May occur in upland areas similar to those dominated by blackberry scrub-shrub.
Cottonwood, Willow Scrub-Shrub (Planted)	Dominated by cottonwood and/or willow trees less than 6 meters high. May occur in upland areas similar to those dominated by blackberry scrub-shrub. Planting project.
Cottonwood, Willow, Ash Forest	May occur in upland areas, wetlands, and riparian corridors. Habitat is dominated by cottonwood, willow, and/or Oregon ash (<i>Fraxinus latifolia</i>), often with a well developed understory. In upland sites, the understory may be composed of bittersweet nightshade (<i>Solanum dulcamara</i>), reed canarygrass (<i>Phalaris arundinacea</i>), etc.
Cottonwood, Willow, Ash Forest (Planted)	May occur in upland areas, wetlands, and riparian corridors. Habitat is dominated by cottonwood, willow, and/or Oregon ash (<i>Fraxinus latifolia</i>), with a well developed understory. In upland sites, the understory may be composed of bittersweet nightshade (<i>Solanum dulcamara</i>), reed canarygrass (<i>Phalaris arundinacea</i>), etc. Planting project.
Cultivated - Bareground/Irrigated	Category used to describe areas that are routinely cultivated, but which may have bare ground for portions of the year. Includes irrigated areas.
Developed - Cultivated	Category used to describe developed areas that are landscaped with trees, shrubs, or grasses (lawn).
Developed - Pervious	Category used to describe areas where vegetation has been removed and development or significant impact has occurred, although percolation of stormwater may still be possible (e.g. dirt lot).
Developed - Impervious	Category used to describe areas where vegetation has been removed and development has occurred; includes areas covered with asphalt and concrete where percolation of stormwater has been effectively eliminated.
Ditch	Artificially constructed waterway designed to convey stormwater and surface water; may include heavily degraded or manipulated drainageways that were once natural; may undergo significant maintenance.
Ditch - Roadside	Artificially constructed waterway designed to convey stormwater and surface water runoff from impervious surface of roadway or occasionally, runway features.
Emergent Wetland	Habitat typically occurs in littoral zone of permanent ponds; in seasonal, temporary ponds; and on stable stream banks or ditch banks that are not eroded by waves or currents. These wetlands are dominated by erect, rooted, often perennial, herbaceous hydrophytes. Common plant species include smartweed

	(Polygonum sp.), reed canarygrass (Phalaris arundinacea), Columbia sedge (Carex aperta), etc.
Emergent Wetland (Planted)	Habitat typically occurs in littoral zone of permanent ponds; in seasonal, temporary ponds; and on stable stream banks or ditch banks that are not eroded by waves or currents. These wetlands are dominated by erect, rooted, often perennial, herbaceous hydrophytes. Common plant species include smartweed (Polygonum sp.), reed canarygrass (Phalaris arundinacea), Columbia sedge (Carex aperta), etc. Planting or mitigation project.
Grass/Forb - Mowed	Open grassy areas that are mowed for vegetation management; commonly found around runways and associated facilities. May include a variety of grass species.
Gravel Bar	Small island of gravel present in river channel.
Hardwood	Stand of trees or forested area dominated by deciduous trees. May include Big leaf maple, cottonwood, alder, ash, etc. and may include a variety of age classes and understory species.
Hardwood (Planted)	Stand of trees or forested area dominated by deciduous trees. May include Big leaf maple, cottonwood, alder, ash, etc. and may include a variety of age classes and understory species. Planting project; plantings may involve non-deciduous tree species, shrubs, or herbs/forbs.
Herbaceous Upland	Typically, grassy upland areas that do not fit into either the grass/forb mowed, developed cultivated, or pervious wasteland/barren/weedy fill designations. May include native and non-native species.
Herbaceous Upland (Planted)	Typically, grassy upland areas that do not fit into either the grass/forb mowed, developed cultivated, or pervious wasteland/barren/weedy fill designations. May include native and non-native species. Planting project.
Herbaceous Wetland	Wet meadows, marshes, fens, and aquatic beds are included in this habitat type. These are typically wetlands or riverine floodplains that are dominated by herbaceous vegetation. Common dominants include cattails, sedges, grasses, bulrushes, or various forbs. Generally, no shrubs or trees are present.
Herbaceous Wetland (Planted)	Wet meadows, marshes, fens, and aquatic beds are included in this habitat type. These are typically wetlands or riverine floodplains that are dominated by herbaceous vegetation. Common dominants include cattails, sedges, grasses, bulrushes, or various forbs. No shrubs or trees are typically present. Planting project or mitigation project.
Improved Pasture - Perennial Grass Seed/Hay	Typically associated with general aviation facilities and other areas where hay or crop production may occur. Variety of grass species may be present.
Mixed Conifer-Hardwood	Areas dominated by a mixture of coniferous and deciduous trees. May include Big leaf maple, alder, Douglas fir, Western red cedar, etc.; may include several strata and diverse assemblage of understory species.
Mixed Conifer-Hardwood (Planted)	Areas dominated by a mixture of coniferous and deciduous trees. May include Big leaf maple, alder, Douglas fir, Western red cedar, etc.; may include several strata and diverse assemblage of understory species. Planting project.

Pervious Wasteland/Barren/Weedy Fill	Open areas with minimal management, may include dredge spoil disposal sites, fill storage areas, and other open weedy fields and equipment storage areas that do not meet other habitat descriptions.
Pond	Small area of still water; can include man-made structures that demonstrate significant ponding.
Railroad - Crushed Rock	Railroad right-of-way with crushed rock surface.
Railroad - Gravel	Railroad right-of-way with gravel surface.
Railroad - Paved	Railroad right-of-way with paved surface.
River	A large natural stream of water flowing in an open channel.
River Beach (Modified/Protected)	Riverbank that has been engineered or armored to protect against erosion or to provide development opportunities.
River Beach (Natural)	Riverbank that is natural and has not been armored. May include sandy or rocky shorelines.
Road - Crushed Rock	Roadway comprised of primarily crushed rock.
Road - Dirt	Roadway comprised of primarily dirt.
Road - Gravel	Roadway comprised of primarily gravel.
Road - Paved	Roadway comprised of pavement.
Savannah	Grassy plain, exposed to hot summer sun, few trees.
Scrub-Shrub	Dominated by shrubs and trees less than 6 meters high; may include a variety of species - intended to serve as catch-all for scrub-shrub habitats dominated by species other than those specifically identified as scrub-shrub habitat in remainder of habitat definitions (e.g. willow scrub-shrub).
Scrub-Shrub (Planted)	Dominated by shrubs and trees less than 6 meters high; may include a variety of species - intended to serve as catch-all for scrub-shrub habitats dominated by species other than those specifically identified as scrub-shrub habitat in remainder of habitat definitions (e.g. willow scrub-shrub). Planting project.
Stream	Waterway demonstrating natural stream characteristics; typically not ditched or otherwise diverted. Small body of water flowing in open channel.
Unimproved Pasture - No Active Management	Typically associated with general aviation facilities and other areas where grazing may occur. A variety of grass species may be present; scattered shrubs and trees may also occur in very limited quantity.
Water Related Structure	Typically associated with marine facilities, includes boat docks, boat ramps, pilings, and other man-made structures.

References

Johnson, David H., and Thomas A. O'Neil, eds. 2001. *Wildlife-habitat relationships in Oregon and Washington*. 1 ed. Corvallis, OR: Oregon State University Press.